De-standardization and gender convergence in work–family life courses in Great Britain: A multi-channel sequence analysis

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A R T I C L E   I N F O

A B S T R A C T

This study addresses the question of de-standardized life courses from a gender perspective. Multi-channel sequence analysis is used to characterise the domains of work, partnership and parenthood in combination across the adult life courses of three birth cohorts of British men and women between the ages of 16 and 42. Three research questions are addressed. First, we examine whether there is evidence of increasing between-person de-standardization (diversity) and within-person differentiation (complexity) in work and family life courses across cohorts during the main childrearing years. Second, we investigate whether men's and women's work–family life courses are converging over time. Finally, we assess the link between educational attainment and work–family life courses across cohorts. Data are from the MRC National Survey of Health and Development 1946 birth cohort ($n = 3012$), the National Child Development Study 1958 birth cohort ($n = 9616$), and the British Cohort Study 1970 birth cohort ($n = 8158$). We apply multi-channel sequence analysis to group individuals into twelve conceptually-based work–family life course types. We find evidence of growing between-person diversity, across cohorts, for both women and men. In addition, partnership trajectories are growing more complex for both genders, while parental biographies and women's work histories are becoming less so. Women's and men's work–family life courses are becoming increasingly similar as more women engage in continuous full-time employment; however, life courses involving part-time employment or a career break remain common for women in the most recent cohort. Continuous, full-time employment combined with minimal family ties up to age 42 emerged as the most common pattern for women and the second most common for men in the 1970 cohort.

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1. Introduction

Like many countries, Great Britain has seen dramatic changes in the nature of work, family and the normative gender divisions between them over the past forty years. Social institutions that divided labour between the sexes

(public, paid labour for one, unpaid caring and domestic labour for the other) have been steadily eroding (Kan, Sullivan, & Gershuny, 2011; Office for National Statistics, 2013), potentially leading towards 'gender convergence' in the distribution of paid work and family caregiving. Notably, continuous employment is now a fact of life for the majority of British women, including mothers (Dex, Ward, & Joshi, 2008; Hansen, Hawkes, & Joshi, 2009; ONS, 2013). Alongside this development, the institution of marriage is in decline (Morgan, 2011; Office for National Statistics, 2011, 2012), although the trend towards fewer and later marriages has been partly offset by rapid increases in the prevalence of non-marital cohabitation (Office for National Statistics, 2012; Coleman & Glenn, 2009). Parenthood, however, remains an event which often re-sets gender relations within families, with much evidence suggesting that mothers adapt their work patterns in response to the birth of a child, while fathers do not (Guidici & Gauthier, 2013; Pailhe, Robette, & Solaz, 2013; Schober, 2013), even over the long term (Fourage et al., 2010).

These social changes and continuities, mainly documented through cross-sectional snapshots of population trends, are often seen as evidence for the de-standardization of life courses—the idea that lives are less predictable and orderly than in a previous era where the male-breadwinner/female-caregiver model reigned supreme, at least for socioeconomically-privileged groups. The increasing availability of longitudinal, cohort data has allowed for the empirical testing of de-standardization processes. To this end, researchers are interested in capturing variation *between* individuals' life courses over time, as well differences *within* them (Aisenbrey & Fasang, 2010). Broadly, they have found growing diversity between life courses, as trajectories in key domains lose their putative universal character; and increasing fluidity within individual life courses, as patterns of employment and marriage grow increasingly unstable (Aisenbrey & Fasang, 2010; Bruckner & Mayer, 2005). Most of this work, however, has treated employment and family trajectories as separate domains.

In recognition of the interwoven nature of family life and paid work over the life course for women and, perhaps increasingly, for men, the current study uses multi-channel sequence analysis to investigate *combined* work–family trajectories for men and women in three British birth cohort studies. More specifically, we test for historical change by investigating whether work–family life courses are becoming more complex (within-person differentiation) and more diverse (between-person de-standardisation) across cohorts. We assess whether these processes differ for women and men and, as a final step, examine the links between educational attainment and work–family life courses.

1.1. Life course de-standardization, and differentiation

It is now commonly understood that biographies have become less predictable, less orderly and less collectively determined – more de-standardized – in recent decades (Beck, 1992; Bruckner & Mayer, 2005). Life course theorists

have distinguished between a variety of relevant concepts in relation to these social changes (Aisenbrey & Fasang, 2010; Bruckner & Mayer, 2005). Here we examine two distinct aspects as described by Aisenbrey and Fasang (2010): diversity *between* individuals in their work–family life courses (de-standardization), as well as movement between states *within* an individual life course (differentiation). The empirical study of de-standardization assesses the extent to which individuals are turning away from a normative, or at least statistically dominant, life course (Bras, Liefbroer, & Elzinga, 2010; Elder, Johnson, & Crosnoe, 2003; Kohli, 2007; Macmillan, 2005; Shanahan, 2000) in the face of an expanding array of 'options' about whether, when and how to engage in paid work, marriage and parenthood. In addition, researchers investigate the growth in complexity, or movement between states within an individual life course, as biographies become more dynamic in response to fluctuating risks across cohorts (Elzinga, 2010).

