Demography (2016) 53:777–804
DOI 10.1007/s13524-016-0478-6

The Family Life Course and Health: Partnership, Fertility Histories, and Later-Life Physical Health Trajectories in Australia

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Abstract Life course perspectives suggest that later-life health reflects long-term social patterns over an individual's life: in particular, the occurrence and timing of key roles and transitions. Such social patterns have been demonstrated empirically for multiple aspects of fertility and partnership histories, including timing of births and marriage, parity, and the presence and timing of a marital disruption. Most previous studies have, however, addressed particular aspects of fertility or partnership histories singly. We build on this research by examining how a holistic classification of family life course trajectories from ages 18 to 50, incorporating both fertility and partnership histories, is linked to later-life physical health for a sample of Australian residents. Our results indicate that long-term family life course trajectories are strongly linked to later-life health for men but only minimally for women. For men, family trajectories characterized by early family formation, no family formation, an early marital disruption, or high fertility are associated with poorer physical health. Among women, only those who experienced both a disrupted marital history and a high level of fertility were found to be in poorer health.

Keywords Life course · Health · Fertility · Marriage · Sequence analysis

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Introduction

Marriage and parenthood have been shown to be associated with diverse health outcomes (Carr and Springer 2010; Umberson et al. 2010). Until recently, most of this work has focused on cross-sectional associations between family statuses and health, or on short-term changes in health associated with family transitions. Such analyses are limited in their ability to examine the lifelong histories of biological, social, and psychological development reflected in observed health differences. Drawing on life course traditions in sociology (Elder 1985; Elder and Giele 2009) and epidemiology (Kuh and Ben-Shlomo 2004; Kuh et al. 2003; Lynch and Smith 2005), a new body of research has emerged that links distinguishing characteristics of marital and fertility trajectories (observed over an extended period of the adult life course) with health outcomes distant in time. This study aims to characterize marital and fertility trajectories by the occurrence and timing of significant events such as marriage, divorce, or childbirth in order to ascertain whether particular types of family life courses are associated with later health (e.g., Dupre and Meadows 2007; Grundy and Kravdal 2010; Hughes and Waite 2009).

With some notable exceptions (Henretta 2007; Kravdal et al. 2012; Sabbath et al. 2015; Williams et al. 2011), most research has focused on marital or fertility histories as independent predictors of health. However, there are compelling reasons to suggest that marital and fertility trajectories will be interdependently related to health. As Macmillan and Copher (2005) argued, marital and fertility histories are deeply entangled given that the resources and demands associated with a role in one social domain may complement or conflict with the performance of other roles. The cross–social domain dependencies (e.g., between marriage and parenthood, or work and family) modify the experience and consequences of each role contingent on the other roles occupied by an individual.

Empirical support for the interdependent effects of marriage and fertility on long-term health has emerged from a small group of studies that have considered the issue. For instance, Alter et al. (2007) found that high fertility led to excess mortality for women widowed early in their lives but that this effect diminished with older age at widowhood. Kravdal et al. (2012) also analyzed mortality and found multiple interdependent effects of fertility and partnership histories. For instance, multipartner fertility, an interaction of parity and marital history, and the timing of fertility and marital events *vis-à-vis* one another were all related to mortality. Last, both Henretta (2007) and Williams et al. (2011) found that a nonmarital birth was negatively associated with women's health later in life, with Williams and colleagues also reporting that this effect depended on the woman's subsequent marital relationship with the father. Both theory and empirical evidence therefore suggest the importance of research that addresses the question of how marital and fertility trajectories jointly influence health.

This article contributes to our understanding of the long-term health consequences of marital and fertility trajectories by using a holistic classification of marital and fertility trajectories from ages 18 to 50 to predict later-life physical health, measured using the physical health component of the SF-36 (Ware et al. 2000). Although several previous studies have examined joint fertility and partnership history classifications in relation to different aspects of health or at different life stages (Barban 2013; Kravdal et al. 2012), we are unaware of any previous work that has considered how long-term family life course trajectories are implicated in physical health in middle and older age. Consistent with life course theory (Elder 1985; Macmillan and Copher 2005), we use multichannel sequence analysis (Gauthier et al. 2010) to group persons with similar family life course trajectories, incorporating the occurrence, number, and timing of fertility and marital events (childbirth, marriage, and marital disruption).

Conceptual Background

Conceptualizing the Family Life Course

Macmillan and Copher (2005:860) stated that the life course is "characterized by *the interlock of multiple role trajectories....*[It is] the dynamic, interconnected unfolding of trajectories and transitions over time." Unpacking this definition, the basic conceptual element of the life course approach is the role—a position within a social institution (such as family or the labor market) that carries with it behavioral expectations and resources (Stryker 1980). Roles are organized both (1) *temporally*, into trajectories of roles occupied sequentially over the life of an individual (Elder and Giele 2009; George 2009), and (2) across social *domains*, into role configurations (Macmillan and Copher 2005) that index the multiple roles occupied by an individual. Within this broader framework, the role trajectories most typically associated with "the family"—partnership and parenthood—may be referred to as the *family life course*. We can further define *family life course trajectory* as the combined history of partnership and parenting roles occupied by an individual over the life course.

The second key concept in the life course approach is resources. Following Sewell (1992), *resources* are defined broadly as anything that enables the exercise of power in social settings: that is, enables human agents to act in particular ways. This includes human resources (e.g., various forms of capital or knowledge, physical attributes of a person, reputation, authority), nonhuman resources (money, housing, commodities), and time required to act. Agents use resources to enact particular behaviors, including *role performance behavior*: that is, those actions that are socially desirable for persons occupying any given role. In turn, role structures across key social institutions (particularly the labor market, family, and welfare state) provide the central channels through which resources are produced and distributed. Consequently, dynamic tension exists between the role configuration occupied by an actor and the resource set available to the actor for role performance (and other behaviors). The cross-domain dependency created by the demands and resources associated with an individual's multiple roles creates life course dynamics: the age-structured development of an individual over multiple dependent social domains (Elder 1985; Elder and Giele 2009; Macmillan and Copher 2005).

The recognition that role performance both demands and produces resources and that individuals occupy multiple concurrent and sequential roles links the family life course with broader stratification processes through the concept of cumulative advantage (Dannefer 2003; DiPrete and Eirich 2006; O'Rand 2002). Originally introduced to the social sciences by Merton (1968), *cumulative advantage* refers to snowballing stratification processes, in which early advantage compounds to produce subsequent advantage. In Merton's original example, this plays out in scientific careers: early indicators of successful role performance (e.g., citations) are leveraged into resources (e.g., grant money, access to collaborators) that enhance subsequent productivity in a recursive cycle. Applying this to the life course as interlocking role trajectories, life course stratification may be conceptualized as a multidimensional, cumulative advantage process.

Scholars commonly stress the principle of timing—that the meaning and significance of a role, a transition, or an event depends on when it occurs in an individual's developmental trajectory—in understanding the life course (Elder and Giele 2009). The most common sense of timing is *transition timing*, the age at which a transition between two roles (such as marriage or first birth) occurs. Transition timing is significant because off-time transitions are more likely to entail role-performance expectations without the appropriate resource set. This may lead to role-performance failure, either in the new social role or in other concurrent roles, contributing to the cumulative advantage process. Applied to multiple transitions, transition timing implies duration (cumulative time in a particular role) and sequencing (temporal ordering of roles) (Barrett 2000; Dupre and Meadows 2007).

