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Cumulative disadvantage, employment–marriage, and health inequalities among American and British mothers



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ABSTRACT

This paper illuminates processes of cumulative disadvantage and the generation of health inequalities among mothers. It asks whether adverse circumstances early in the life course cumulate as health-harming biographical patterns across the prime working and family caregiving years. It also explores whether broader institutional contexts may moderate the cumulative effects of micro-level processes. An analysis of data from the British National Child Development Study and the US National Longitudinal Survey of Youth reveals several expected social inequalities in health. In addition, the study uncovers new evidence of cumulative disadvantage: Adversities in early life selected women into long-term employment and marriage biographies that then intensified existing health disparities in mid-life. The analysis also shows that this accumulation of disadvantage was more prominent in the US than in Britain.

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Although access to higher education and the labour market have improved the health of women overall, social inequalities in health among women remain disappointingly large (Schutte, Chastang, Parent-Thirion, Vermeylen, & Niedhammer, 2013; Shaw, McGeever, Vasquez, Agahi, & Fors, 2014). In the face of this observation, researchers are turning their attention to the social processes that create and sustain health inequalities. Informed by life course sociology, work in this tradition moves beyond cross-sectional snapshots of material and social circumstances, towards identifying the pathways through which such conditions leave their traces in bodies over time. Cumulative advantage/disadvantage (CAD) is a prominent framework for understanding these processes (O’Rand, 2009). A central tenet is that the social gap in health grows over the course of a woman’s life, through mechanisms that

concentrate the impact of early advantages or disadvantages as an individual ages (Hamil-Luker & O’Rand, 2007; Kuh et al., 2009).

Despite the promise of this framework, the pathways through which social inequalities in women’s health develop over the life course remain something of a black box. Most existing CAD research focuses on a restricted selection of cross-sectional mediators – typically, adult socioeconomic position and health behaviours – thought to link early adversity to adult health. While this emphasis is well-justified, studies have yet to incorporate a number of central findings from research on women’s health and the life course. One is the consistent conclusion that non-employment and the absence of an intimate relationship are detrimental to women’s health (Klumb & Lampert, 2004; Waite & Maggie, 2000). Another is the consensus among life course researchers that adult circumstances over the long term are more significant for health than conditions at a single point in time (Dupre, Beck, & Meadows, 2009; Moen, Dempster-McClain, & Williams,

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1992). Related to this is the contention that biographies in one area of life are not separate from those in other domains (Elder, Johnson, & Crosnoe, 2003; MacMillan, 2005). These insights shift the research focus from the health effects of single aspects of the life course (e.g., employment or marital histories) to their combined influences over time. Finally, life course researchers acknowledge that individuals construct their biographies within a set of opportunities and constraints defined, in part, by institutional contexts—central among them, is the welfare state (Kohli, 2007; Mayer, 2005). From this perspective, nations' broad approaches to social welfare are seen to influence at least two aspects of individual life courses germane to women's health: the protection (or otherwise) of a minimum level of economic well-being for individuals and families in need, and the shaping of mothers' employment histories and their reliance on marriage (Esping-Andersen, 1990; Orloff, 1993). CAD health research that links macro-level contexts to micro-level processes is, however, virtually non-existent.

Our study builds on existing CAD research on social inequalities in women's health in three key ways. First, we adopt a *broader* view than previous studies, by considering how paid work and marriage collectively mediate early-life social conditions and adult health. Although employment and marital status are known determinants of women's health on their own, whether and how they function together in the cumulation of health (dis)advantage has yet to be investigated. Second, we take a *longer* view than much existing research—using multi-dimensional optimal matching analysis (Pollock, 2007) to model patterns in employment and marriage across a significant period of adulthood. Our innovative approach to working with detailed life histories allows us to assess whether health risks accrue across the life course, in part, because adversity in the early years selects women into employment–marriage biographies that are more likely to harm, rather than enhance, health in adulthood. Third, we take a *contextual* view of CAD processes by comparing results for Britain and the US. Although these two nations share a broad orientation to the mix of public and private provision, they differ somewhat in their approaches to minimizing socioeconomic inequality and providing support for family responsibilities. This variation may yield distinct individual-level processes of cumulative disadvantage among women. Our study focuses on mothers because they are a group most likely to be affected by differences in welfare state generosity. Moreover, maternity is pivotal in the life courses of women. Among other things, childbirth marks a moment at which socioeconomic position becomes particularly consequential for women's employment trajectories (Baum, 2002; Macran, Joshi, & Dex, 1996; Warren, 2000); and primary responsibility for raising children heightens the significance of marriage for women's health (Bartley, Sacker, Firth, & Fitzpatrick, 1999; Koropecjy-Cox, Pienta, & Brown, 2007; Williams, Sassler, Frech, Addo, & Cooksey, 2011).

We begin by outlining three bodies of scholarship that are integral to our inquiry, yet are seldom linked in empirical research: cumulative disadvantage; employment/marriage and women's health; and the institutional contexts that shape the life course. We then describe the

methods used to conduct our investigation, including our unique strategy for modelling mothers' adult biographies. Following this, we document longitudinal patterns in British and American mothers' paid work and marriage biographies, and examine how these biographies contribute to processes of cumulative health disadvantage. The paper concludes with a discussion of the implications of our results for theory and research about the social processes that generate health inequalities among mothers and the institutional contexts that structure them.

1. Background

1.1. Cumulative advantage/disadvantage (CAD)

CAD research focuses on identifying the mechanisms whereby inequality grows over the life course (Willson, Shuey, & Elder, 2007). It encompasses the view that benefits associated with a person's structural position during his/her youth increase over time, widening differences between individuals or groups as they age (O'Rand, 2006). Path dependency – the idea that advantages at a given point are dependent on previous advantages – is a key aspect of this process (DiPrete & Eirich, 2006). Focusing on disadvantage (as does most empirical work), a large body of research has documented the pivotal role of education in the inter-generational transmission of adversity. Parents with little formal education tend to have fewer of the financial, cultural, and social resources needed to ensure the educational success of their children (Lareau, 2003; Walsemann, Geronimus, & Gee, 2008). These children's low educational attainment may, in turn, limit their employment opportunities in adulthood (England, Garcia-Beaulieu, & Ross, 2004; Falci, Mortimer, & Noel, 2010) and their ability to form the enduring marital partnerships (Martin, 2006; McLanahan, 2009) that foster health (Dupre, 2008; Mirowsky & Ross, 2005). Epidemiologists call these path-dependent processes 'chains of risk' to capture the notion that a negative experience at one point in time increases the risks that others will follow (Lynch & Davey Smith, 2005).

There is ample evidence, across a variety of jurisdictions, that social and economic disadvantages during childhood affect adult health. Low parental education, income, and occupational class; parental divorce; and living in a sole-parent household are positively associated with early mortality (Galobardes, Lynch, & Davey Smith, 2004; Kuh et al., 2009; Remes & Martikainen, 2012), poor physical health (Guralnik, Butterworth, Wadsworth, & Kuh, 2006; Hamil-Luker & O'Rand, 2007), and poor psychological health during adulthood (Elovainio et al., 2012; Gilman, Kawachi, Fitzmaurice, & Buka, 2003; Luo & Waite, 2005). Studies that explore the pathways between childhood adversity and adult health find that the process is partially mediated by socioeconomic position and lifestyle during adulthood (Galobardes et al., 2004; Haas, 2008; Kuh, Power, Blane, & Bartley, 1997; Murray et al., 2011; O'Rand & Hamil-Luker, 2005). This body of work, however, has largely neglected other potentially important pathways, including those associated with the dominant

institutions of adulthood—employment and family. The next section summarizes current knowledge of how experiences in these domains are related to women's health.

1.2. *Employment, marriage, and women's health*

The widespread entry of mothers into the labour force in recent decades has given rise to two dominant hypotheses about the health implications of combining paid work and family responsibilities. According to the role enhancement hypothesis, employment promotes mothers' health by generating social and economic resources, and providing direction in life (Nordenmark, 2004). Conversely, the role conflict hypothesis posits that the competing demands of paid work and caregiving increase stress levels among employed mothers, harming their health (Gove, 1984). Although beneficial health effects of both marriage and employment are documented when these states are examined separately (Klumb & Lampert, 2004; Manzoli, Villari, Pirone, & Boccia, 2007; Waite & Maggie, 2000), the health consequences of women holding multiple social roles are still not clear (Casini, Godin, Clays, & Kittel, 2013; Kostianen, Martelin, Kestilä, Martikainen, & Koskinen, 2009; Nyman, Spak, & Hensing, 2012; Pavalko, Gong, & Long, 2007)¹.