A number of studies have now used sequence analysis to examine de-standardization empirically in relation to family life courses (Elzinga & Liefbroer, 2007; Widmer & Gauthier, 2013) and employment histories (Anyadike-Danes & McVicar, 2010; Blair-Loy, 1999; Levy, Gauthier, & Widmer, 2013a,b; Martin, Schoon, & Ross, 2008; Simonson, Romeu Gordo, & Titova, 2011). Studies of parenthood and partnership fairly consistently suggest increasing between-person diversity across cohorts (Elzinga & Liefbroer, 2007), at least before the age of 30 (Widmer & Ritschard, 2009). Evidence regarding the de-standardisation of working life courses is less consistent. Using the two more recent British cohorts included in this study, Martin et al. (2008) reported greater diversity in the employment trajectories in young adults in the 1970 birth cohort than in the 1958 birth cohort. However, other studies suggest that de-standardization may be gendered. For example, Widmer and Ritschard (2009) observed, for the Swiss Household Panel, that women's employment trajectories became more diverse over time, while men's did not change.

1.2. Gender convergence and individualization

Some contend that life courses have also become more unstable as the breakdown of collective determination ushers in new risks (Beck & Beck-Gernsheim, 2002). These life course changes are sometimes interpreted in light of the individualization thesis (Beck, 1992; Beck and Beck-Gernsheim, 2002). "Individualization" reflects the assertion that, since approximately the mid-20th century, an epochal transformation of social institutions, and of the relationship between individuals and society, has been occurring. Simply stated, the controllability, certainty and security that underpinned institutions and action during the Enlightenment-based modern era are said to have collapsed. In their place have arisen the uncertainty, ambiguity and complexity that characterize the current period, often referred to as the second, or reflexive, modernity. Indeed, the weakening of patriarchal social structures in determining gender roles has been at the heart of descriptions of individualization in western

society (Beck & Beck-Gernsheim, 2001; Beck-Gernsheim, 2002)[1]. While the category of gender may have predicted women's and men's life courses in the modern era, in the second modernity the once-dominant model of a female caregiver paired for life with a male breadwinner has been supplanted by provisional, more negotiated marital biographies and women's stronger attachment to the labour force. Thus, in addition increasing differentiation and diversity in the timing, order, and/or duration of life course biographies, we expect to see gender convergence in work–family life courses as the power of patriarchal institutions to structure gender roles weakens. Using sequence analysis, Simonson and colleagues (2011) found 'housewife' trajectories increasingly replaced by part-time and career break trajectories for German women born between 1936 and 1965. However, this study excluded men, and none of the studies that have examined data for both women and men have tested for 'gender convergence.' Hence, while we have some empirical evidence that some aspects of individuals' lives have become more diverse during a period of rapid social change, it is still not clear whether and how these changes may be different for women and men.

Approaching the life course from a gender perspective requires us to acknowledge the inseparability of work and family life, particularly for women, but also, increasingly, for men. Pollock (2007) and Gauthier, Widmer, Bucher, and Notredame (2013) have demonstrated that multi-channel sequence analysis can be used to examine multiple life course domains in combination, in recognition of their real-world interdependence. We know of four previous studies using multi-channel sequence analysis to examine work–family life courses in combination. One used Spanish data to examine work–family life courses in women, but did not investigate cohort or gender differences (Davia & Legazpe, 2014). A second found evidence of increasing between-person de-standardisation in work–family life courses amongst American women, but was not able to examine gender differences (Worts, Sacker, McMunn, & McDonough, 2013). A third study investigated gender differences in work–family life courses amongst French couples (Pailhe et al., 2013), while a fourth compared class and gender differences in work–family life courses in the United States and Germany (Aisenbrey & Fasang, 2010). Neither of these latter two studies offered evidence on cohort differences.

1.3. Educational attainment and adult work–family life courses

Individualization theory has been criticised for its lack of emphasis on the structuring of individuals' ability to construct their work and family biographies according to the resources they have available (Brannen & Nilsen, 2004; Heinz, 2009). "Individualised" biographies may be

particularly risk-laden for those lacking educational credentials because these individuals continue to be overly-represented in fragile or non-existent marriages, and in low-paying, low-status and/or temporary jobs. Early school-leaving has been linked with early marriage and childbearing, a greater likelihood of divorce (Berrington, 2001; Fry & Cohn, 2010; Martin, 2006), and a lower likelihood of continuous paid employment in relatively high quality jobs (Berger, Steinmuller, & Sopp, 1993; Duffield, 2002; Lawton & Thompson, 2013; Pailhe et al., 2013; Worts et al., 2013). Moreover, parents with higher educational qualifications are better able to purchase reliable childcare in order to maintain full-time employment (Macran, Joshi, & Dex, 1996; Ward, Dale, & Joshi, 1996), and to maintain both stable partnerships and strong ties to employment (Attewell & Lavin, 2007). Thus, we hypothesise that higher educational attainment will predict membership in work–family life courses characterised by strong, stable links to paid work as well as stable partnerships. While educational attainment has increased across consecutive British cohorts (Department for Education, 2012; Higher Education Statistics Agency, 2014), we have no a priori reason to expect that its links with stable employment and partnership will have changed.