Life course pathways are strongly patterned by gender; women and men typically occupy different role configurations over the life course and command different resource sets (Bianchi et al. 2006; Chesters et al. 2009). For instance, gender role ideologies dominant in mid-twentieth century Western nations positioned women as responsible for unpaid care work (in particular, childcare and housework) and concomitantly presuppose that women will cease labor market participation upon marriage. Men, on the other hand, were expected to act in the family as breadwinners, employed full-time with little responsibility for the home. Over the latter half of the twentieth century and early twenty-first century this division weakened considerably (but did not disappear), with Australian women's labor force participation increasing from 34 % in 1961 to 59 % in 2011, a change that has been driven by women aged 25–59 (Australian Bureau of Statistics 2011). Part-time employment now represents a large share of women's employment at all ages, particularly for those aged 15–24 and 35–59. For men, overall labor force participation has decreased from 82 % to 72 % from 1961 to 2011. Part-time work has also increased for men but is concentrated at younger and older ages, with less than 10 % of men aged 25–59 working part-time. Hours spent on housework has also become more equal because of a large reduction in women's housework time (Baxter 2002), although women's housework time remains strongly tied to partnership and fertility transitions, while men's is largely unresponsive to those transitions (Baxter, et al. 2008). These patterns suggest that family life course trajectories are likely to have different health consequences, depending on sex.

In order for the family life course to become embodied as health stratification, some biological process must mediate between social position and health outcomes. The central concept that describes this process during adulthood is *accumulation of risk* (Kuh et al. 2003), which posits that "life course exposures or insults gradually accumulate through episodes of illness and injury, adverse environmental conditions, and health damaging behaviors" (p. 779). Many exposures may operate in tandem to produce health outcomes, including diet (Darnton-Hill et al. 2004), physical activity (Dodds et al. 2013; Hillsdon et al. 2005), stress (McEwan 2007), alcohol (Rehm et al. 2009), and smoking (Mathers et al. 2009).

Family life course trajectories may link to the accumulation of risk process in several distinct ways. First, role performance may involve health-related behaviors directly. For example, marriage is commonly associated with the expectation of "cleaning up one's act," and consequently desisting from or limiting alcohol and substance use (Duncan et al. 2006). Short- and long-term resource constraints arising from role-performance demands and the cumulative advantage process may also independently limit actors' ability to pursue healthy behaviors.

Empirical Literature Review

Fertility History and Health

Perhaps the most heavily studied aspect of fertility history is parity (number of live births), which is associated with numerous disease and mortality outcomes (Grundy and Kravdal 2010; Hurt et al. 2006). Typically, studies report a U- or J-shaped relationship between parity and all-cause mortality (Doblhammer 2000; Hurt et al. 2006) or cardiovascular disease (Jaffe et al. 2011; Lawlor et al. 2003; Parikh et al. 2010), a positive relationship between parity and type 2 diabetes (Mueller et al. 2013; Nicholson et al. 2006), and a variable (although more commonly negative) relationship for different cancers (Guan et al. 2013; Kaae et al. 2007; Kelsey et al. 1993; Molokwu et al. 2007). Because research linking parity to health has principally focused on direct physiological consequences of pregnancy and childbearing, most studies have excluded men. Those that have included men have found that for all-cause mortality and most disease types, a similar relationship holds for both sexes (Grundy and Kravdal 2008; Keizer et al. 2012; Kravdal 1995; Lawlor et al. 2003), suggesting that the bulk of the association between parity and health may be attributable to behavioral changes.

Studies linking parity to general or functional health status in later life are less common. In the earliest study we are aware of, Kington et al. (1997) reported that women's parity was negatively associated with general health and that parities of six or higher were associated with an increased likelihood of physical role limitation. A number of studies have since confirmed a negative relationship between high parities and general or self-rated health status for women (Grundy and Holt 2000; Read et al. 2011; Sudha et al. 2006), although Hank (2010) found that high parity was *positively* related to self-rated health for West German women but not for their East German counterparts. Hank (2010) also found that high parity was positively associated with self-rated health for West German men, whereas Read and Grundy (2011) found an inconsistent relationship for British men. Several studies also examined activities of daily living (ADL) limitations or the presence of a disability or health limitation but presented conflicting results. Spence (2008) and Engelman et al. (2010) examined women's parity in relation to ADL limitations and found nonsignificant results. However, Grundy and Holt (2000), Grundy and Tomassini (2005), Akin et al. (2010), and Aiken et al. (2012) found that high parity was associated with increased likelihood of disability or health limitation for women, and Read et al. (2011) found that both women without children and those with four or more children had an elevated risk of health limitations. For men, Engelman et al. (2010) found that parity was positively related to number of ADL limitations in Egypt, and Read et al. (2011) reported that men with three or more children had more health limitations.

Age at first birth has also been linked with health outcomes (Grundy and Kravdal 2008; Grundy and Tomassini 2005; Merrill et al. 2005; Mirowsky 2002, 2005; Spence and Eberstein 2009). For women, most studies have found a negative association between age at first birth (often defined categorically as on-time vs. early first birth) and mortality risk (Doblhammer 2000; Grundy 2009; Grundy and Kravdal 2008; Grundy and Tomassini 2005). This relationship has been reported also for cardiovascular disease mortality (Chang et al. 2011), diabetes-related mortality (Vandenheede et al. 2012), and various other causes of death (Grundy and Kravdal 2010). Mirowsky (2002, 2005) found an optimal age at first birth for women's health in the early 30s, and a negative linear relationship between age at first birth and mortality risk. Early first births have also been found to increase men's likelihood of death and chronic disease (Grundy and Kravdal 2008, 2010; Mirowsky 2002; Pudrovska and Carr 2009). Poorer general health and higher risk of disability or health limitations have also been linked to early first births for men and women (Grundy and Holt 2000; Grundy and Tomassini 2005; Hank 2010; Kington et al. 1997; Read et al. 2011; Spence 2008). In sum, early age at first birth has been consistently linked to poorer later-life outcomes across multiple aspects of health for men and women, with the exception of some cancers.

Marital History and Health

Research linking marital histories to health has studied several distinct aspects, including cumulative time spent in different states (e.g., married, divorced, widowed), age at first marriage, and the number of marital disruptions (divorce, separation, widowhood). These characteristics are hypothesized to affect health in a number of ways. Time spent married is argued to be positively related to health because of the cumulative effects of social, emotional, and financial support from one's partner and social control of deleterious health-related behaviors (Bachman et al. 2002; Dupre and Meadows 2007). Empirically, several studies have supported this association for outcomes such as self-rated health (Grundy and Holt 2000), disability (Grundy and Holt 2000), incident chronic disease (Dupre and Meadows 2007), and mortality (Brockmann and Klein 2004; Dupre et al. 2009; Henretta 2010; Lund et al. 2004). McFarland et al. (2013) found that accumulated marital duration was negatively associated with biological markers of cardiovascular risk (but not metabolic risk or inflammation risk) in women but not significantly related to biological risk markers in men. A number of studies have also shown that time spent in a disrupted marital state (divorce/separation/widowhood) is negatively related to health (Berntsen and Kravdal 2012; Dupre and Meadows 2007; Hughes and Waite 2009).

Age at first marriage occupies an ambiguous position in this literature. On one hand, earlier age at first marriage implies, *ceteris paribus*, longer accumulated marriage duration and thus better health. However, early age at first marriage has also been linked to disadvantaged socioeconomic pathways and increased likelihood of marital disruption (Alexander and Reilley 1981; Booth and Edwards 1985; Heaton 1991). In conjunction with the hypothesized effect of marriage duration, this suggests a nonlinear relationship, with an optimum time for marriage that does not interfere with educational and labor market participation but maximizes the health benefits of marriage. Available research tends to support the idea that an early marriage is detrimental to health outcomes (Dupre et al. 2009; Grundy and Holt 2000); however, some studies have also found that late marriage is protective or have reported a positive linear relationship between age at marriage and health (Dupre et al. 2009; Hughes and Waite 2009;

McFarland et al. 2013). Contradictory evidence has also been found by Henretta (2010), who found no significant relationship between age at marriage and mortality, and Brockmann and Klein (2004), who found that older age at marriage was positively related to mortality. There is, therefore, considerable uncertainty regarding the association between age at marriage and health outcomes.