One exception is parenting in the absence of an intimate partner. Studies consistently show that lone mothers experience greater psychological distress and depression than their married counterparts (Evenson & Simon, 2005; Koropecjy-Cox et al., 2007), more long-term illness (Grundy & Tomassini, 2005; Wickrama, Lorenz, Conger, Elder, & Todd, 2006), poorer overall health (Bartley et al., 1999; Williams et al., 2011), and higher risks of death (Grundy & Tomassini, 2005; Henretta, 2007). Greater financial pressure, social isolation, and caregiving strain explain some of these health disparities (Avison, Ali, & Walters, 2007).

According to life course researchers, however, the social roles a woman holds at any one point in her life are less important for health than how these roles unfold over time (Moen et al., 1992). This is particularly true for mothers, who are much more likely than other women (or men) to leave employment temporarily or permanently (Craig & Mullan, 2010; Schober, 2013), and who may experience pronounced strains if they live for extended periods without a marital partner (Avison, Davies, Willson, & Shuey, 2008; Hughes & Waite, 2009). A small body of research examining long-term employment patterns does indeed suggest that it may not be paid work per se but, rather, consistent employment that protects mothers' health (Frech & Damaske, 2012; McMunn, Bartley, & Kuh, 2006; Wilk, 2001).

Considering marital status over the longer term also provides additional insights. In general, the longer a marriage lasts, the more it appears to safeguard a woman's health (Dupre et al., 2009; Hughes & Waite, 2009;

Menaghan & Cooksey, 2008; but see Monden & Junc, 2013). Remarriage may be similarly salutary, but its consequences are thought to be smaller and shorter-lived than those of a first marriage (Carr & Springer, 2010). Divorce may have long-lasting negative health effects for women, but only among those who remain unpartnered (Hughes & Waite, 2009). Among the few studies of parenthood in combination with marital trajectories, results are mixed. Some find that enduring marriage is best for the health of mothers (Avison et al., 2008), while others report no health differences among mothers who are stably married or stably single (Meadows, McLanahan, & Brooks-Gunn, 2008). Still others describe negative impacts of parenting alone only among certain social groups (Williams et al., 2011) or during limited periods of time following the end of a union (Meadows et al., 2008).

In summary, the evidence is fairly clear that steadily married women are healthier than their non-married counterparts and that a strong labour force attachment fosters women's health. However, it is less obvious how long-term marriage and employment operate in the context of family obligations. Moreover, we note that virtually all existing research focuses on a single country, despite the contention of life course sociologists that the nature of work and family experiences – and, ultimately, their health effects – depend on the broader social context in which they unfold. It is to this last issue that we now turn.

1.3. *Cumulative disadvantage and institutional contexts*

Welfare state theory – the view that cross-national variations in systems of social provision shape the degree of inequality within nations (Esping-Andersen, 1990) – provides a useful framework for understanding how macro contexts may influence CAD processes and women's health. Scholars in this tradition have identified several relevant dimensions of nations' broad approaches to social policy: the level of inequality they support; and the extent to which they buffer labour market risks, reconcile employment and family, and foster women's dependence on marriage.

In early research, the US and Britain were grouped together among countries with weak social benefit systems and high levels of inequality (Esping-Andersen, 1990). However, subsequent work suggested that Britain's egalitarian benefit structure, large public sector, strong trade unions, progressive taxation, and publicly funded healthcare distinguishes it from the US (Castles & Mitchell, 1993). Indeed, these differences may have repercussions for social inequalities in health which, as some research indicates, may be larger in the US (McDonough, Worts, & Sacker, 2010; Banks, Marmot, Oldfield, & James, 2006). Moreover, Britain has provided higher social transfers to families – especially those headed by women – than the US (Christopher, 2002; Ray, Gornick, & Schmitt, 2010). Together, these features suggest that vulnerable British women may be less exposed to CAD processes than their American counterparts, both early in the life course and during the adult years.

¹ Health selection accounts for some of this association, but a relationship remains, net of prior health (McMunn et al., 2006).

This last point touches on the question of how institutional contexts shape the lives of mothers, in particular. In this regard, feminist analyses direct attention to inequalities arising from caregiving obligations – disproportionately borne by women – and highlight variations in work–family reconciliation and women’s vulnerability outside marriage (Orloff, 1993). Studies show that, where family policies are weak, mothers are vulnerable outside marriage (Misra, Moller, & Budig, 2007) and that, regardless of marital status, those at the lower end of the socioeconomic scale are at greater risk of insecure employment or leaving the labour force entirely (Baum, 2002; Warren, 2000). For women who remain in paid work, the work–family conflict arising from a lack of public support for caregiving may curb the health benefits of employment (Boye, 2011).

Both the US and Britain depend heavily on women’s unpaid caregiving (Meyers & Gornick, 2003). However, they differ with respect to the implementation of this approach. American mothers generally have extremely limited (or no) access to caregiving supports, such as paid maternity/family care leave or publicly funded childcare, especially if they fall at the disadvantaged end of the social scale (Ray, Gornick, & Schmitt, 2009). This, combined with a weak social safety net that stresses employment for survival (Esping-Andersen, 1990), suggests that conditions may be especially taxing for American mothers who enter their prime working and childrearing years already disadvantaged by unfavourable early-life conditions. The challenges may be heightened for those raising children alone: While lone mothers are more likely to be employed in the US than in Britain (Gonzalez, 2004), working single mothers are far more likely to be poor in the US (Gornick, 2004).

Although far from treating caregiving as a public responsibility, the British welfare state has long incorporated a range of provisions (e.g., mothers’ allowances, food supplements, and certain tax and pension provisions) aimed at mitigating the costs of women’s caregiving (Cousins, 2005; Noble, 2009). As a result, studies conclude that Britain provides somewhat more financial support for two-parent and lone-mother families than the US (Ray et al., 2010). These differences in the extent to which employment insecurity is buffered, benefits reduce inequalities, and the work of caring for self and others is supported by the state suggest that the health gap between mothers with the most favourable and the most challenging early-life and employment–marriage biographies may be smaller in Britain than in the US.

2. Research questions and hypotheses

Weaving together these threads in existing research, we begin unpacking the black box through which social inequalities in women’s health develop over the life course in differing institutional contexts (Fig. 1). To do so, we address the following three questions and related hypotheses:

1. How are long-term combined employment–marital patterns associated with health?

We hypothesize that mothers with neither long-term marital partners nor paid work will be the least healthy at mid-life; those with enduring marriages and sustained attachment to the labour force will be the healthiest; and those whose long-term employment–marriage patterns fall between these two extremes will be at intermediate health risk.

2. Do employment–marriage biographies mediate associations between early-life circumstances in mothers’ mid-life health ways that are consistent with CAD processes?

We hypothesize that early-life adversity will select women into long-term trajectories marked by sole motherhood and non-employment; these biographies, will, in turn, be associated with worse health, net of early adversities themselves. Conversely, those with early-life advantages will be more likely to enter employment–marriage trajectories that predict better health (i.e., a strong labour-force attachment and stable marriage), net of associations with early-life circumstances.

3. Does evidence of cumulative health disadvantage vary across institutional contexts?

We hypothesize that associations consistent with CAD processes will be more evident for the US than they are for Britain, where the welfare state plays a stronger role in mitigating socioeconomic inequalities among mothers across the life course.

3. Methods

3.1. Data

Our data come from two nationally representative cohort studies. For the US, we use the National Longitudinal Survey of Youth (NLSY79) (McClain & Hering, 2001), and for Britain, the National Child Development Study (NCDS) (Elliot & Vaitilingam, 2008). The NLSY79 tracks individuals who were aged 14–21 years in 1978; interviews were conducted annually until 1994 and have been held in alternate years since then. The NCDS is a longitudinal study of *all* individuals born during one week of March 1958 in England, Scotland, and Wales; data have been collected ten times to date, at birth and ages 7, 11, 16, 23, 33, 42, 46, 50, and 55. The NLSY79 oversampled Blacks and Hispanics to permit analysis of these groups². Because the NCDS covers the entire population born during one week, it cannot oversample; and because that population was virtually all White (Atherton, Fuller, Shepherd, Strachan, & Power, 2008; Power & Elliott, 2006), very incomplete data on race/ethnicity were collected (see fn. 7). However, both surveys provide detailed work, marital, and childbearing/childrearing histories, along with measures of several key socio-demographic characteristics.

From each survey, we use data on employment and marital circumstances for all years in which respondents were aged 25–39 years – that is, of prime working and

² We employ population weights to account for oversampling, as well as for attrition and the use of multiple waves of data. See <http://www.nlsinfo.org/weights/nlsy79>.