1.4. This study

This study addresses the question of de-standardized life courses from a gender perspective. It employs multi-channel sequence analysis to characterise combined work, partnership and parenthood biographies over ages 16–42, for three birth cohorts of British men and women. These biographies are then used to address three research questions. First, we examine whether there is evidence of increasing between-person de-standardization and within-person differentiation in work and family life courses across cohorts. Second, we investigate whether men's and women's work–family life courses are converging as would be predicted by the weakening of patriarchal institutions such as the gender division of labour. If so, we ask whether this convergence is the result of women's life courses becoming more like men's, or whether there is evidence that men's work–family life courses are also changing. Finally, we investigate whether educational attainment is linked with work–family life courses characterised by stronger ties to employment and partnership alongside later transitions to parenthood, and whether this relationship is robust across cohorts.

2. Methods

2.1. Datasets

This study uses three British birth cohorts, each born 12 years apart. The MRC National Survey of Health and Development (NSHD, or 1946 birth cohort) is based on a sample of 5362 participants comprising all singleton births to married women with husbands in non-manual and agricultural employment, along with one in four (randomly selected) singleton births to women with husbands in manual employment births during a single week in 1946 in

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[1] Beck and Beck-Gernsheim (2002) are careful to distinguish between their theory of individualisation and the neo-liberal sense of the term evoking self-sufficient mastery of life in relative isolation (Charles and Harris, 2007).

England, Scotland and Wales (Wadsworth, Kuh, Richards, & Hardy, 2006). Weights were used in analysis of the 1946 cohort data to account for this under-sampling of births to manual workers. These participants have been surveyed 23 times from birth to age 64 years. The second cohort used is the National Child Development Study (NCDS, or 1958 birth cohort), which aimed to recruit all babies born during a single week in England, Wales and Scotland in 1958 (n = 17,416, 98.8% of target) (Power & Elliott, 2006). Participants in the 1958 cohort have been surveyed ten times from birth to 55 years. The British Cohort Study (BCS, or 1970 cohort) comprises a sample of 16,571 (95.9% of target) babies born during a single week of 1970 in England, Wales and Scotland (Elliott & Shepherd, 2006). Participants were surveyed nine times from birth through 42 years.

2.2. Measures

2.2.1. Work–family life courses

We derived work–family life courses from annual information about work, partnership and parenthood status between ages 16–42 years. Work–family life courses stop at age 42 as this is the oldest age currently available for the 1970 cohort. Annual work status was coded as follows: (1) full-time employment, (2) part-time employment (≤30 h per week), (3) full-time caring for children or (4) other non-employed. The latter category includes those in full-time education or training, unable to work due to sickness or disability, unemployed, retired or not in paid work for any other reason. Participants in all three cohorts who had more than one activity for each year of interest were coded as having been in the modal activity for that year.

Dates of marriage, cohabitation, separation, divorce and widowhood were used to derive annual partnership status variables for each cohort. Annual partnership status was coded as: (1) married, (2) cohabiting or (3) not in a live-in partnership. In the 1958 and 1970 cohorts, publicly available partnership histories were used to derive this information (Hancock, 2011a,b). Information on cohabitations in the 1946 cohort was not included in the surveys until age 36 (1982). This variable was used to identify cohabitations previously recorded as marriages. Again, the modal partnership status was taken in years when participants experienced one or more partnership transitions.

Information on children present in the household was derived from dates of birth, adoption, fostering and (where appropriate) dates of leaving or death of children from each adult survey. Annual information on children in the household was categorised as: (1) no children in the household or youngest child in the household >16 years, (2) youngest child in household aged 0–4 years and (3) youngest child in the household aged 5–16 years. We used the separate-domain measures to create a 36-category joint-state variable covering all possible combinations of employment, partnership and parenthood (4 employment × 3 partnership × 3 parenthood states). The 26 joint-state variables – one for each of the 26 ages in a respondent's record – are then reduced using sequence analysis (see Section 2.3).

2.2.2. Educational attainment

Educational attainment is included as a co-variate to address the final research question: whether the link between education qualifications and more advantaged work–family life courses (here defined as those characterised by strong links to paid work, stable marriage and later transitions to parenthood) remains stable across cohorts. Educational attainment was measured as highest academic or vocational qualification obtained by age 26 years in the 1946 and 1970 cohorts, and by age 23 years in the 1958 cohort. This was categorised according to the UK National Vocational Qualifications scale as follows: no qualifications (0), CSE/O-level/NVQ1-2 level qualifications (1), A-level/NVQ3 qualifications (2) and higher qualifications (3)[2].

2.3. Statistical analysis

2.3.1. Multi-channel sequence analysis

The three life course domains of employment, partnership and parenthood were grouped using multi-channel sequence analysis (Gauthier et al., 2013; Pollock, 2007). Sequence analysis uses whole work–family life courses as the unit of analysis (Barban & Billari, 2012). It compares each sequence to all others in the dataset and measures of the distinctness (or similarity) of individuals' biographical sequences (Abbott and Tsay 2000). The technique uses information on states at each age in the biographical sequence, and calculates a set of distance measures representing the "cost" (reflecting the number of substitutions and insertions or deletions needed) of converting one to another (MacIndoe & Abbott, 2004). Distances can be derived in two ways: (1) relative to every other sequence in the data; or (2) relative to one or more reference sequences—often a set of theoretically-derived "ideal-type" sequences aimed at grouping individuals on the basis of their closeness to a given "model" biography (Gauthier et al., 2013; Pollock, 2007; Wiggins et al., 2007). We chose the latter approach. This entailed developing a set of ideal-typical work–family reference life course sequences or model biographies that described various pathways three cohorts might have traced in each of the three domains over the ages 16–42. The first two authors of this paper each independently designed a set of ideal types based on existing theory and research concerning key patterns – both past and present – in work and family arrangements (Crompton, 2006; Ferri, Bynner, & Wadsworth, 2003). The separately-developed typologies were then compared with one another and were found to overlap substantially and a common set of 12 reference sequences was agreed upon (Table 1). The sequence analysis calculated distances from the reference sequences for all. Respondents were then allocated to the group whose model biography most closely matched their own,

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[2] NVQ1& 2 are equivalent to the General Certificate of Secondary Education courses (GCSEs) which are standardised tests generally taken at age sixteen in the UK. NVQ3 is equivalent to higher grades on Advanced-level qualification standardised tests generally taken at age 18 in the UK.