Marital disruptions are the third major component of marital trajectories that has been linked to health outcomes. In addition to reducing marriage duration, marital disruptions are commonly argued to represent major stressful life events with separate negative health consequences (Booth and Amato 1991). Research has found mixed support for this conjecture. Several studies have reported that although marital disruptions impact on health in the short term, these effects dissipate over time (Thierry 2000; Williams and Umberson 2004). Conversely, multiple studies have found that the presence and number of marital disruptions is harmful for later health, including mortality (Blomgren et al. 2012; Dupre et al. 2009; Henretta 2010), chronic conditions (Dupre and Meadows 2007; Hughes and Waite 2009; Zhang 2006), mobility limitations (Hughes and Waite 2009), and biological risk markers (McFarland et al. 2013).

Joint Effects of Marital and Fertility Histories on Health

Only a limited number of studies have considered joint long-term effects of fertility and partnership histories on health—with those that have done so typically addressing only interactions between limited aspects of each. Both Henretta (2007) and Williams et al. (2011) examined how marital status at first birth affects women's subsequent health. These studies found that a nonmarital first birth reduced women's health much later, across multiple dimensions of health, including self-rated health, mortality, and chronic disease. Williams et al. (2011) additionally found that this effect was ameliorated for women who later entered into an enduring marriage with the child's biological father. Barban (2013) investigated how family formation trajectories (incorporating fertility and partnership histories at ages 15–30) were associated with women's self-reported health, depression, smoking, and drinking at ages 30–32, and found that trajectories characterized by single motherhood and long-term cohabitation had poorer self-rated health and (for cohabiters) increased depressive symptoms compared with the "late transitions" group with delayed family formation. Similarly, Sabbath et al. (2015) modeled all-cause mortality risk among U.S. women in relation to their family histories, finding that single-mothers and nonworking married mothers exhibited higher mortality risk than married mothers with consistent employment histories.

Alter et al. (2007) found that high parity was associated with elevated mortality risk among widowed women in nineteenth century Europe but that this excess risk was attenuated when the widowhood occurred at an older age. They interpreted this to mean that younger children place demands on the widow's resources, leading to elevated poverty, stress, and mortality, whereas older children would have helped the family through employment. Kravdal et al. (2012) also examined mortality, using Norwegian register data. Because of the large number of observations in their data, they were able to construct a fine-grained joint classification of fertility and partnership histories, including information on current marital status, previous experience of marital disruptions, number of children, and multipartner fertility. Their results both confirmed some previous observations regarding separate effects of fertility and partnership histories and indicated some interdependence. For instance, they found that parity was more strongly related to mortality among never-married than among the currently or previously married, that multipartner fertility was associated with increased mortality, and that the effect of divorce depended (in particular for men) on the age of the oldest child at the time of the disruption (Kravdal et al. 2012). The limited available evidence, therefore, supports the suggestion that considerable interdependence is likely to exist in the processes whereby fertility and partnership histories contribute to later-life health outcomes. Of the studies that we are aware of, only three have used a comprehensive measure of family life course trajectories, and they examined only self-rated health at a relatively young age (Barban 2013) and mortality (Kravdal et al. 2012).

Summary

Epidemiologic theory (Kuh et al. 2003) indicates that health disparities develop gradually over adulthood, suggesting that point-in-time measures of fertility or partnership statuses may not adequately capture the links between these factors and health. Fertility and partnership roles are furthermore deeply interrelated (Macmillan and Copher 2005) given that the resources and demands associated with one role may modify the experience of another. Consequently, research that addresses how whole family life course trajectories are linked to later-life health is likely to offer additional insights. Previous studies that have investigated this topic indicate that family life course trajectories are linked to mortality (Kravdal et al. 2012) and self-rated health at ages 30–32 (Barban 2013). However, no studies have examined how family life course trajectories (incorporating fertility and partnership domains) are related to general and functional health at older ages. This article, therefore, contributes to the literature by examining this question.

Data and Methods

Sample and Variables

Data for the research were extracted from Waves 1–11 of the Household, Income and Labour Dynamics in Australia (HILDA) survey. HILDA is a multistage probability sample of Australian households followed from baseline in 2001 to Wave 11 in 2011. A full description of the sampling design, questionnaire, and interview processes is available in Watson and Wooden (2012). For this analysis, we restricted the sample to original sample members aged 51 or older at baseline in 2001, yielding a final analytical sample of 4,615 persons. Restricting the sample to older persons is necessary for two reasons. First, it allows us to operationalize family life course trajectories over a consistent age range (18–50) for each individual. Second, focusing on older persons ensures adequate variation in our key health measure.

Summary statistics for all variables included in the analyses are presented in Table 1. Data missing because of nonresponse or survey attrition (but not respondent mortality) on covariates (including family life course group) and the health outcomes were imputed using multiple imputation by chained estimates (Little and Rubin 2002; van Buuren 2007; White et al. 2011) in Stata 13.0. To allow fully for any potential differences in the patterns of associations between men and women, we performed imputation separately by sex.

The primary outcome—physical health—is measured using four subscales of the SF-36 (Butterworth and Crosier 2004; Ware et al. 2000), which is captured each wave in the self-complete section of HILDA. In early analyses, the *general health* (e.g., "I seem to get sick a little easier than other people"), *physical functioning* (e.g., "health now limits you […] lifting or carrying groceries"), *bodily pain* (e.g., "how much bodily pain have you had during the past 4 weeks?"), and *role physical* (e.g., "as a result of your physical health […] cut down the amount of time you spent on work or other activities"), scored according to standard rules, were considered separately (Ware et al. 2000). Because separate analyses of the subscales showed little difference in the pattern of results, we combined the four using principal components analysis. Previous work with the SF-36 suggests a single physical health component (Ware et al. 1998), and this was supported for our data. The first principal component (standardized to a mean of 50 and a standard deviation of 10 for person-years in our sample) was extracted and used as the dependent variable in subsequent analyses.

Family life course group was the primary explanatory variable. The derivation of this variable is described in detail shortly; however, in broad terms, it is a (retrospective) classification of different family life course patterns over the adult life course, from ages 18 to 50.

Background covariates in the analyses include age (at baseline in 2001), sex, immigration/indigenous status, father's occupational status at age 14, education,[1] family status at age 14, number of siblings, self-reported health in childhood (before age 15), parents' smoking in childhood (yes/no at any stage of childhood), whether the respondent ever missed a month of school because of poor health in childhood, height (deviation in centimeters from the age- and sex-specific mean), and mother's/father's ages at death. These variables were selected to account as fully as possible for early-life environments that might confound the association between family life course trajectory and health.

Data Analysis Strategy

Data analysis proceeded in two broad stages. In the first stage, we grouped sample members with similar fertility and partnership histories from ages 18 to 50 using sequence analysis (Abbott and Tsay 2000). The resulting classification of family life course trajectories forms the primary independent variable for the second stage of analysis, in which we analyzed physical health trajectories over the duration of the panel (when respondents are aged 51 and older) using a series of latent growth models (Bollen and Curran 2006). The aim of the analysis was to establish how different kinds of family life course trajectories are associated with physical health in later life; whether the association differs by sex, age, and time; and whether it is

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[1] Because education can overlap with the start of the family life course, it is possible that education mediates rather than confounds the association between family life course trajectory and later-life health. However, because education is a powerful predictor of health and is completed early in life for most respondents, it was considered preferable on balance to control for it. Excluding education from the models does not alter our findings.