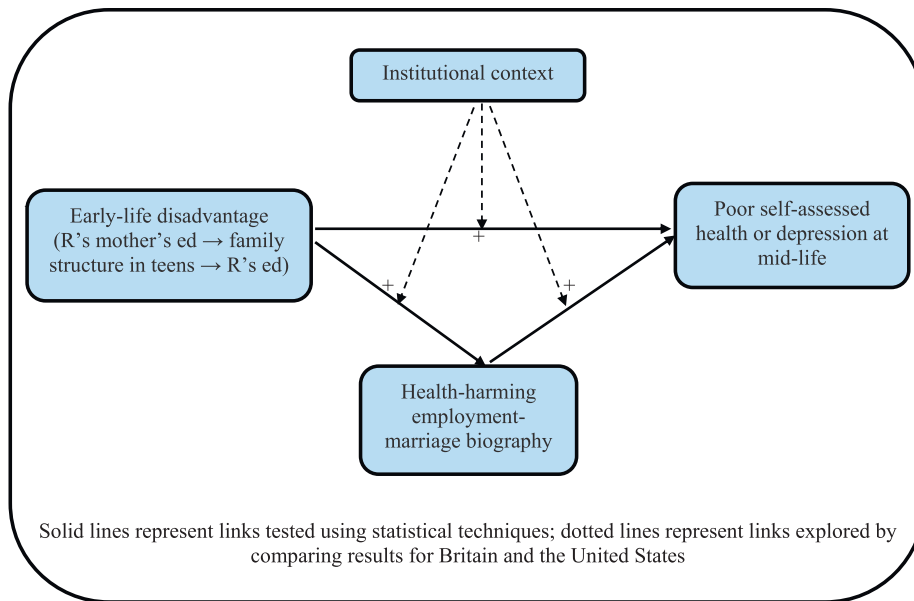


Fig. 1. Conceptual model for CAD processes and mothers' mid-life health.

childrearing age – along with information on adverse circumstances experienced earlier in the life course. Our sample includes all women who had given birth to at least one child by age 39³, and for whom information on the health outcomes was available. Missing data on the covariates were imputed (see below) to yield an NLSY79 sample of 3575 and an NCDS sample of 4880.

3.2. Measures

3.2.1. Health

We examine two health indicators – self-rated health (SRH) and depression – both measured at the first interview following the woman's 40th birthday (the first time these indicators of health were assessed in the NLSY79). For SRH, NLSY79 respondents were asked: "In general, would you say your health is excellent, very good, good, fair, or poor?" NCDS participants were asked: "How would you describe your health generally? Would you say it is excellent, good, fair, or poor?" We create a dichotomous measure by coding fair and poor responses as poor health (yes = 1; no = 0), resulting in frequencies of 12.1% (weighted) in the NLSY79 and 18.3% in the NCDS⁴.

The NLSY79 measured depression using a seven-item version of the CES-D scale (Radloff, 1977). From scores of 0–21 (Cronbach's alpha = 0.84), we assign a threshold of 8 to designate depression (yes = 1; no = 0). The NCDS measured depression using the 24-item Malaise Inventory (Rutter, Tizard, & Whitmore, 1970; Rodgers, Pickles, Power, Collishaw, & Maughan, 1999). From scores of 0–24

(Cronbach's alpha = 0.83), we again assign a threshold of 8 to designate depression (yes = 1; no = 0). Our depression cut-points are consistent with those used by other researchers (Levine, 2013; Rodgers et al., 1999). The prevalence of depression is 15.5% (weighted) in the American sample and 14.6% in the British sample.

3.2.2. Early-life disadvantage

Early-life disadvantage is measured using two indicators from the family of origin and one from adolescence. In the family of origin, socioeconomic disadvantage is assessed using *mother's education*: for the US, having completed less than 12 years of education and, for Britain, having left school by the minimum leaving age (yes = 1; no = 0). Maternal education is a reliable indicator that is usually known, remains stable over time, and is less subjective than reports of parental employment status, occupation, and childhood poverty (Ross & Mirowsky, 2011). The availability of family resources is measured by whether a respondent *lived with only one parent* at age 14 (US) or 16 (Britain) (yes = 1; no = 0) (Elman & O'Rand, 2004). Those from one-parent families are more likely to experience behavioural problems and school failure in childhood, and truncated educational attainment (Wickrama, Conger, Wallace, & Glen, 2003; Williams et al., 2011). The indicator of disadvantage during adolescence is *educational attainment*: whether a woman completed less than 12 years of education (US) or did not obtain her O-levels (Britain) (yes = 1; no = 0). This minimal schooling generally bars individuals from entering post-secondary and tertiary education (i.e., levels 4–6 of the International Standard Classification of Education) (UNESCO, 2006).

3.2.3. Employment–marriage life courses

Paid work and marital biographies are derived from start and end dates for employment and marital periods. Using 15 annual time periods (years in which the

³ Women who had *not* given birth by age 39 comprised 16.2% of the NLSY79 and 14.7% of the NCDS samples.

⁴ For the NLSY79, the SRH percent distribution (weighted) is: excellent = 22.8; very good = 37.3; good = 27.7; fair = 9.2; and poor = 2.9. For the NCDS, the percent distribution is: excellent = 29.0; good = 52.7; fair = 14.5; and poor = 3.8.

respondent was ages 25–39) we code a set of categorical variables representing whether, during that year, a respondent was: (1) primarily employed full-time, part-time, or non-employed; and (2) primarily married or not⁵.

We use the separate-domain measures to create a six-category joint-states variable covering all possible combinations of employment and marriage (3 employment \times 2 marital states). The 15 joint-state variables – one for each of the 15 ages in a respondent's record – are then reduced using optimal matching analysis (see Section 3.3) to produce a six-category classification of employment–marriage life course patterns: 1 = Married Mother Full-timer; 2 = Married Mother Part-timer; 3 = Married At-home Mother; 4 = Divorcing Back-to-work Mother⁶; 5 = Single Employed Mother; and 6 = Single At-home Mother. The first three groups are characterized by stable marriages, but are distinguished by their paid work patterns. The fourth group reflects a variant of the 'traditional' family pattern—homemaking and a stable marriage in early adulthood, followed by divorce/separation and entry into the labour force. The fifth and sixth groups both reflect the absence of a stable marriage, but differ with respect to long-term labour force attachment.

3.2.4. Controls

Two prior health indicators are included as controls because of their potential association with both the outcomes of interest and the pathways influencing them: whether respondents had health limitations at age 23 that prevented work (yes = 1; no = 0) or limited work (yes = 1; no = 0). For the NLSY79, we also control for membership in a disadvantaged racial/ethnic group (yes = 1; no = 0)⁷.

⁵ We do not consider histories of non-marital cohabitation for three reasons. First, complete start and end dates for this type of living arrangement were not collected in the NLSY79 until 2002, when respondents were aged 38–45—too late to be useful for our purposes (data were not retrospective). Second, the information we do have for the American sample indicates that, at *single* time points (i.e., at each interview), no more than 6 percent were cohabiting. Age-specific proportions are higher for the NCDS sample, where we do have complete histories; however, from those histories we know that the vast majority of British cohabitation spells lasted two or fewer years. Finally, because we are interested in *longitudinal* patterns (and because non-marital cohabitation for this generation tended to be a prelude to marriage, so would not appreciably alter life course type assignment as defined here), we would need to isolate a group who cohabited through most or all of the 15 years covered. The complete histories available for NCDS respondents reveal that this would be such a tiny fraction of the sample as to be substantively meaningless.

⁶ The Divorcing Back-to-work Mother model biography involves marriage up to the woman's mid-30s and a transition to paid work shortly thereafter—a fairly specific combination felt to be relevant to the cohort in our study, though not necessarily prevalent. It should be noted, as well, that some Single At-home Mothers and Single Employed Mothers were married for a short time; hence, these groups include women who experienced a break-up earlier the 15-year observation period (and were mostly non-employed or mostly employed during this time).

⁷ In the NCDS, information on race/ethnicity was not collected until age 33. More importantly, among those who answered the question (12% of our analytic sample did not), 98% chose "White." This squares with both the reality in 1958 Britain and the estimates of other analysts for this survey (Power & Elliott, 2006). Thus we can be fairly confident that there is essentially no variation along this dimension in our British sample, hence no reason to control for it.

3.3. Analysis

3.3.1. Dynamic optimal matching

Prior to testing our analytic model for CAD processes and mothers' health, we used an innovative strategy – dynamic optimal matching (OM) – to characterize women's adult employment–marriage trajectories. This method enabled us to address several challenges faced by those who work with detailed life histories: reducing the data, while simultaneously respecting theoretical interests and taking account of the complexity intrinsic to extended multiple-domain biographical sequences. OM accomplishes this by classifying these otherwise unwieldy data according to theoretically meaningful and/or empirically-based criteria. We conducted the joint-state OM using a refinement devised by Lesnard (2010) and implemented in Stata -seqcomp⁸. Lesnard's method better distinguishes respondents on the basis of the timing of states within the life course than do standard algorithms and, for our data, produces no ties (instances where individuals are matched with more than one life course type). Like all OM, this approach has at its heart the calculation of distance measures, that is, measures of the distinctness (or similarity) of individuals' biographical sequences (Abbott & Tsay, 2000). The technique uses information on states at each age in the biographical sequence (in our case, employment/marital statuses over ages 25–39 years), and calculates a distance measure representing the 'cost' of converting one person's sequence to another's (MacIndoe & Abbott, 2004). Individuals are then either clustered empirically or matched to their nearest theoretically-derived sequence. We chose to calculate distances relative to a set of six reference sequences, or 'model' employment–marriage biographies. These biographies were developed separately by all authors, then assessed for overlap (found to be substantial) as well as unique patterns that were of theoretical interest, to arrive at the final six. Following OM, the validity of the classification was assessed by examining between-group heterogeneity and within-group homogeneity (both considerable), using information on individuals' 'own-group' distance measures.