Table 1
Model biographies used in the sequences analysis.

Ideal type	Description
'Work, No Family'	Continuous full-time employment; no partner; no children
'Work, Marriage, Non-parent'	Continuous full-time employment; married from age 21; no children
'Work, Cohabitation, Later Parent'	Continuous full-time employment; cohabiting from age 26; children from age 30
'Work, Later Family'	Continuous full-time employment; cohabiting from ages 26 to 27, married from age 28; children from age 30
'Work, Early Family'	Continuous full-time employment; married from age 21; children from age 23
'Work, Divorced Parent'	Continuous full-time employment; married from 21 to 37, single from age 38; children from age 23
'Teen parent'	Caring for children full-time until age 24, employed full-time from age 25; married from age 32; children from age 19
'Later Family, Work Break'	Employed full-time until age 29, caring for children full-time from age 30; married from age 26; children from age 30
'Early Family, Work Break'	Employed full-time until age 22, caring for children full-time from age 23–30, employed part-time from age 31; married from age 21; children from age 23
'Part-time Work, Early Family'	Employed full-time until age 22, part-time employed from age 23; married from age 21; children from age 23
'No paid work, Early Family'	Employed part-time until age 21, caring for children full-time from age 22; married from age 20; children from age 22
'Unstable Work, No Family'	Full-time employed 16–22, other not employed 23–26, full-time employed 27–28, other not employed 29–32, full-time employed 33–34, other not employed 35–38, full-time employed 39–40, other not employed age 41; single throughout; no children

across the three domains. The particular method of sequence analysis used in this study was Dynamic Hamming (seqcomp command in Stata) which better distinguishes respondents on the basis of the timing of states within the life course than do standard algorithms (Aisenbrey & Fasang, 2010; Lesnard, 2006, 2010)[3]. Sequence analysis was conducted separately on the three cohorts.

Following our multi-channel sequence analysis, the validity of our 12-group classification was assessed using within- and between-group variability with respect to "own-group" distance measures[4]. As a sensitively analyses, we also compared our conceptually-derived results with an empirically-based hierarchical clustering of distances using Ward's linkage to create clusters. A 12 cluster solution produced types that were a close match to those based on the reference sequences in Table 1. Finally, we examined age-specific experiences of work, partnership and parenthood for each of the 12 reference types and found that they reflected the reference sequences well in all cohorts (see Appendix B).

2.3.2. Multiple imputation

Failing to account for missing information in longitudinal studies can lead to bias, as those without complete data tend to differ from those with full information

(Carpenter & Plewis, 2011). This study accounted for missing data in two stages. First, missing information on work, partnerships and children in the household was imputed using an approach developed by Halpin (2012, 2013, see Appendix 1 for further details), prior to running the sequence analysis. All three domains were included in the imputation of all others[5]. This resulted in a total of 3012 participants in the 1946 cohort, 9616 participants in the 1958 and 8158 participants in the 1970 cohort with available work–family sequences from age 16–42. Twenty imputed datasets were created. The sequence analysis and the allocation of participants to their closest model biography were conducted separately on each of the 20 imputed datasets. After the sequence analysis was conducted, missing data on educational qualifications was imputed using Stata 13's – mi impute – suite of commands to update missing values of other variables in the 20 datasets created in the first stage of imputations using multiple imputation by chained equations (MICE). The imputation model included gender, work and family variables, as well as auxiliary variables predictive of missingness, such as indicators of social disadvantage. All 20 datasets were then appended to the original to create a single file for use in the main analysis.

2.3.3. Investigating life course differentiation within individuals

Within-person differentiation was measured using Elzinga's complexity index (using CHESA v3.1, Elzinga, 2009). This measure takes into account the duration of work and family states, as well as the number of distinct

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[3] Lesnard's method varies substitution costs across time points in the sequence, and permits no indel operations. Substitution costs are derived empirically, from transition probabilities at each time point. Thus, higher costs are assigned to substitutions mimicking transitions that are rare at a given age, while lower costs are attached to substitutions mimicking transitions that are common at that age.

[4] "Own-group" distance measures are individuals' distances from the reference sequence that was their closest match. Group-specific means and variances on these distances can be examined to assess how alike individuals are within a given group, and how distinct they are, collectively, from respondents in other groups. (Note, however, that distinctness between groups will not be large if two reference sequences are in many respects similar.)