Table 1 Summary statistics: Means or percentages

	Imputed %	Unimputed	Completed
Physical Health (2001)	14.5	50.7 (10.1)	50.3 (10.7)
Family Life Course Trajectory			
Standard – moderate fertility	7.7	17.9	17.9
Standard – high fertility		15.6	15.6
Early standard – low fertility		20.4	20.2
Early standard – moderate fertility		9.5	9.5
Early standard – high fertility		7.3	7.3
Late family formation		3.5	3.6
Premarital birth		2.2	2.2
Marriage without children		4.2	4.2
No family formation		6.0	6.0
Late marital disruption with children		3.1	3.1
Early marital disruption with children		3.0	3.0
Remarriage – children 1st marriage		4.2	4.1
Remarriage – no children 1st marriage		1.1	1.1
Disrupted marital history – high fertility		2.1	2.1
Demographics/Childhood Environment			
Age (2001)	0.0	64.1 (9.8)	N/A[a]
Female	0.0	52.4	N/A[a]
Immigration/indigenous status			
3+-generation Australian	3.6	55.7	55.8
2nd-generation immigrant		10.7	10.8
1st-generation immigrant – English-speaking background		16.8	16.7
1st-generation immigrant – non–English-speaking background		15.9	15.8
Aboriginal or Torres Strait Islander		1.0	1.0
Highest completed educational qualification			
Less than complete secondary school	0.1	53.4	53.4
Completed secondary school		7.5	7.5
Certificate/diploma		26.9	26.9
Bachelors degree or higher		12.3	12.3
Father's occupational status	3.0	39.4 (19.6)	38.6 (20.4)
Number of siblings	0.2	3.0 (1.9)	3.0 (1.9)
Self-reported general health in childhood	36.4	1.7 (1.0)	1.8 (1.4)
Either parent smoked	36.6	71.2	69.5
Missed a month of school because of poor health	36.4	12.0	15.7
Height (cm deviation from age × sex mean)	29.5	0.0 (6.9)	–0.1 (9.6)
Father survival status			
Died age <60	41.2	18.3	20.9
Died age 60–74		29.5	28.7
Died age 75+/Not deceased		52.3	50.4

Table 1 (continued)

	Imputed %	Unimputed	Completed
Mother survival status			
Died age <60	39.2	10.8	14.2
Died age 60–74		20.5	20.6
Died age 75+/Not deceased		68.7	65.2
Family situation at age 14			
Living with both biological parents	0.0	81.7	N/A[a]
Stepfamily		3.0	
Single-parent family		10.4	
Other (e.g., living with grandparents)		4.8	

Notes: Percentages may not sum to 100 because of rounding. Standard deviations are shown in parentheses.

[a] Not applicable because no cases were imputed.

robust to the inclusion of controls for a variety of childhood and early-life health, family, and socioeconomic factors that may confound the relationship.

Sequence Analysis

The goal of the sequence analysis was to efficiently group persons with similar family life course trajectories while capturing theoretically salient variation in the different aspects of fertility and partnership histories hypothesized to be important for health outcomes, including the occurrence and timing of key events (childbirth, marriage, and marital disruption) and the level of fertility. An alternative approach is to cross-classify the relevant events and timings; however, this approach was infeasible because of the many sparse cells in the survey data. Because the family life course has multiple dimensions, multichannel sequence analysis (Gabadinho et al. 2011; Gauthier et al. 2010) was chosen as the most appropriate method. Each respondent was coded on five channels (representing different aspects of their fertility and partnership histories[2]) for each year from age 18 to age 50, resulting in a sequence of 33 age-specific statuses for each channel. The five channels used in the analysis were (1) current marital status (married/not married); (2) cumulative number of marital transitions experienced (marriages and marital disruptions, including divorce, separation, or widowhood); (3) number of biological children ever born to date; (4) number of biological children aged 0–14 born in current marriage (standard parenting); and (5) number of biological children aged 0–14 not born in current marriage, including children not born in a marriage and children from a previous marriage (nonstandard parenting). Cohabitation

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[2] Fertility histories are constructed retrospectively on the basis of respondent age, children's age, children's ages at death, and reported dates of marriages and marital disruptions. A small number of cases (32) were cleaned of implausibly high, low, and internally inconsistent values. Regarding the quality of the measures generally, Mayer (2008) argued that the quality of retrospective reporting is not systematically worse than concurrent reporting and depends on salience and the degree to which the details in question are embedded in biographical and relational structures, which can serve as recall aids. This suggests that reporting is likely good for current marriage and children's ages but may be poorer for previous marriages, marital disruptions, and ages of children from previous relationships.

was excluded from consideration both because of measurement limitations (information was collected only on the first two cohabiting relationships) and because it was much less common among the cohorts included in the analysis (Dempsey and de Vaus 2004). A total of 4,261 persons with complete fertility and marital history data were included in the sequence analysis.[3]

Sequence analysis is a family of approaches to classifying longitudinal categorical data, which typically proceeds in two steps, each of which requires decisions from the analyst. The first step is the construction of a dissimilarity matrix quantifying the degree of difference between all pairs of observations in the data. The primary decision in this step is how substitution and insertion/deletion costs will be set, which defines the difference between elements in a sequence and hence sequences as a whole. In this study, the Hamming distance (no insertions/deletions) with user-defined substitution costs was chosen (substitution costs matrices are presented in Table 2). Hamming distance was considered appropriate because of the conceptual centrality of timing in our analysis. The principal alternative, optimal matching, was discarded because allowing insertion/deletion may lead to distortions in timing (Lesnard 2010). As further support for this assertion, a recent simulation study found that Hamming-based measures were particularly suitable for analyses focused on timing (Studer and Ritschard 2016). Hamming distance also has the advantage of being the simplest (and hence most transparent) alternative (Halpin 2014). Substitution costs were specified directly because alternatives, such as unitary substitution costs or transition-rate based costs, produced implausible results in our application.[4] We chose costs with the goal of giving approximately equal weight to partnership and fertility histories. Higher weight was given to the first instance of repeatable transitions (birth, marriage, and marital disruption) in order to more clearly differentiate family life course trajectories that include these events from those that do not. For example, the substitution cost for zero children/one child is specified as twice the substitution cost for one child/two children. The pairwise dissimilarity between any two family life course trajectories is equal to the sum of the 165 (5 channels × 33 years) element-wise substitution costs.

In the second step, we applied cluster analysis to the dissimilarity matrix derived from the sequence analysis to group similar sequences of events. We chose Ward's (1963) method as the clustering algorithm. In this approach, a decision on the number of groups is required for further analysis. This decision is typically made on the basis of a mix of empirical indicators, visual inspection of plots, and the theoretical suitability of the obtained groups (Everitt et al. 2011). Examination of the clustering dendrogram initially suggested a five-group solution. However, scatterplots of the first five dimensions of a classical multidimensional scaling solution and the Calinski-Harabasz index (Calinski and Harabasz 1974) did not provide any clear evidence of a natural or dominating separation of clusters in the data. Despite the lack of natural clusters, cluster analysis may still be useful as an efficient means of partitioning data into homogenous

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[3] We imputed family life course trajectory group for cases with missing sequence data prior to fitting the growth models.

[4] In particular, these substitution cost schemes fail to respect the natural ordering of states in the fertility and number of marital transitions channels. Furthermore, the alternative substitution cost schemes do not give any additional weight to the first instance of a given transition. This is significant for fertility, where it is reasonable to suggest that the distinction between no children and any children has some additional significance beyond differences in number of children.