3.3.2. Imputation

Dynamic optimal matching requires complete data on the sequence variables. Because many respondents were missing data from one or more interviews, we imputed values where necessary in order to retain as many cases as possible in the analyses and keep the findings representative. Imputations were carried out in Stata (-ice-), using a two-fold fully conditional multiple imputation specification (Van Buuren, Boshuizen, & Knook, 1999). For further details see Worts, Sacker, McMunn, & McDonough (2013). Following optimal matching, missing covariate values were imputed using chained equations (White, Royston, & Wood, 2011) in Stata (-mi impute-). As is standard practice, these equations included individuals' employment–marriage trajectory type, along with a range of other variables known to be associated with early-life disadvantage.

⁸ See http://laurent.lesnard.free.fr/article.php?id_article=8.

3.3.3. Logistic regression and decomposition

Relationships among early-life conditions, employment–marriage life courses, and mothers' health are estimated via a series of logistic regression models run in Stata, using procedures designed to handle multiply imputed data. Estimates for the NLSY79 sample are weighted (see Section 3.1). Because the NCDS is a census of all births in a particular week in 1958, population weights are neither necessary nor available.

We begin by assessing the components of our model for CAD processes, using separate regressions for: (1) health on early-life disadvantages and controls; (2) health on life course type and controls; and (3) life course type on early-life disadvantages and controls. We then run a full model (health on early-life disadvantages, controls, and life course type) and decompose associations to evaluate the role of work–marriage life course type in the cumulation of health disadvantage. Decomposition separates the total association between each early-life circumstance and mid-life health into direct and indirect (via employment–marriage biography) components, providing a measure of the extent to which employment–marital histories intensify the health-harming effects of early-life disadvantages. We decompose associations using the KHB method (Karlson, Holm, & Breen, 2012), which corrects for rescaling to permit comparison of coefficients across nested logistic regression models. Implemented in Stata, KHB decomposition yields adjusted logits for the total, direct, and indirect associations for the variables of interest. We use these coefficients to calculate unbiased percentages attributable to direct and indirect components. In addition, we employ nested model comparisons (with and without key early-life disadvantages) to shed further light on the paths by which early adversity may translate into compromised health at midlife.

4. Results

4.1. Sample characteristics

Table 1 lists the characteristics of the two samples. Across all individuals and time points, American mothers spent more years in full-time employment than in part-time work or not employed, and more years married than not. Only 17% completed less than 12 years of schooling, while a third had mothers with low education. Just over one-quarter lived with only one parent in adolescence. Like their American counterparts, British mothers were more frequently engaged in full-time than part-time or no employment (but with the balance shifted somewhat towards part-time work), and were more often married than not over the 15 years of follow-up. The prevalence of low educational attainment was higher among Britons than Americans – 30% of respondents and 75% of their mothers – but fewer lived with only one parent at age 16 (2%). These national distributions are very close to those reported elsewhere for comparable ages and time periods, except that other sources show a higher percentage of British adolescents living in sole-parent households (Office for National Statistics, 2003, 2008, 2013; US Census Bureau, 1985, 1993; Ventura, Mathews, & Hamilton, 2001).

Table 1

Mean years in each life course state and sample distributions of early-life disadvantage, by country.

	US ^a	Britain
	Mean years (of 15)	
Life course state		
Employed full-time	7.9	6.1
Employed part-time	2.5	4.1
Not employed	4.6	4.8
Married	11.0	11.5
Sample percent		
Early-life disadvantage		
Mother did not complete high school/left by minimum	33.5	75.1
Did not live with both parents at 14/16	26.5	2.2
Did not complete high school/O levels	17.4	30.0

^a Weighted estimates.

Because Table 1 presents employment and marital states averaged across all ages, it does not speak to longer-term patterns. Figs. 2 and 3 display, for the US and Britain, respectively, age-specific experiences in paid work and marriage for each OM-generated life course trajectory. They show that the original model biographies are quite well captured using this method, and represent identifiable longer-term patterns. For example, in both countries, all three married-mother groups consist primarily of women who were married at all 15 time points (less so at younger ages), but they are distinguished by employment patterns in line with their respective types (mostly full-time, mostly part-time, and mostly at-home). Mothers without stable marital partners and those whose partnerships ended are differentiated by their marital histories (mostly unmarried throughout, or mostly married at younger ages and mostly unmarried at older ages), as well as whether their work histories were dominated by non-employment, full-time employment, or (re-)entry at older ages⁹.

Table 2 provides distributions for the six employment–marriage biographies in each country, ranked by their expected relationships with health. Previous research leads us to speculate that mothers who are long-term married with a sustained attachment to the labour force (part-time or full-time) will be healthiest at mid-life. The next three biographies are challenging to differentiate in relation to their anticipated associations with health, but they share the potential for fewer resources and more stress (Pearlin, Schieman, Fazio, & Meersman, 2005). Stressors include marital break-up (Divorcing Back-to-work Mother); raising children alone while working for pay (Single Employed Mother); or being out of the labour force over the long term (Married At-home Mother). The relative lack of the resources that come from either paid

⁹ Because OM assigns each woman to her *closest-matched* sequence type (and very few will match in every detail), mean employment and marriage characteristics at each age do not correspond exactly to any given type. Thus, we speak of a particular employment–marriage group as comprising those who were *mostly* married and working full-time, *mostly* married and working part-time, etc.

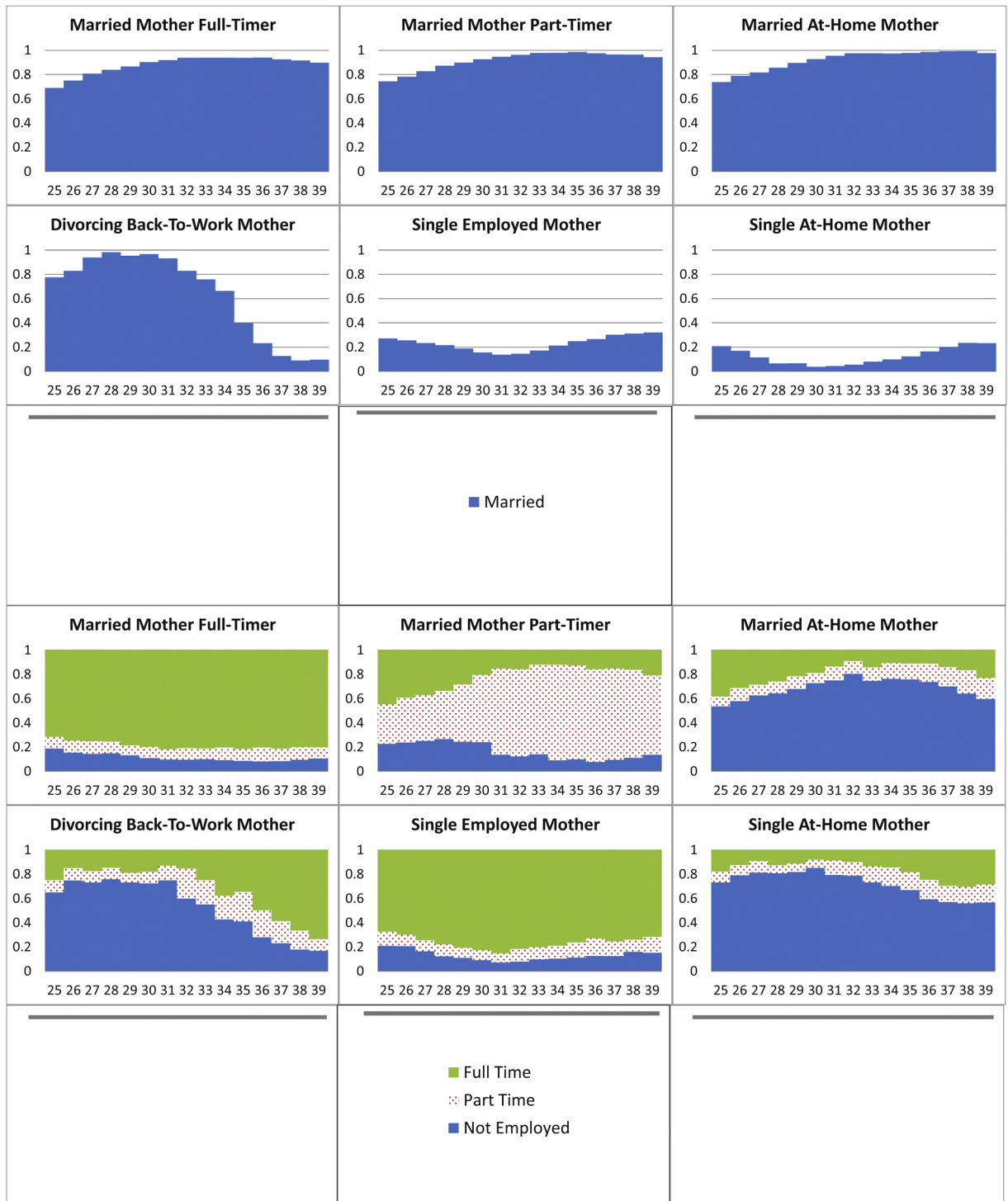


Fig. 2. Distribution of marital status and employment by employment–marriage trajectories, ages 25–39, US.

work or marriage locates Single At-home Mothers in the most vulnerable position with respect to predicted health.