[5] Missingness was greatest for the work domain, with 44.3% of the 1946 cohort, 21.9% of the 1958 cohort and 5.3% of the 1970 cohort missing at least some information. The proportion with missing partnership data was 7% for the 1946 cohort, 9.3% for the 1958 and 4.7% for the 1970 cohort. There was no missing information on parenthood in the 1946 and 1958 cohorts, but 7.6% of 1970 cohort respondents were missing at least some parental data.

sub-sequences (Elzinga, 2010). The index is calculated separately for each individual. Higher complexity indicates more movement between states over the life course—that is, greater within-person differentiation.

2.3.4. Investigating de-standardization between individuals across cohorts

Two measures, Shannon entropies and Simpson's index of diversity, were used to assess de-standardization, or between-person diversity. Shannon entropies capture how concentrated or dispersed the distribution of work–family life courses is for a given gender–cohort combination. They were calculated as follows:

$$\in = -\sum p_i \ln p_i$$

where p_i is the proportion of respondents in work–family type i. Values ranged from 0 to 2.5 (the natural log of the number of work–family types), with higher values indicating a more even spread across the 12 work–family types—that is, greater between-person diversity.

Simpson's index of diversity take into account the number of work–family types and the distribution of participants across these types. They measure the probability that two people randomly selected from a cohort will belong to different work–family types. Simpson's index of diversity (SID) was calculated as:

$$SID = 1 - \frac{\sum n(n-1)}{N(N-1)}$$

where n is the total number of people allocated to work–family type i and N is the total number of participants. Values range from 0 to 1, with higher values indicative of more diversity.

2.3.5. Investigating gender convergence and the link between educational attainment and work–family life courses across cohorts

To examine whether men's and women's work–family life courses are becoming more similar across cohorts, first the proportion of men and women in each work–family group was calculated for each cohort. Then, multinomial regression models with cohort–gender interaction terms were run to test whether men and women are becoming significantly more similar in their work–family trajectories across cohorts. Similarly, to determine whether associations between educational attainment and work–family life courses have remained stable across cohorts, work–family types were cross-tabulated with educational attainment separately for men and women in each cohort, and multinomial regression models with cohort–education interaction terms were run (using separate models for men and women).

3. Results

3.1. Domain-specific differentiation: Did work, partnership or parenthood trajectories become more complex?

We investigated whether individual life courses became more complex within work and family domains

using mean complexity indices for each gender–cohort group (Table 2). Results show increasingly complex partnership histories across cohorts for both men and women. By contrast, parenthood became less complex across cohorts. A separate analysis (not shown) suggested that the reduction in parental complexity may be the product of parents in the 1958 cohort having fewer children than those in the earlier-born cohort; almost 90% of parents in the 1958 cohort had one or two children, compared with about 60% parents in the 1946 cohort who had that number. Reductions in parenthood life course complexity between the 1958 and 1970 cohorts were most likely due to the greater proportion of those in the most recent cohort who had not had any children by the age of 42. Members of the 1970 cohort spent an average of 15.4 years without children in the household, compared with 12 and 11 years for those born in 1958 and 1970, respectively.

Patterns of cross-cohort change in the differentiation of work sequences differed for women and men. As with parenthood, women's work patterns became less complex while, for men, complexity was lowest for those born in 1958, and highest for those born in 1970 (Table 2). Table 2 also shows that men's work histories were much less complex than women's across all three cohorts.

3.2. De-standardization: Did work–family life courses become more diverse across cohorts?

As mentioned above, we used two indicators to investigate the de-standardization of work–family life courses. Simpson's Index of Diversity and the Shannon entropy scores both demonstrate that the dispersal of men and women across the 12 work–family life course types became significantly greater with each subsequent cohort (Table 3). Both measures also indicate that women's work–family life courses were much more diverse than men's across all cohorts, although these gender differences decline across cohorts.

3.3. Gender convergence: Did men's and women's work–family life courses become more similar?

Gender–cohort interaction terms in multinomial models predicting work–family type membership were sta-

Table 2
Differentiation in work, partnership and parenthood by cohort and gender.

	Elzinga's complexity index[*]		
	Work	Partnerships	Children
Men			
1946	3.06 (2.95, 3.18)	4.08 (3.98, 4.17)	5.81 (5.68, 5.94)
1958	2.74 (2.68, 2.80)	5.24 (5.19, 5.30)	5.55 (5.48, 5.62)
1970	3.41 (3.34, 3.48)	5.46 (5.39, 5.53)	4.67 (4.59, 4.75)
Women			
1946	6.28 (6.15, 6.42)	3.52 (3.43, 3.60)	6.19 (6.08, 6.30)
1958	6.00 (5.93, 6.07)	4.84 (4.78, 4.89)	5.82 (5.75, 5.88)
1970	5.96 (5.89, 6.04)	5.39 (5.32, 5.45)	5.31 (5.24, 5.39)

[*] High values indicates more within-person complexity of states within each domain.

Table 3
Indicators of de-standardization in work–family life courses by birth cohort and gender.