Table 2 Substitution cost matrices

		(a)	(b)	(c)	(d)	(e)	(f)	(g)
	Not Married (a)	0						
Currently Married	Married (b)	1	0					
Number of Marital Transitions								
0	(a)	0						
1	(b)	1	0					
2	(c)	2	1	0				
3	(d)	3	2	1	0			
4	(e)	3.5	2.5	1.5	0.5	0		
…	…			+ 0.5/transition				
8	(g)	5.5	4.5	3.5	2.5	2	…	0
Number of Children[a]								
0	(a)	0						
1	(b)	1	0	0				
2	(c)	1.5	0.5	+ 0.5/child				
…	…							
14	(e)	7.5	6.5	6	…	0		

[a] Identical matrix used for number of children ever born, children aged 0–14 born in current marriage, and children aged 0–14 not born in current marriage channels.

subsets (Everitt et al. 2011), which is appropriate for this application. Because the purpose of the sequence analysis was to find a solution that differentiates between respondents on the basis of the timing and occurrence of key family events, we conducted a series of discriminant analyses to determine how well six family life course indicators (age at first birth, parity at 50, number of years from 18–50 with one or more children aged 0–14 who were not born in a current marriage, age at first marriage, years spent married from 18–50, and number of marital status transitions experienced by age 50) discriminated between cluster solutions from 2–20 groups. A plot of eigenvalues (see Fig. 1) for the range of cluster solutions showed a large increase in the eigenvalue of the first discriminant function at the 13-group solution,

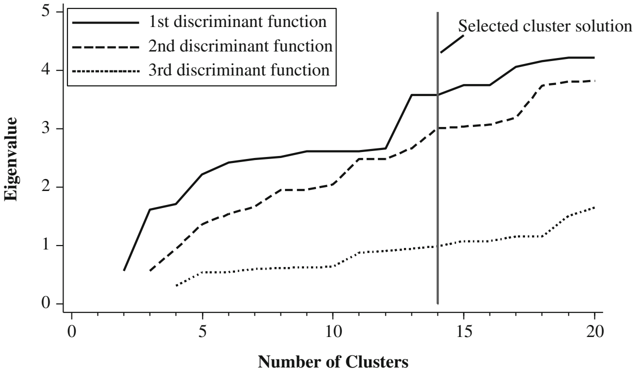

Fig. 1 Discriminant function eigenvalues by number of clusters

suggesting that this represents a suitable minimum number of clusters. The 14-group solution splits the remarriage clusters, distinguishing between those with and those without children from the first marriage, and represents an elbow in the eigenvalue of the second discriminant function. Solutions with more clusters did not substantially improve the eigenvalues of the discriminant functions until the 18-cluster solution and did not provide theoretically informative distinctions. Consequently, we selected the 14-group solution for further analysis.

Modeling Approach

We modeled physical health from 2001–2011, when the respondents were aged 51 and older, using a series of latent growth curve models (Bollen and Curran 2006). We performed estimation in Mplus 7 (Muthén and Muthén 2012) using robust maximum likelihood (the Mplus *mlr* option) to account for the survey design and nonindependence of household members. The growth models are specified as

$$y_{it} = \alpha_i + \lambda_t \beta_i + \varepsilon_{it}, \tag{1}$$

where y_{it} is respondent i's physical health at wave t, α_i is the random intercept for respondent i (which represents expected physical health at baseline in 2001), λ_t is a wave-specific constant equal to $t - 1$, β_i is respondent i's yearly rate of change in physical health, and ε_{it} is the respondent and wave-specific residual term. Further, α_i and β_i are allowed to depend on covariates as specified in Eqs. (2) and (3).

$$\alpha_i = \mu_\alpha + \mathbf{\Gamma}_\alpha \mathbf{X}_\alpha + \zeta_{\alpha i} \tag{2}$$

$$\beta_i = \mu_\beta + \mathbf{\Gamma}_\beta \mathbf{X}_\beta + \zeta_{\beta i}, \tag{3}$$

where (μ_α, μ_β) are intercepts for the random intercept and rate of change, respectively; $(\mathbf{\Gamma}_\alpha, \mathbf{\Gamma}_\beta)$ are vectors of coefficients to be estimated $(\mathbf{X}_\alpha, \mathbf{X}_\beta)$ are covariate matrices; and $(\zeta_{\alpha i}, \zeta_{\beta i})$ are residual terms.

We initially fitted four models to test different possibilities for the relationship among family life course group, sex, age, and physical health; we chose the best model on the basis of the Akaike information criterion (AIC) (Akaike 1974) values. We subsequently fitted a fifth model, which extended the model selected from the first four by adding controls for background covariates.

Results

Sequence Analysis of Family Life Course Trajectories

Summary statistics for the selected 14-group solution are contained in Table 3. Figure 2 presents age-specific distributions of marital and fertility states for each cluster. The first five groups represent variations in level of fertility and timing of

Table 3 Family life course trajectory: Group summary statistics

	1st Marriage[a]	Years Married[b]	Number of Marital Transitions (%)					First Marital Disruption[c]	1st Birth[d]	Number of Children (%)						Years NSP(e)[b]
			0	1	2	3	4+			0	1	2	3	4	5+	
Standard – Moderate Fertility (*N* = 762)	26.8 (3.0)	24.1 (3.0)	0.0	97.4	2.2	0.4	0.0	48.3 (1.3)	30.7 (2.6)	0.0	7.1	53.0	26.8	8.4	4.7	0.0 (0.6)
Standard – High Fertility (*N* = 666)	23.0 (1.9)	27.8 (2.1)	0.0	92.8	5.1	2.1	0.0	47.2 (2.2)	25.1 (1.9)	0.0	0.0	0.0	32.6	39.3	28.1	0.2 (1.0)
Early Standard – Low Fertility (*N* = 868)	21.4 (1.9)	28.3 (3.6)	0.0	78.7	13.3	7.3	0.8	42.7 (4.3)	24.0 (2.7)	0.0	15.9	78.3	5.2	0.6	0.0	0.3 (1.4)
Early Standard – Moderate Fertility (*N* = 406)	20.4 (1.6)	30.4 (1.7)	0.0	94.8	3.0	2.2	0.0	46.6 (2.7)	21.8 (1.9)	0.0	0.0	0.0	99.5	0.5	0.0	0.0 (0.1)
Early Standard – High Fertility (*N* = 310)	19.8 (1.4)	30.1 (3.5)	0.0	84.2	11.6	4.2	0.0	43.1 (3.6)	20.8 (1.9)	0.0	0.0	0.0	0.0	48.1	51.9	0.9 (3.0)
Late Family Formation (*N* = 150)	35.4 (3.6)	14.7 (4.6)	0.0	82.7	9.3	8.0	0.0	42.8 (4.0)	36.4 (4.5)	0.0	38.0	40.7	14.0	5.3	2.0	4.7 (6.9)
Premarital Birth (*N* = 94)	26.4 (5.6)	22.5 (7.7)	4.3	64.9	25.5	5.3	0.0	45.9 (4.0)	21.4 (3.6)	0.0	3.2	16.0	39.4	21.3	20.2	17.1 (3.6)
Marriage Without Children (*N* = 177)	26.8 (4.8)	19.8 (7.7)	0.0	57.6	20.3	15.8	6.2	35.3 (7.2)	47.1 (4.7)	94.9	1.7	1.7	1.1	0.6	0.0	0.0 (0.3)
No Family Formation (*N* = 255)	44.2 (3.2)	1.2 (2.8)	81.2	16.9	2.0	0.0	0.0	45.8 (3.0)	34.8 (10.4)	85.9	8.2	3.9	2.0	0.0	0.0	1.7 (5.1)
Late Marital Disruption With Children (*N* = 132)	24.8 (3.0)	17.7 (5.4)	0.0	0.0	72.0	25.8	2.3	40.6 (3.4)	28.6 (2.7)	0.0	18.9	37.9	33.3	8.3	1.5	6.8 (3.8)
Early Marital Disruption With Children (*N* = 129)	21.7 (2.8)	12.2 (6.0)	0.0	0.0	51.9	31.0	17.1	28.9 (3.9)	25.6 (5.2)	0.0	43.4	41.1	13.2	2.3	0.0	12.9 (4.0)
Remarriage – Children 1st Marriage (*N* = 179)	20.6 (2.2)	25.4 (5.3)	0.0	0.0	0.0	67.6	32.4	29.1 (4.7)	22.7 (3.2)	0.0	3.4	43.0	29.1	18.4	6.2	10.2 (5.0)
Remarriage – No Children 1st Marriage (*N* = 45)	23.8 (2.9)	23.7 (3.5)	0.0	0.0	0.0	80.0	20.0	29.5 (4.0)	34.6 (3.0)	0.0	22.2	42.2	26.7	8.9	0.0	2.8 (5.1)
Disrupted Marital History – High Fertility (*N* = 88)	19.9 (2.3)	20.5 (6.7)	0.0	0.0	29.6	43.2	27.3	32.5 (4.4)	19.8 (2.3)	0.0	0.0	0.0	20.5	37.5	42.1	13.7 (8.4)

[a] Average age (SD) for ever married.