Most women experienced what we expect are health-sustaining biographies: married mothers in (mostly)

continuous full-time or part-time employment (53% in the US, 54% in Britain). In both countries, a little over one-fifth were stably married but with a weak attachment to the labour force, and 3–4% had a marriage end in

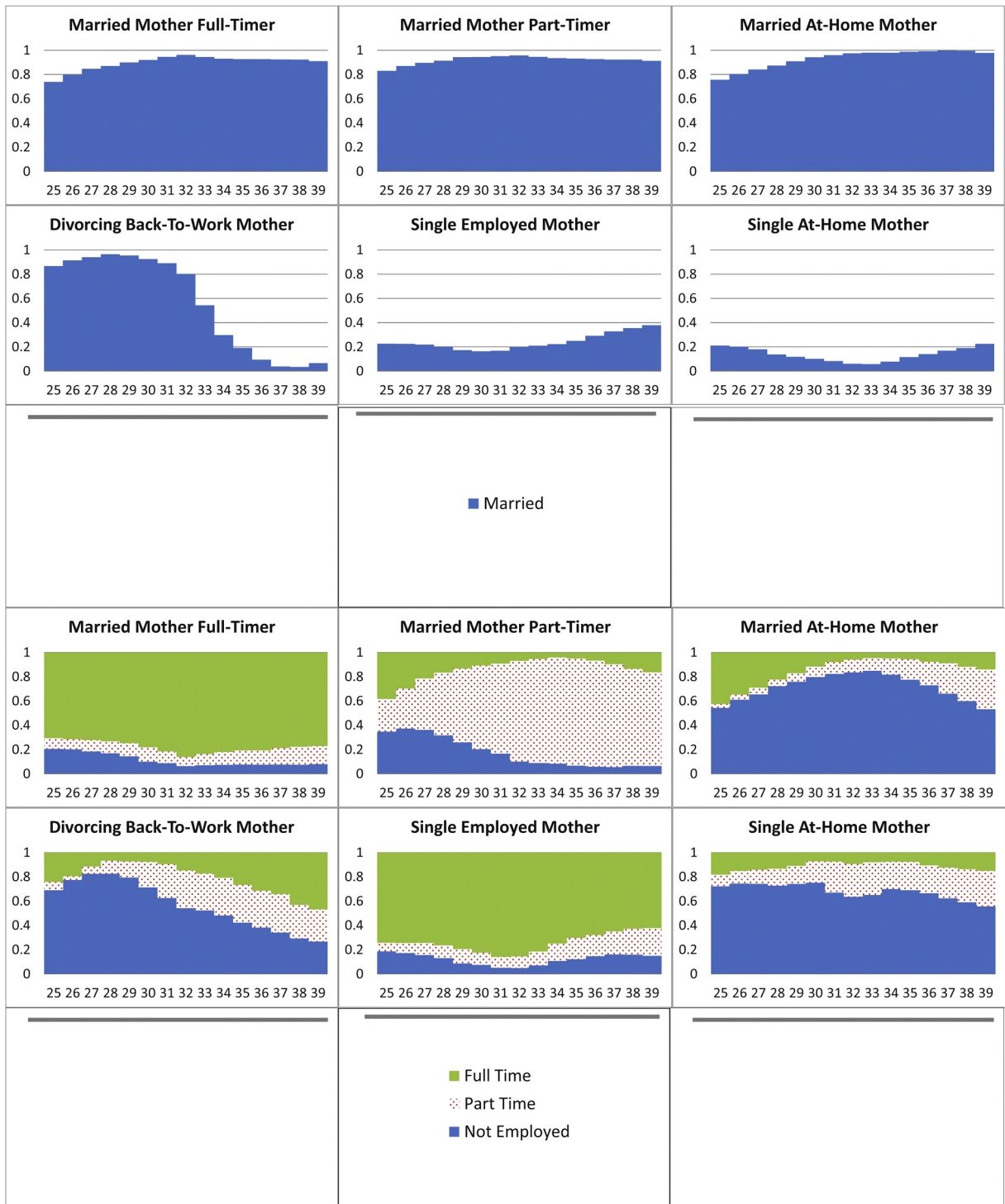


Fig. 3. Distribution of marital status and employment by employment–marriage trajectories, ages 25–39, Britain.

their mid-30s, followed by (re)entry into paid work (see fn. 6). American mothers were marginally more likely than their British counterparts (22% versus 19%) to have spent the majority of the 15 years without a marital

partner, whether attached to the labour force (Single Employed Mothers) or in the group considered at greatest risk for poor mid-life health (Single At-home Mothers).

Table 2
Description and distribution of employment–marriage life course groups, by country.

Employment–marriage life course	Employment–marriage patterns age 25–39	Distribution ^a	
		US ^b	Britain
1. Married mother full-timer	Mostly married throughout; mostly employed full-time throughout	40.71	28.62
2. Married mother, part-timer	Mostly married throughout; mostly employed part-time throughout	11.91	25.01
3. Married at-home mother	Mostly married throughout; mostly out of the labour force throughout	22.34	22.95
4. Divorcing back-to-work mother	Mostly married, then mostly unmarried; mostly homemaker, then mostly employed	2.98	3.99
5. Single employed mother	Unstable or no marriage; mostly employed full-time throughout	14.88	13.01
6. Single At-home Mother	Unstable or no marriage; mostly out of the labour force throughout	7.17	6.42

^a Percent distributions are averaged over 20 multiple imputation datasets.

^b Proportions are weighted.

4.2. Early-life disadvantages and health

We begin the analysis by estimating bivariate relationships between early-life disadvantages and health in adulthood, net of controls (Table 3). Results for the US reveal that low education (own and mother's) and living in a sole parent household in adolescence increased the odds of poor health and depression. In Britain, only the woman's own education was significantly associated with mid-life health; not completing O-levels doubled the odds of poor self-rated health and depression in her early 40s.

4.3. Social selection into employment–marriage biographies

We next assess the first segment of our proposed CAD pathway: the selection of women into potentially health-damaging (or out of health-sustaining) employment–marriage biographies on the basis of hardships during childhood and adolescence. Table 4 shows that American and British women with low educational attainment were more likely to experience unstable marriage (Divorcing Back-To-Work Mother) or a weak attachment to the labour force (Married At-home Mother), and even more likely to experience both (Single At-home Mother) than they were to be a Married Mother Full-timer. In the US, Married Mother Part-timers tended to come from less disadvantaged backgrounds (OR = 0.6 for higher maternal education) suggesting

Table 3
Odds of poor self-rated health and depression by early-life condition and country^a.

	Poor self-rated health	Depression
US		
Early-life conditions		
Mother did not complete high school	1.958***	1.580***
Did not live with both parents at 14	1.759***	1.298*
Did not complete high school	3.097***	2.281***
Britain		
Early-life conditions		
Mother not schooled beyond minimum	1.103	1.068
Did not live with both parents at 16	0.823	0.820
Did not complete O levels	2.281***	2.333***

^a Bivariate associations, net of health limitations at age 23 and, for the US, race/ethnicity.

* $p < 0.05$.

*** $p < 0.001$.

that longer-term part-time employment (combined with stable marriage) may be a mark of privilege. Among British women, by contrast, this group was more likely to have low educational attainment (OR = 1.6). In addition, while American women who lived with only one parent in mid-adolescence had higher odds of marital disruption or weak/no marital ties (OR = 2.0 for Divorcing Back-to-work Mother; OR = 1.5 for Single Employed Mother; OR = 2.0 for Single At-home Mother), this early-life disadvantage did not select British women into potentially health-harming employment–marriage biographies.