	Simpson's index of diversity		Shannon entropies	
		95% CI		95% CI
Men				
1946	0.686	0.682, 0.689	1.45	1.44, 1.46
1958	0.760	0.759, 0.761	1.66	1.66, 1.66
1970	0.796	0.796, 0.797	1.77	1.77, 1.78
Women				
1946	0.858	0.856, 0.859	2.09	2.08, 2.10
1958	0.882	0.882, 0.883	2.25	2.25, 2.25
1970	0.888	0.888, 0.889	2.31	2.31, 2.31

tistically significant (Wald test $p = 0.02$), suggesting that gender differences in work–family life courses have diminished significantly across cohorts. Table 4 shows the proportion of men and women in each work–family life course type across the three cohorts, while Table 5 shows multinomial models for gender differences in the likelihood of being in each of the work–family types compared with the 'Work, Early Family' type across cohorts. The vast majority of men in all three cohorts were in one of the six work–family types characterised by stable participation in full-time employment. The percentage of men in the 'Work, Early Family' type decreased fairly dramatically, and significantly, across cohorts, from a little less than half in the 1946 cohort to only 15% in the 1970 birth cohort (Table 4). While membership in the 'Work, Early Family' type decreased for both men and women across cohorts, the drop was greater for men.

Men were more likely than women to combine later marriage and parenthood with continuous employment ('Work, Later Family') across all cohorts, although the gap showed signs of narrowing in the most recent cohort (Table 4). The multinomial models confirmed that women were significantly less likely than men to be in the 'Work, Later Family' type, but the gender difference was significantly smaller in the two more recent cohorts compared with those born in 1946 (Table 5).

The proportion of women in one of the six types characterised by continuous full-time employment increased steadily from 31% in the 1946 cohort, to 47% in the 1958, and 60% in the 1970 cohort (Table 4). This increase across cohorts held true for women in all work–family life courses characterised by continuous full-time employment with the exception of those who entered marriage and parenthood early, and those who married by did not become parents (Table 4). Conversely, the percentage of women in the 'No Paid Work, Early Family' type dropped fairly substantially, and significantly, between the 1946 and 1958 cohorts (13% and 4%, respectively), while membership of the 'Early Family, Work Break' type was significantly lower amongst women in the 1970 cohort (7%) than in the two earlier-born cohorts (16–17%). Multinomial models reveal that the gender differential for these two life course types decreased between the 1958 and 1970 cohorts as these biographies became less common for women. (No gender difference could be

calculated for the 1946 cohort as there were no men in these types in that cohort) (Table 5).

Table 4 shows significant increases across cohorts in the percentage of both women and men in the long-term 'Work, Cohabitation, Later Parent' type, with a particularly large uptick for the 1970 cohort. Perhaps the most striking finding was the high preponderance of both men and women in the 1970 cohort who combined minimal or no family ties by age 42 with continuous full-time employment (the 'Work, No Family' type)[6]. Over a quarter of men and nearly a fifth of women in the 1970 cohort had this type of biography (Table 4).

Table 4 also shows that, although the proportion of women in the 'Part-time Work, Early Family' type remained relatively high, it decreased significantly across cohorts. The percentage of women in the 'Later Family, Work Break' type, and that of both men and women in the 'Work, Marriage, Non-Parent' type (stable marriage and full-time employment but no or almost no years as a parent), remained stable across cohorts. The proportion of men and women in the 'Work, Divorced Parent' type was small across cohorts, perhaps due to life course typologies stopping at age 42, although the percentage did increase slightly across cohorts (Table 4). In addition, the gender gap was significantly greater in the 1970 cohort than in the two earlier-born cohorts, as women grew increasingly more likely than men to be 'Work, Divorced Parent's (Table 5).

Membership in the 'Teen parent' type was low across cohorts, and, though also small, the proportion of men and women with 'Unstable Work, No Family' was highest for the 1970 cohort (3% and 2%, respectively). Virtually no men were in either of the career break types, the 'Part-time Work, Early Family', the 'No Paid Work, Early Family', or the 'Teen parent' types, and this remained the case for all cohorts (Table 4).

3.4. Education and adult work–family life courses

We examined whether higher educational attainment was associated with membership in work–family life courses characterised by stronger ties to paid work and partnership, and later parenthood transitions, and whether the strength of this link remained stable across cohorts. Regarding the first question, Fig. 1, which shows proportions in each work–family life course type by education, cohort and gender, shows that educational attainment was positively associated with work–family life courses that combined continuous full-time employment with either minimal/no parenting (the 'Work, Marriage, Non-Parent' and 'Work, No Family' types), or later parenthood (the 'Work, Later Family' type). This was true for both men and women, and for all cohorts. Educational attainment was negatively associated with membership in the 'Unstable Work, No Family' type (weak ties in all three work–family domains) for both genders and all three cohorts.

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[6] A small number of individuals in this group did marry and have children, as every group include individuals who do not match its reference sequence exactly.

Table 4
Work–family type membership by gender and cohort.

	Men			Women		
	1946 cohort $n = 1487$ (%)	1958 cohort $n = 4684$ (%)	1970 cohort $n = 3810$ (%)	1946 cohort $n = 1525$ (%)	1958 cohort $n = 4932$ (%)	1970 cohort $n = 4348$ (%)
Work, No Family	11.1	12.9	25.7[*]	4.8	9.7	18.7[*]
Work, Marriage, Non-Parent	9.6	7.9	9.2	6.6	8.8	8.9
Work, Cohabitation, Later Parent	2.3	7.0	13.4[*]	1.1	5.1	10.9[*]
Work, Later Family	26.1	33.1	29.7[*]	2.7	8.5	11.4[*]
Work, Early Family	46.8	31.6	14.5[*]	15.0	11.8	6.5[*]
Work, Divorced Parent	1.3	4.6	3.1[*]	0.6	2.8	3.7[*]
Teen parent	0.5	0.9	0.5	3.0	1.5	2.9[*]
Later Family, Work Break	0.6	0.2	0.5	12.5	13.1	12.3
Early Family, Work Break	0	0.1	0.1	17.1	16.1	6.6[*]
Part-time Work, Early Family	0.4	0.3	0.2	22.6	17.6	12.9[*]
No Paid Work, Early Family	0	0.1	0.2	13.4	4.3	3.2[*]
Unstable Work, No Family	1.4	1.2	2.8[*]	0.6	0.6	2.0[*]

[*] p Value for linear trend four group membership across cohorts <0.001 within genders.