[b] Average years (SD).

[c] Average age (SD) for ever disrupted.

[d] Average age (SD) for ever parent.

[e] Nonstandard parenting.

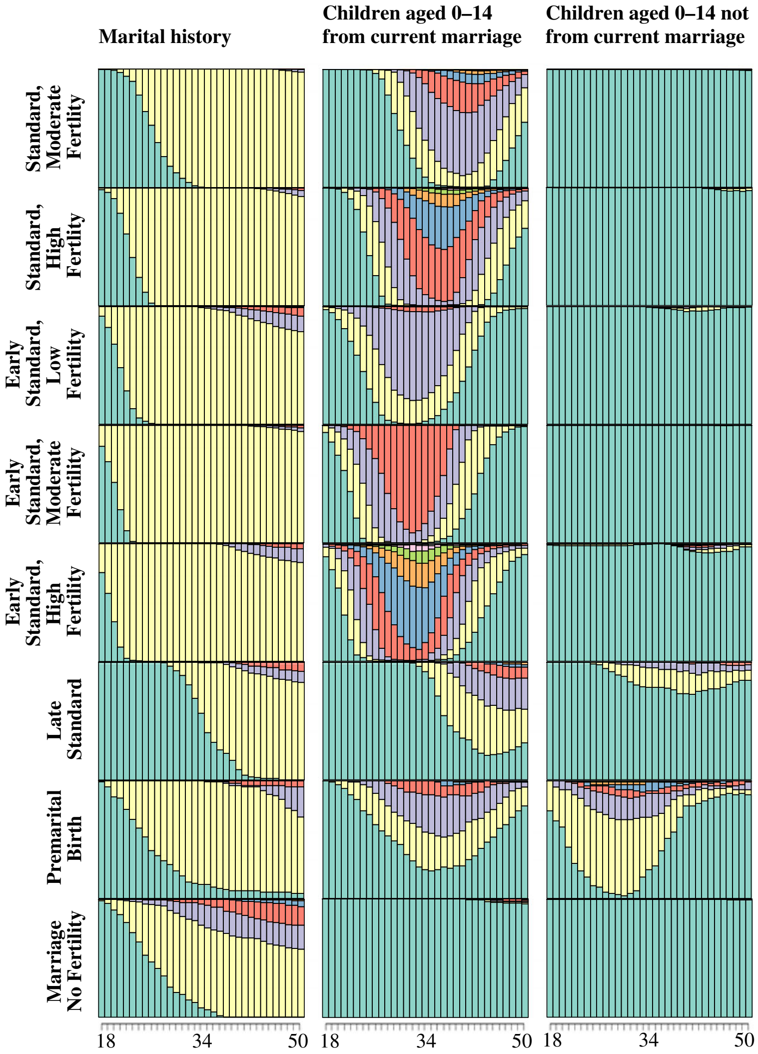

Fig. 2 State distributions of family life course groups by age and family life course group. The online version of this article displays the figure in color, where colors reference different states depending on the channel (marital or fertility). The vertical axis of each plot displays the cumulative state distribution in that family life course group and channel. The horizontal axis displays age from 18 to 50

family formation on what could be thought of as a traditionally standard family life course. Each group is characterized by a single continuous marriage beginning between ages 18 and 25, with subsequent fertility occurring within that marriage. The first group (*Standard – moderate fertility*) entered marriage in the mid-20s followed by first birth around age 30, and two to three children. A total of 762 persons, or 18 % of the sample, are captured in this group. The second group (*Standard – high fertility*, *n* = 666) is distinguished from the first by a slightly earlier age at marriage in the early to mid-20s and higher and earlier fertility (mostly four or five children). Groups 3–5 comprise persons with an early first

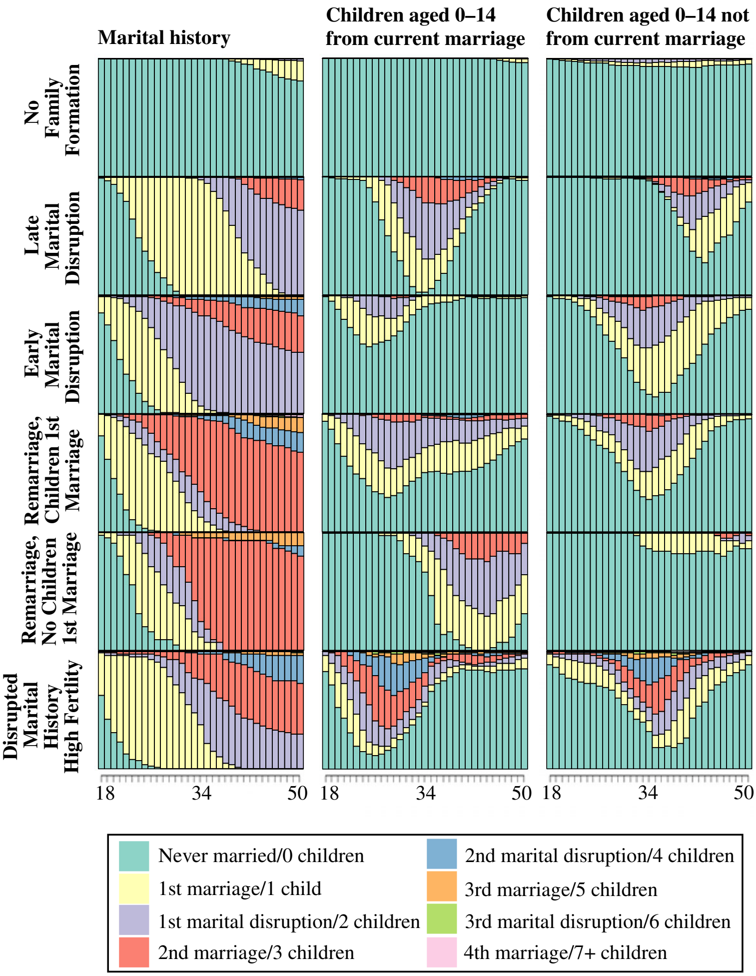

Fig. 2 (continued)

marriage (from 18 to 21) and a variable level of fertility starting primarily in the early 20s. They are labeled, respectively, *Early standard – low fertility* (*n* = 868), *Early standard – moderate fertility* (*n* = 406), and *Early standard – high fertility* (*n* = 310). None of the groups are characterized by common nonstandard parenting arrangements. Overall, these groups capture 70.7 % of the sample.

The sixth group (*Late family formation*, *n* = 150) is characterized by marriage in the 30s followed by low to moderate fertility commencing in the mid-30s. The seventh group (*n* = 94) is made up of persons who have a premarital birth early in the life course (from late teens to mid-20s) and then subsequently marry and have additional children in the context of the marriage. Because the distinguishing feature of the group is the early experience of nonstandard fertility, this cluster is labelled *Premarital birth*. Groups 8 (*n* = 177) and 9 (*n* = 255) have very low (mostly zero) fertility either with (group 8) or without (group 9) marriage.

Accordingly, group 8 is labeled *Marriage without children*, and group 9 is labeled *No family formation*.