4.4. Employment–marriage trajectories and health

If our model of CAD processes is correct, employment–marriage biographies should also be associated with the health outcomes. Fig. 4 depicts the relative risks of poor

Table 4
Odds of selection, via early-life disadvantage, into employment–marriage biographies, by country^a.

	U.S.	Britain
Married mother part-timer		
Mother did not complete high school/left by minimum	0.607**	1.142
Did not live with both parents at 14/16	0.894	0.794
Did not complete high school/O levels	0.893	1.588***
Married at-home mother		
Mother did not complete high school/left by minimum	0.919	1.062
Did not live with both parents at 14/16	1.014	1.192
Did not complete high school/O levels	2.450***	1.775***
Divorcing back-to-work mother		
Mother did not complete high school/left by minimum	0.768	0.972
Did not live with both parents at 14/16	2.027**	0.052
Did not complete high school/O levels	2.902***	2.364***
Single employed mother		
Mother did not complete high school/left by minimum	0.984	1.134
Did not live with both parents at 14/16	1.539**	0.665
Did not complete high school/O levels	1.086	1.156
Single At-home Mother		
Mother did not complete high school/left by minimum	1.141	1.322
Did not live with both parents at 14/16	1.969***	1.331
Did not complete high school/O levels	4.708***	4.100***

^a Reference group is married mother full-timer. Models control for work-related health limitations at age 23 and, for the US, race/ethnicity.

** $p < 0.01$.

*** $p < 0.001$.

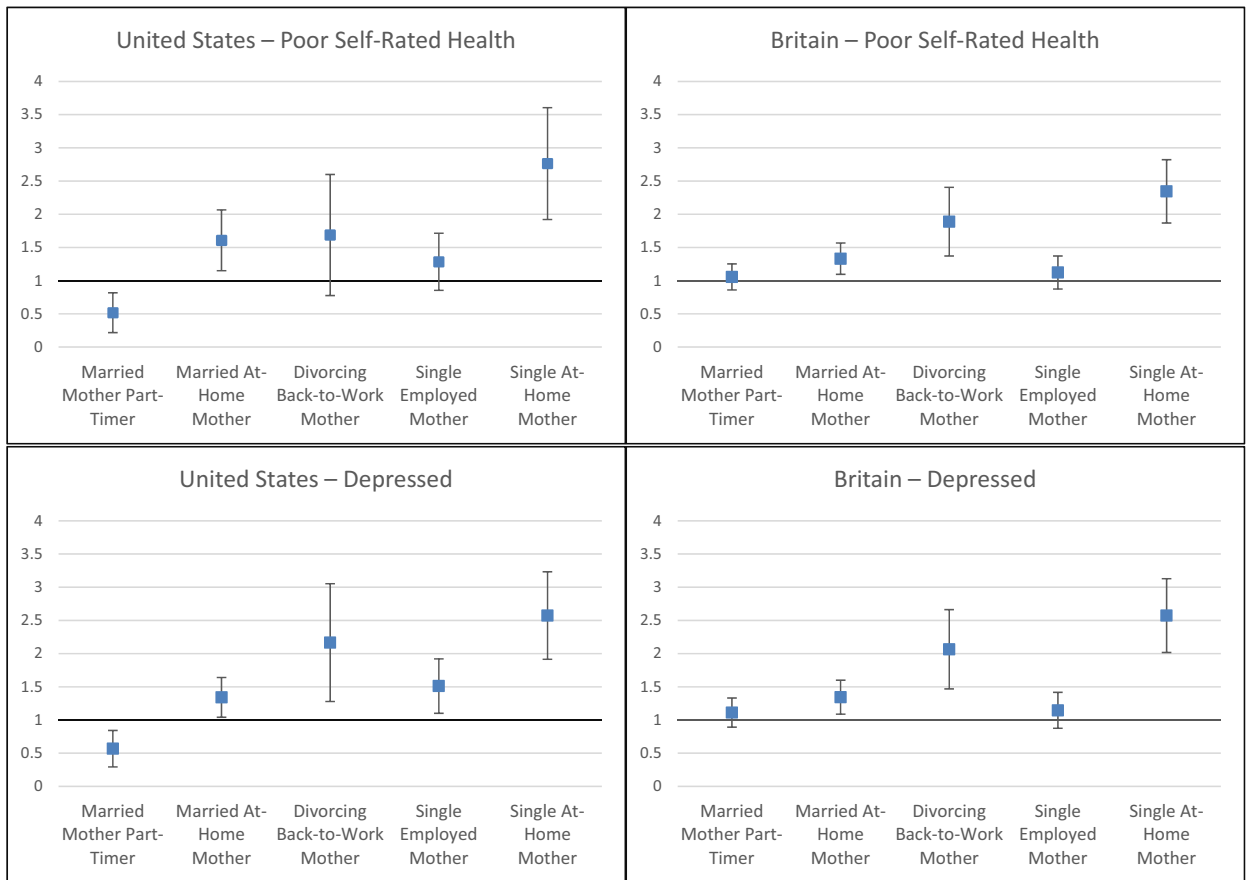


Fig. 4. Relative adjusted risk of poor self-rated health and depression, by employment-marriage biography (ref = married mother full-timer) and country.

self-rated health or being depressed for each employment-marriage life course type, compared with Married Mother Full-timers, net of controls. We expected married mothers with a strong attachment to the labour force to have the best health, lone mothers with little or no long-term paid work experience to have the worst, and those with other employment and marriage trajectories to have intermediate risks. This is generally borne out for both countries, with three exceptions. First, Single Employed Mothers in both countries were no more likely than Married Mother Full-timers to rate their health as poor; the same is true for depression, but only among British mothers. Second, American Divorcing Back-to-work Mothers were not at higher risk of reporting poor health than Married Mother Full-timers. And finally, in the US, stably married mothers who worked part-time over most or all of the 15 years were significantly less likely to report poor health or be depressed at mid-life than their full-time employed counterparts. The latter conclusion is contrary to recent research that finds little or no difference in the health of mothers working part-time or full-time; however, these studies use different measures of health than our own, assess employment over (often much) shorter time periods and/or do not model paid work in conjunction with marital histories (Brooks-Gunn, Han, & Waldfogel, 2010; Buehler &

O'Brien, 2011; Frech & Damaske, 2012). Our results for Britain are more in keeping with existing work: Long-term marriage and part-time employment – a more common strategy for mothers in that country than in the US – was associated with the same risks as the reference group.

Additional investigation using reference groups other than Married Mother Full-timers sheds light on the health ranking of the employment-marriage trajectories we anticipate will have intermediate risks (results available on request). These comparisons are at least partly consistent with expectations. Single At-home Mothers generally had the worst mid-life health, and two of the three 'intermediate-risk' groups (Married At-home Mothers and Single Employed Mothers) usually fell somewhere between Married Mother Full-timers (or Part-timers) and Single At-Home Mothers. However, Divorcing Back-to-work Mothers (those whose marriage ended recently and who returned to work) were somewhat anomalous—both more and less vulnerable than expected, depending on the context and health measure. They were more susceptible to depression in both countries (and to poor health in Britain) than Married At-home Mothers, more likely to experience both poor self-assessed health and depression than Single Employed Mothers in Britain, and at no less risk for both outcomes than Single At-home

Mothers in both countries. At the same time, they were no more likely to report poor health than Married Mother Full-timers in the US. A mixed picture is also evident in longitudinal research on the health implications of divorce (Lorenz, Wickrama, Conger, & Elder, 2006; Williams & Umberson, 2004). Some of this work suggests that the negative associations between divorce and depressive symptoms may decline and stabilize over time (Bleke-saune, 2008; Strohschein, McDonough, Monette, & Shao, 2005), but our study design (health measured once at mid-life) precluded an assessment of this pattern.

These results suggest that mothers' health at early mid-life can be distinguished on the basis of certain patterns of combined, long-term experiences in key life domains. Sustained weak attachment to the labour force is generally associated with worse health, regardless of marital history, but the risks are greatest when this coincides with the lasting absence of a partner. Women whose marriages ended and who then combined parenthood and employment are, for the most part, at greater risk for poor health and depression than long-term married working mothers (as well as long-term married at-home mothers). And, among women who were involved in extended lone parenting, sustained engagement in paid work predicted better health in both countries. Finally, in the US only, lasting part-time work appears better than a history of full-time employment for the health of steadily married mothers.