Table 5
Multinomial regression of gender and cohort differences in work–family type membership.

	1946 cohort ($n = 3012$)		1958 cohort ($n = 9616$)		1970 cohort ($n = 8158$)	
	RRR[**]	95% CI	RRR[**]	95% CI	RRR[**]	95% CI
Work, no family	1.62	1.21–2.17	2.02	1.73–2.36	1.63	1.37–1.93
Work, marriage, non-parent	2.04	1.51–2.75	2.98[a]	2.51–3.53	2.16[b]	1.76–2.65
Work, cohabitation, later parent	1.43	0.72–2.82	1.96[a]	1.62–2.38	1.82[a]	1.51–2.21
Work, later family	0.32	0.23–0.45	0.69[a]	0.59–0.79	0.86[a]	0.72–1.03
Work, early family	Ref		Ref		Ref	
Work, divorced parent	1.17	0.47–2.92	1.64	1.3–2.09	2.64[b]	1.99–3.50
Teen parent	21.35	7.87–57.91	4.31[a]	2.86–6.48	14.47[b]	8.53–24.54
Later family, work break	104.81	44.61–246.28	218.92	103.97–460.94	0.86[b]	0.72–1.03
Early family, work break	–[*]	–	405.14[a]	167.09–982.31	113.3[a,b]	49.19–277.72
Part-time work, early family	237.62	87.50–645.28	151.91	88.90–259.58	138.60	67.59–284.39
No paid work, early family	–	–	179.02[a]	56.95–562.81	30.1[a,b]	15.06–59.98
Unstable work, no family	1.88	0.93–3.79	1.40	0.88–2.21	1.61	1.17–2.21
	$r^2 = 0.15$[c]		$r^2 = 0.10$[c]		$r^2 = 0.06$[c]	

[*] There were no men in the 'Early Family, Work Break' and 'No Paid Work, Early Family' types in the 1946 cohort.
[**] RRR = relative risk ratio women vs. men, extremely large RRR indicate groups which are populated almost entirely by women.
[a] Indicates gender difference significantly different from 1946 cohort at $p < 0.05$ level in gender × cohort interaction.
[b] Indicates gender difference significantly different from 1958 cohort at $p < 0.05$ level in gender × cohort interaction.
[c] McFadden pseudo r^2.

Amongst men, continuous full-time employment with early family formation (the 'Work, Early Family' type) was negatively associated with educational attainment. The same was true for 'Work, Cohabitation, Later Parent' and 'Work, Divorced Parent's, but only in the two later-born cohorts as numbers were too small to permit investigation of these groups in the earliest cohort[7]. For women, educational attainment was negatively associated with life course types that combined relatively early family formation with weaker ties to paid work—'Early Family, Work Break,' 'Part-time Work, Early Family,' 'No Paid Work, Early Family' and 'Teen parent.'

Tests of the interaction between educational qualifications and cohort in multinominal models predicting work–family type membership were not statistically significant for men or women (or in gender-combined models),

suggesting that the associations between educational attainment and adult work–family life courses described above are fairly consistent across cohorts. Only for women in the 'Work, Divorced Parent' type was there a shift in the link to education across the cohorts. In the 1946 cohort, women in with higher educational qualifications were more likely than other women to be 'Work, Divorced Parents', while membership in this type was inversely associated with educational attainment for women in the 1970 cohort.

4. Discussion

To our knowledge, this study is the first to characterise life course states and transitions in the combined domains of paid work, partnership and parenthood, and to use those sequences as units of analysis in an investigation of cohort change in women's and men's work–family biographies. More specifically, it is the first to consider whether British work–family life courses are becoming