The remaining groups all experience marital disruption in combination with fertility. They differ, however, in the timing of the marital disruption, whether there is subsequent remarriage, and the timing and level of fertility. Groups 10 (n = 132) and 11 (n = 129) are labeled *Late marital disruption with children* and *Early marital disruption with children*, and are characterized by a marriage with children (commencing at a similar age to the standard clusters) that is subsequently disrupted, and a low incidence of remarriage. Marital disruption occurs, on average, at age 40.6 for the *Late marital disruption with children* group and at a significantly earlier age of 28.9 years for the *Early marital disruption with children* group. Because of the timing of the marital disruption, the *Early marital disruption* group experiences a substantially longer period of nonstandard parenting. Groups 12 (*Remarriage – children 1st marriage*, n = 179) and 13 (*Remarriage – no children 1st marriage*, n = 45) are distinguished primarily by a short first marriage followed by marital disruption in the mid-20s to mid-30s, with a second marriage commencing soon thereafter. The two groups differ in that individuals in group 12 had a first birth in their first marriage and therefore experience nonstandard parenting in parallel with their second marriage, whereas group 13 has only minimal nonstandard parenting because of the absence of a birth in the first marriage. The final cluster, group 14 (*Disrupted marital history – high fertility*, n = 88), is characterized by heterogeneous disrupted marital histories paired with a high level of fertility. Because of this combination, members of this group tend to have standard parenting arrangements early in the life course followed by a significant period of nonstandard parenting arrangements.

Modeling the Health Consequences of Family Life Course Trajectories

Table 4 summarizes the specifications of the models. The selected model (Model 4) allows α_i to depend on the interaction of sex and family life course group. Models that allow β_i to depend on family life course group (Model 2) or α_i to depend on the interaction of age and family life course group (Model 3) were inferior to the simpler Model 1 and were consequently not considered further. The failure of Models 2 and 3 to provide an improved model fit compared to Model 1

Table 4 Model specifications and model fit

	$\mathbf{X}_\alpha$	$\mathbf{X}_\beta$	AIC
Model 1	Baseline age; sex; family life course trajectory	Baseline age; sex	296,390.7
Model 2	As Model 1	As Model 1, plus family life course trajectory	296,402.8
Model 3	As Model 1, plus family life course trajectory × baseline age	As Model 1	296,393.5
Model 4	As Model 1, plus family life course trajectory × female	As Model 1	296,386.8
Model 5	As Model 4, plus controls	As Model 1	296,150.9

implies that health differences between the family life course groups are stable over the duration of the survey and for different ages but are patterned differently for men and women.

Results from the models selected on the basis of AIC (Models 4 and 5) are presented in Table 5. To assist in the interpretation of the interaction, we present the pattern of results separately by sex in Fig. 3. Because the presence of significant interactions with sex implies that the effects of family life course trajectory must be interpreted separately for men and women, we first describe the results for men. Adjusting only for age, men in the *Standard – high fertility*, the *Late family formation*, and all three of the *Early standard* groups have significantly poorer health than those in the *Standard – moderate fertility* reference group. Within the *Early standard* groups, no significant differences are found by level of fertility. Most of these differences are only marginally attenuated by controls for early-life socioeconomic status, health, and family situation, and remain significant. The sole exception is the coefficient for *Late family formation*, which is no longer significant after controls.

Men in the *Premarital birth* and *Marriage without children* groups are not significantly less healthy. The *No family formation* contrast is significant ($b = –2.9$, $p < .01$), indicating that men who never marry or have children are, on average, in poorer physical health. This contrast remains significant after the inclusion of controls.

Among marital disruption groups, men in the *Late marital disruption* group are not significantly different from the reference category. Men in the *Early marital disruption* group are, however, in substantially worse physical health ($b = –7.0$, $p < .001$). These findings suggest that the *timing* of marital disruptions may be an important factor in understanding how family trajectories are associated with men’s health. The *Remarriage – children 1st marriage* category is also associated with significantly poorer health, while the *Remarriage – no children 1st marriage* group is not significantly different from the reference group. Last, the *Disrupted marital history – high fertility* group is also in significantly poorer health ($b = –4.4$, $p < .05$).

A substantially different pattern of results emerges for women. Compared with the *Standard – moderate fertility* group, only the *Disrupted marital history – high fertility* group has a significantly different (and poorer) level of physical health. Family life course trajectories therefore seem to be less consequential overall for women’s health than men’s. However, a number of significant differences exist between other categories. In particular, the *Standard – high fertility* group emerges as the healthiest for women, faring significantly better than the *Early standard – low fertility*, *Premarital birth*, *Early marital disruption*, *Remarriage – children 1st marriage*, and *Disrupted marital history – high fertility* groups before controls. After controls, only women in the *Early marital disruption* and *Disrupted marital history – high fertility* groups are worse off than women in the *Standard – high fertility* group.

Results for control variables are as expected, although not all are significant predictors of physical health. Older age at baseline is associated with a poorer level of and faster decline in physical health. Women and first-generation migrants from a non-English-speaking background are in significantly poorer health; by contrast, holding a post-school qualification, having a father with a higher status occupation, being a first-generation migrant from an English-speaking background, having fewer siblings, greater height, being healthier during childhood, and not missing a month of school because of poor health are associated with significantly better physical health. Parents’

Table 5 Physical health growth model estimates

	α_i (intercept)			
	Model 4		Model 5	
	Est.	SE	Est.	SE
μ_α	72.2***	1.2	72.3***	1.4
Family Life Course Trajectory				
Standard – moderate fertility				
Standard – high fertility	–1.4*	0.6	–1.3*	0.6
Early standard – low fertility	–2.5***	0.7	–2.4***	0.7
Early standard – moderate fertility	–2.4**	0.9	–2.1*	0.9
Early standard – high fertility	–3.2**	1.1	–2.7*	1.1
Late family formation	–2.0*	0.9	–1.0	0.9
Premarital birth	–1.3	1.4	–0.8	1.4
Marriage without children	–0.4	1.0	–0.5	1.0
No family formation	–2.9**	0.9	2.5**	0.9
Late marital disruption with children	–0.5	1.1	–0.7	1.1
Early marital disruption with children	–7.0***	1.7	–6.7***	1.7
Remarriage – children 1st marriage	–3.9**	1.3	–4.2**	1.3
Remarriage – no children 1st marriage	–1.9	1.6	–2.2	1.6
Disrupted marital history – high fertility	–4.4*	2.2	–3.8	2.1
Family Life Course Trajectory × Female				
Standard – high fertility × Female	2.4*	1.0	2.4*	1.0
Early standard – low fertility × Female	1.8	0.9	2.3*	1.0
Early standard – moderate fertility × Female	2.2	1.2	2.6*	1.2
Early standard – high fertility × Female	2.6	1.4	3.0*	1.3
Late family formation × Female	2.8	1.7	2.3	1.7
Premarital birth × Female	–1.1	2.2	–0.4	2.2
Marriage without children × Female	0.6	1.4	0.7	1.5
No family formation × Female	3.4*	1.4	2.4	1.4
Late marital disruption with children × Female	–0.5	1.8	–0.3	1.8
Early marital disruption with children × Female	4.9*	2.1	4.9*	2.1
Remarriage – children 1st marriage × Female	3.0	1.6	3.6*	1.6
Remarriage – no children 1st marriage × Female	3.2	2.6	2.8	2.5
Disrupted marital history – high fertility × Female	–0.2	2.6	–0.1	2.6
Demographics/Childhood Environment				
Age (2001)	–0.3***	0.02	–0.3***	0.02
Female	1.5*	0.7	–1.5*	0.7
Immigration/Indigenous status				
3+-generation Australian				
2nd-generation immigrant			0.3	0.4
1st-generation immigrant – English-speaking background			1.2**	0.4
1st-generation immigrant – non–English-speaking background			–2.0***	0.4