4.5. Path-dependent CAD and health

Having ascertained that early-life disadvantages are associated with adult health, that adversity in childhood and adolescence selects women into certain work–marriage biographies, and that those biographies, in turn, predict mid-life health, we are now in a position to test a path-dependent model for CAD processes. From models that also include work–marriage biography, we decompose the associations between early-life disadvantages and mid-life health into their direct (attributable solely to the early-life condition, net of controls and other early-life conditions), indirect (attributable to the pathway through work–marriage life course type), and total (direct+indirect) constituents. Table 5 shows the results of this decomposition. For both American and British mothers, results suggest that elevated risks rooted in low educational attainment cumulated by means of work–marriage biographies in poor self-assessed health and depression. The proportions attributable to the path through work–marriage biography are greater for the US than for Britain: 0.19–0.23 versus 0.10–0.11. Further investigation (available on request) shows that, for both outcomes, this path operated primarily through selection into Single At-Home Motherhood (and in the US, to a lesser extent, by selection out of the Married Mother Full-timer trajectory). In addition, there is evidence, for American mothers' depression risks, that selection into

Table 5
Decomposition of effects of life course type (LCT) and early life conditions on health, by country.

	Poor self-rated health		Depression	
	Logit	Percent of total	Logit	Percent of total
US				
Mother did not complete high school				
Total	0.353**	100.00	0.271 ^a	100.00
Direct	0.316 ^a	89.49 ^b	0.236 ^a	87.23 ^b
Indirect (through LCT)	0.037	ns	0.035	ns
Did not live with both parents at 14				
Total	0.241	ns	0.049	ns
Direct	0.181	ns	−0.037	ns
Indirect (through LCT)	0.060	ns	0.085 ^c	n/a ^c
Did not complete high school				
Total	0.920***	100.00	0.718***	100.00
Direct	0.745***	81.01	0.555***	77.28
Indirect (through LCT)	0.175***	18.99 ^a	0.163***	22.72 ^a
Britain				
Mother not schooled beyond minimum				
Total	0.082	ns	0.048	ns
Direct	0.075	ns	0.039	ns
Indirect (through LCT)	0.007	ns	0.008	ns
Did not live with both parents at 16				
Total	−0.236	ns	−0.242	ns
Direct	−0.255	ns	−0.258	ns
Indirect (through LCT)	0.019	ns	0.016	ns
Did not complete O levels				
Total	0.823***	100.00	0.844***	100.00
Direct	0.740***	89.89	0.753***	89.12
Indirect (through LCT)	0.083**	10.11 ^a	0.092**	10.88 ^a

^a Mediation operates primarily via selection into Single At-Home Motherhood (and, in the US, to a lesser extent by selection out of the Married Mother Full-timer biography).

^b Effect is not mediated by LCT, net of other ELDs.

^c Effect is indirect only. Mediation operates primarily via selection into Single At-Home Motherhood.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

less health-sustaining work–marriage biographies (especially Single At-home Motherhood) raised to significance a non-significant direct association with one parent in adolescence. In the US, mother's education was directly related to both health outcomes, but there is no evidence of an indirect path through work–family life course type, net of other early-life disadvantages.

Nested model comparisons (available on request) do, however, point to paths from maternal education and family structure in mid-adolescence through work–marriage biographies—at least, for American mothers. These paths operated via the woman's own education (mother's education → R's education → work–marriage biography → mid-life health). This same transmission route is evident for the association between living in a sole-parent household in adolescence and poor self-assessed health (family structure in adolescence → R's education → work–marriage biography → mid-life health). Moreover, as discussed above, the latter association also worked partially through work–family biography alone (family structure in adolescence → work–marriage biography → mid-life health). Among British mothers, by contrast, we found no evidence for either health outcome of an indirect path from these two early-life disadvantages through work–marriage trajectory type—even one that operated *via* other early-life disadvantages. This null finding for Britain must be interpreted with caution for two reasons. First, early school leaving among respondents' mothers was quite common in the British sample (75%) and, thus, may not be a clear indicator of early life course 'risk'. Second, the lack of variability on not living with both parents in adolescence (98% lived with both) likely limited our ability to detect significant effects among Britons. These measurement issues do not, however, affect our findings concerning cross-national differences in social inequalities in health—a subject to which we now return.

4.6. CAD and social inequalities in health

We shed additional light on these disparities by calculating predicted health risks for mothers whose life courses traced markedly different early life → work–marriage pathways. To make the contrasts meaningful, we focus on the four combinations defined by low and high education (the early-life circumstance that consistently matters in both countries) and the most and least 'healthy' work–marriage biographies (Married Mother Part-timer¹⁰ and Single At-home Mother). Fig. 5 shows the predicted probabilities of poor health and depression for British and American mothers with these four contrasting profiles. It reveals several noteworthy features relevant to CAD processes and the production of social inequalities in mid-life health. First, for British mothers, a low education → Married Mother Part-timer 'life path' was essentially equivalent, in health terms, to moving from high education to a Single At-home Mother adult biography. In

other words, the vulnerability associated with an educational deficit was equivalent to that attached to an 'unhealthy' adult biography. The same can be said of poor self-rated health in the US, although confidence intervals overlap by only a small margin (upper CI for Married Mother Part-timers with low education = 0.13, lower CI for Single At-home Mothers with high education = 0.12). By contrast, mothers in the US who obtained at least a high school education but later followed a Single At-home Mother trajectory were much worse off with respect to depression risks than those who traced a low education → Married Mother Part-timer 'life path.' That is, the work–marriage life course they followed appears to have been more consequential, in health terms, than the (dis)advantage with which they began.

A second noteworthy feature is the social gradient that is evident for both health outcomes and both countries. Women who entered adulthood without a basic education and subsequently traced the least 'healthy' work–marriage biography were at much greater risk than those who obtained a basic education or better and then followed the most salutary adult trajectory. For example, American mothers in the latter group had a probability of reporting poor health at mid-life of 0.04, while for those in the former group the probability was 0.30—a relative risk of 7.5 times for the most disadvantaged versus the most advantaged mothers. The corresponding gradient for depression among mothers in the US was 0.07 versus 0.39—a relative risk of nearly six times.

Finally, the evidence of cumulative disadvantage involving work–marriage biographies found for Britain is reflected in social inequalities in mothers' mid-life health that were about one-half to two-thirds the size of those in the US. British mothers with the least healthy profile (Single At-home Mothers with low education) had just 3.4 times the probability of reporting poor health, and 3.6 times the likelihood of being depressed, as those with the most salutary profile (Married Mother Part-timers with high education).

5. Discussion

Drawing on insights from a range of literatures and adopting a broader, longer, and more contextualized view than previous research, this study sheds new light on how inequalities in women's health may develop over the adult life course. We explore a previously unrecognized 'chain of risk' implicated in what might be called a 'life-path' gradient in health. In so doing, we find evidence that elevated vulnerability rooted in low educational attainment (and its antecedents) may cumulate over the life course via health-damaging employment–marriage trajectories, ultimately widening inequalities in mothers' health. This micro-level process appears to be somewhat context-specific, with observed gradients at mid-life being larger among American than British mothers.

Beyond these principal findings, the study makes several other unique contributions. First, our innovative strategy for modelling extended biographies enables us to explore the associations between health and *long-term, combined* patterns of employment and marriage, and, thus,

¹⁰ We use Married Mother Part-timer because that biography is clearly associated with the best health in the US, and is equivalent-to-best (indistinguishable from Married Mother Full-timer) in Britain.

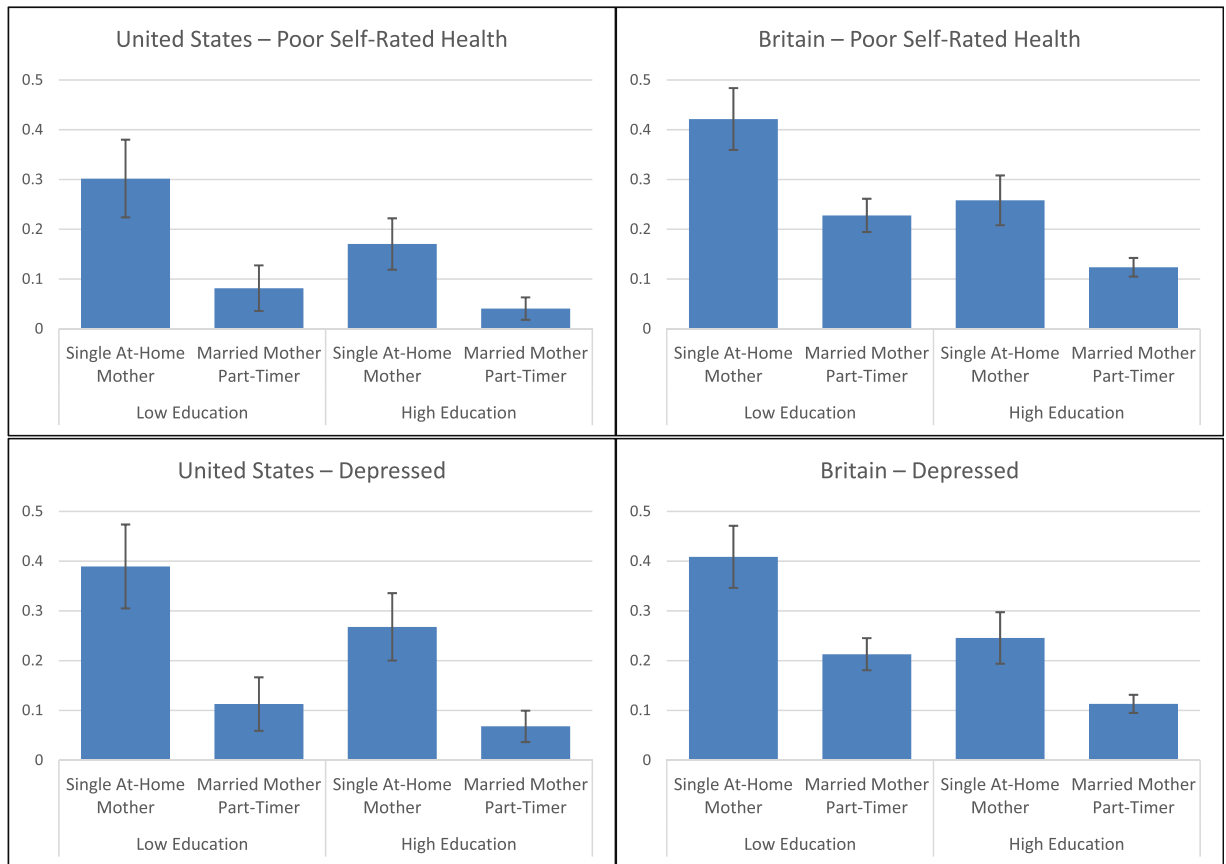


Fig. 5. Probability of poor self-rated health and depression for contrasting early-life/adult biography profiles. Distributions are adjusted probabilities from models including early-life disadvantages and prior health limitations. In the calculation of probabilities for low and high education, other early-life disadvantages and prior health limitations are set at their sample means. For the US, probabilities are calculated for non-Hispanic Whites, to better approximate the composition of the British sample.

to contribute to the literatures on employment, marriage, and women's health. We demonstrate, for example, that the ongoing absence of both paid work and a marital partner predicts worse self-rated health than the lasting absence of either one alone. This finding adds nuance to existing research on the health-sustaining effects of marriage (Dupre et al., 2009; Hughes & Waite, 2009). It suggests that, among mothers, a strong attachment to the labour force may compensate, in health terms, for the long-term absence of a partner (as can a stable marriage for a weak attachment to the labour force).

Second, our analysis quantifies the extent of selection into less 'healthy' employment–marriage biographies on the basis of characteristics that themselves elevate risks. Consistent with previous research (e.g., Montez, 2013; Schafer, Wilkinson, & Ferraro, 2013), education is a key determinant in both countries. In addition, family structure in adolescence selects women into adult trajectories involving unstable marriage—but only in the US. Our results also extend those of the one existing similar study (of employment biographies only, using American data) (Frech & Damaske, 2012), by showing that education-based selection is even stronger for trajectories combining

unstable/no paid work with unstable/no marriage, and that selection processes may differ across institutional contexts.

A third noteworthy finding is that the health status of long-term lone mothers can be distinguished on the basis of their employment histories. Our combined biographies demonstrate that ongoing involvement in paid work is associated with better health among long-term single mothers. In both countries, Single Employed Mothers were significantly less likely to report poor health, or to be depressed, in their early 40s than Single At-home Mothers. And in Britain, continuous employment meant they were also in no worse health than stably married mothers. These results add important complexity to the multitude of studies showing that lone mothers are in worse health than their married counterparts (e.g., Avison et al., 2007; Benzeval, 1998; Evenson & Simon, 2005; Grundy & Tomassini, 2005; Henretta, 2007; Koropeckyj-Cox et al., 2007; Kalil & Kunz, 2002; Martikainen, 1995; Wickrama et al., 2006; Williams et al., 2011). In both the US and (especially) Britain, a secure attachment to the labour force may lessen or even eliminate the health risks associated with long-term lone motherhood.

A fourth contribution is somewhat unexpected: Ongoing part-time employment among married mothers, though more common in Britain, is uniquely 'healthy' in the US. Research on work–family conflict suggests that mothers may curtail their employment in response to overwhelming demands in these two domains (Bianchi & Milkie, 2010), and perhaps this strategy reduces health risks. Our study suggests, however, that part of the reason for their better health may be that Married Mother Part-timers are relatively advantaged in the US (they had better-educated mothers than the next-healthiest group). Relatedly, Cooke and Gash (2010) speculate that their finding of lower divorce hazards for part-time employed mothers in the US (but not in Britain) reflects the generally privileged position of American mothers who work shorter hours. We add evidence on *long-term* part-time work to support that conjecture. In addition, we note that the association between ongoing part-time employment and privilege in the US, but not in Britain, is consistent with the two nations' approaches to social welfare. Historically, British social and labour market policy has aimed to support (although not generously) male breadwinning and female caregiving (Backhans, Burström, & Marklund, 2011; Ciccio & Verloo, 2012; Lewis, 1992), making it both possible and necessary for many mothers to work part-time. By contrast, the very weak social safety net in the US (Esping-Andersen, 1990; Kamerman & Kahn, 1997; Smeeding, 2005) virtually compels mothers to work full-time over the longer-term—as the majority of steadily married mothers in our study did. Under such circumstances, part-time work may become a restricted option, more often sustainable where personal or household resources are on the generous side.

Our results need to be interpreted in light of several limitations built into the data and the analytical strategy. The first is that the available measures of self-assessed health and depression are not identical in the two surveys and, thus, may not be strictly comparable (Jurges, Avendano, & Mackenbach, 2007). However, we use a combination of strategies to accommodate the differences. We dichotomize both outcomes according to recommended practice (Jurges et al., 2007; Levine, 2013; Rodgers et al., 1999); and, where we compare outcomes across countries, it is on the basis of *relative*, rather than absolute measures. Thus, our general conclusions regarding cross-national differences in CAD processes should not be affected.

A second limitation is our restricted capacity to control for health in childhood and adolescence. Our central interest was in the pathways linking early-life disadvantage to health at mid-life through selection into various employment–marriage trajectories. However, it could be argued that it is poor health at younger ages that sets people on the paths of disadvantage that we assessed, that is, low educational attainment and unstable or no employment and/or intimate relationships in adulthood. Although we used the only early-life health control available in both data sets (i.e., health limitations at age 23 that prevented/limited work), we cannot rule out the possibility that the associations between employment–marriage biographies and mid-life health are confounded by health status earlier in the life course.

A third limitation concerns imputation. Dynamic optimal matching requires complete data on the employment and marital sequences. To the extent that imputed values do not match actual circumstances, our results may not exactly reflect the role of work–marriage biographies for this cohort of American and British mothers. Similar concerns may apply to the imputation of covariate values in order to keep as many individuals as possible in the study. We have, however, gone to considerable lengths to accommodate the uncertainty associated with imputed sequence values—using a two-fold fully conditional specification, running a large number of imputations and working with techniques that adjust standard errors to account for any variation across imputed datasets. In addition, a sensitivity analysis conducted on a sample whose eligibility was based on more stringent criteria for sequence missingness (results available on request) reveals that none of our conclusions would change—although between-country differences in the health gradients for contrasting 'life path' profiles would be somewhat larger (likely because missingness is associated with social disadvantage). Likewise, an analysis based on the sample that excluded those without complete covariate information replicated all the main findings here, but found somewhat stronger between-country differences in 'life path' gradients. As a result of all these measures, we have considerable confidence in the findings presented here.

A final limitation concerns what we can say, more precisely, about the role of institutional contexts in processes of cumulative disadvantage and women's health. While we have identified differences between American and British mothers that are consistent with what we know about the two nations' broad-brush approaches to labour market and care-based inequalities (Esping-Andersen, 1990), we cannot say, unequivocally, that they are causally linked to diverging institutional practices. Nor can we determine what *specific* policy instruments might minimize (or maximize) the cumulation of health disadvantage, or the extent to which families are actually availing themselves of such programmes (Parcel, Campbell, & Zhong, 2012). We also cannot say whether similar principles apply in other types of welfare states. In this respect, our work should be viewed as a point of departure for future studies, to be conducted as the necessary data become available. Future work might, for example, incorporate enough countries to conduct a multi-level analysis, and a range of level-two measures designed to pinpoint which aspects of the institutional context are most effective at minimizing the CAD processes examined here.

These limitations aside, our study begins the important task of unpacking the black box surrounding the mechanisms that generate and sustain social inequalities in women's health. By comparing micro-level processes of cumulative (dis)advantage between two welfare states, it adds a new dimension, one that is especially relevant to the lives of mothers, to our understanding of how these inequalities persist. At the same time, our documentation of cross-national differences supports the view that growing disparities are not inevitable—that a policy

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