Table 5 (continued)

Aboriginal or Torres Strait Islander			–2.7	1.7
Highest completed educational qualification				
Less than complete secondary school				
Completed secondary school			0.3	0.6
Certificate/diploma			0.9*	0.3
Bachelors degree or higher			2.3***	0.4
Father's occupational status			0.02*	0.01
Number of siblings			–0.2*	0.1
Self-reported general health in childhood			–0.7***	0.2
Either parent smoked			–0.4	0.3
Missed a month of school because of poor health			–1.4**	0.5
Height (cm deviation from age × sex mean)			0.05*	0.02
Father's survival status 2009				
Died age <60				
Died age 60–74			–0.5	0.5
Died age 75+/Not deceased			–0.4	0.4
Mother's survival status 2009				
Died age <60				
Died age 60–74			–0.4	0.5
Died age 75+/Not deceased			–0.6	0.4
Family situation at age 14				
Living with both biological parents				
Stepfamily			0.4	0.8
Single-parent family			–0.8	0.5
Other (e.g., living with grandparents)			–0.6	0.7

	β_i (rate of change)			
	Model 4		Model 5	
	Est.	SE	Est.	SE
μ_β	0.5**	0.1	0.5**	0.1
Demographics				
Age (2001)	–0.01***	0.002	–0.01***	0.002
Female	–0.04	0.04	–0.03	0.04

Notes: $N = 4{,}615$. $m = 50$ imputed data sets.

*$p < .05$; **$p < .01$; ***$p < .001$

age at death, being of Aboriginal or Torres Strait Islander descent, family structure in childhood, and parents' smoking during childhood are not significant predictors of physical health, conditioning on the other covariates.

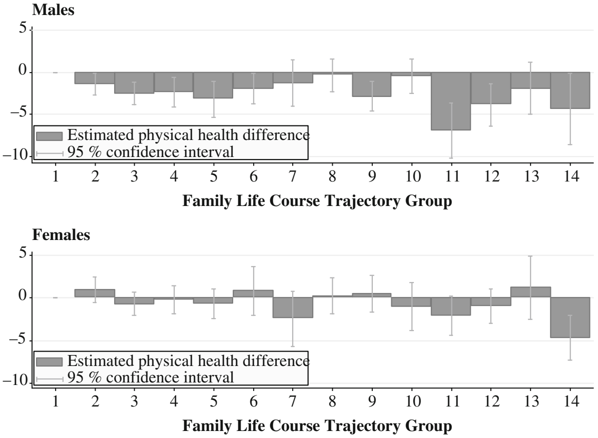

Fig. 3 Physical health differences between family life course groups. Estimates are from Model 4. Family life course groups are (1) *Standard – moderate fertility*; (2) *Standard – high fertility*; (3) *Early standard – low fertility*; (4) *Early standard – moderate fertility*; (5) *Early standard – high fertility*; (6) *Late standard*; (7) *Premarital birth*; (8) *Marriage without children*; (9) *No family formation*; (10) *Late marital disruption with children*; (11) *Early marital disruption with children*; (12) *Remarriage – children 1st marriage*; (13) *Remarriage – no children 1st marriage*; and (14) *Disrupted marital history – high fertility*

Discussion and Conclusions

This study adds to our understanding of the links among partnership, fertility, and health in several ways. As the first study to consider how a combined classification of marital and fertility histories over a long period of the life course is associated with general and functional health in later life, this study provides a new approach to understanding the position of the family in health inequalities.

Our results suggest that family life course trajectories have lasting consequences for men's physical health, dependent on the occurrence and timing of major life course events. In particular, groups characterized by early family formation, marital disruption, the timing of marital disruption, and failure to marry emerged as detrimental for men's health, with the observed differences only minimally affected by controls for an array of early-life factors. This pattern of results is consistent with previous research findings indicating that marriage duration (Brockmann and Klein 2004; Dupre et al. 2009; Dupre and Meadows 2007), marital disruptions (Dupre and Meadows 2007; Hughes and Waite 2009), and "on-time" family formation (Dupre et al. 2009; Grundy and Holt 2000; Grundy and Tomassini 2005; Read and Grundy 2011) are linked to men's health and mortality.

Although our analyses do not provide any direct evidence about the mechanisms that link family life course trajectories to physical health, it seems plausible that for men, the primary health benefits of the family life course are realized through marriage rather than parenthood. A reasonable summary of our results for men would be that, conditional on "on-time" family formation, health improves with longer marriage duration. This is consistent with our findings that men who marry but never have children are no less healthy than men who experience a standard family life course and that men who never marry are in poorer health. It is also supported by the pattern of effects among the disrupted family history groups with regard to the timing of marital disruption and the occurrence of remarriage. The significant negative effects found for the early family formation groups suggests that early marriages (even when sustained) may not be as beneficial to men's health, which might reflect higher conflict within the marriage because early starter couples may lack the resources to manage the challenges of their lives together (White and Rogers 2000).

The magnitude of the observed differences for men is often large relative to the coefficients for established predictors of health included in our models. For instance, the difference in physical health between men in the *Early standard* groups and those in the *Standard – moderate fertility* group was approximately as large as the difference between those with less than complete secondary school and those with a university degree, or the equivalent of a 7- to 9-year age difference. The largest contrast, for the *Early marital disruption* group, is the equivalent of a 23-year age difference. As the trajectory groups capture cumulative experience over a long period, it is perhaps not surprising that the effects are large. Nevertheless, the substantial differences in health between family trajectory groups suggest that the nexus between family life course trajectories and men's health is likely to be a fruitful area of ongoing inquiry.

For women, we found few differences in physical health between the family life course trajectory groups. After early-life family, health, and socioeconomic circumstances were controlled for, only women with both a disrupted marital history and a high level of fertility were in significantly worse health than those women who had experienced a normatively standard family life course. This finding contrasts with previous work showing long-term associations between the family life course and women's health and mortality (Alter et al. 2007; Grundy and Tomassini 2010; Hughes and Waite 2009; Kravdal et al. 2012; Read and Grundy 2011).

The differences between our findings and previous work may partly reflect the focus on holistic life course trajectories: whole-trajectory analyses are not directly comparable with analyses that attempt to isolate the effects of single factors because the whole-trajectory comparisons are conditional on all the events included in the trajectories. Thus, for example, the lack of significant differences between women in the various standard family life course groups does not indicate that parity or timing of family formation are unrelated to health, but rather that they are unrelated to health *conditional on subsequently remaining in a single marriage*. This is an observation that parallels Williams et al.'s (2011) finding that the negative health consequences of a nonmarital first birth were mitigated by subsequent marriage to the child's father. This observation is also in line with Umberson et al.'s (2010) summary of a number of studies suggesting that short-term health and health-related consequences of parenthood are less pronounced for married women.

As Macmillan and Copher (2005) argued, the life course is a set of dynamic processes, weaving individuals' multiple roles over time in ways that are likely to have long-term consequences for health and well-being in older age (Kuh et al. 2003). Future work should seek to build on this by examining how the family life course intersects with the production of health at multiple temporal scales (health-related behaviors in the short term and morbidity and mortality in the long term) and across multiple social domains. In particular, it would be beneficial to incorporate employment histories alongside family histories in later work. Studies that investigate how individuals' many roles interact with the resources available to them to encourage, enable, or dissuade health-related behaviors, and how long-term role trajectories are associated with health, are critical to building an account of health stratification that adequately represents the complexity implied by life course scholarship.

Acknowledgments This article uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this article, however, are those of the author and should not be attributed to either DSS or the Melbourne Institute. The authors wish to thank Melanie Spallek for assistance with R code for the sequence analysis, and Bill Martin and the anonymous reviewers at *Demography* for their insightful comments and criticism.

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