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[7] There were 34 men in the Cohabiter and 19 men in the Divorced lone parent groups in the 1946 cohort.
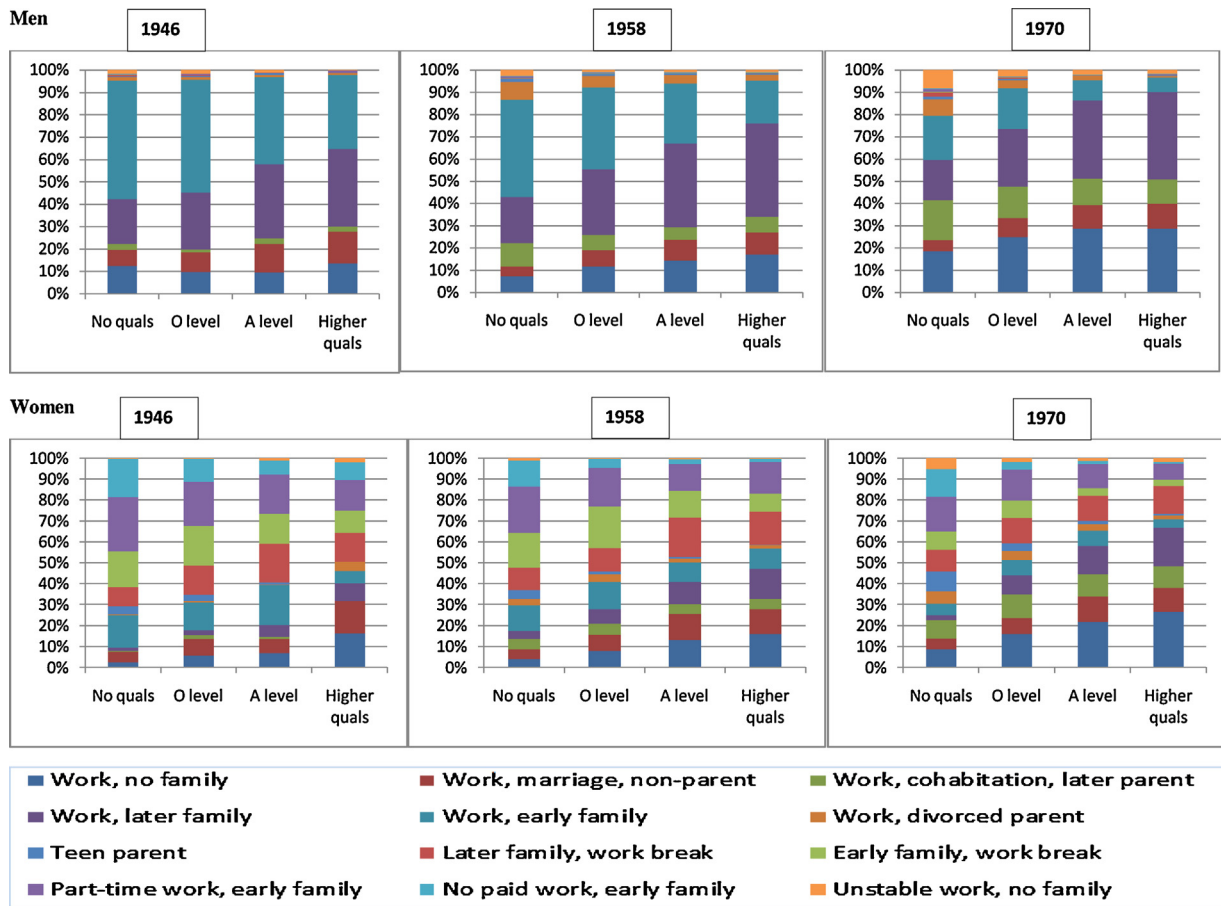
Fig. 1. Work–family types by educational qualifications amongst men and women in the 1946, 1958 and 1970 birth cohorts.

more de-standardized as the breakdown of collective determination ushers in new risks, whether men's and women's biographies are becoming more similar as traditional gender divisions of labour weaken, and, whether links between educational attainment and work–family life courses have diminished or remained robust across cohorts.

4.1. De-standardization in work–family life courses

We have examined cohort differences in both between-person de-standardization (diversity) in work–family life courses and within-person differentiation (complexity) of work and family sequences. We found that men and women are becoming more diverse in their spread across work–family biographies with each subsequent cohort. Increases in complexity are limited to partnership for both men and women, as more choose to cohabit before marriage and perhaps dissolve and reform partnerships. The complexity of parental histories declined across cohorts, as people began to have fewer children or none. Employment complexity differed by gender. As has been found previously for the United States (Worts et al., 2013) and Germany (Bruckner & Mayer,

2005), women's working lives became less complex across cohorts as greater numbers maintained continuous, or nearly continuous, full-time employment. For men, those in our middle (1958) cohort experienced the least complex working lives, while those born in 1970 experienced the greatest complexity. This may reflect differences in the labour market during the working lives of these two cohorts, with men born in 1970 being more vulnerable to periods of unemployment than their predecessors (Jenkins, 2010).

4.2. Gender convergence in work–family life courses over time

We also found evidence that women's and men's work–family biographies are converging. Life course type distributions are much more similar for men and women born in 1970 than for those born in 1958, and more similar, still, than for those born in 1946. However, this convergence is almost entirely the result of a greater proportion of women adopting traditionally 'male' employment patterns (i.e., continuous full-time employment), rather than of any discernible trend towards men reducing hours or taking time off work to accommodate parenthood. Sequence

analysis of the employment patterns of West German women born between 1936 and 1965 found a similar shift away from 'housewife' trajectories (although in that context, they were replaced by part-time and career break trajectories) (Simonson et al., 2011). The increase amongst British women in trajectories which combine continuous employment with parenthood is also in line with evidence from previous work that has not used sequence analysis. For example, Fourage Manzoni, Muffels, and Luijkx (2010) examined cohort (1919–1971) differences in labour market supply amongst German, Dutch and British mothers, and found less drop-off in labour market participation and a quicker return to employment after childbirth in younger cohorts.

While we do see a growing proportion of women in trajectories characterised by continuous full-time employment in our study, our results reinforce the idea that this social change remains incomplete (Esping-Anderson, 2009). Work–family life courses characterised by long-term part-time employment or a career break later in their thirties remained the second and third most common trajectories (respectively) for women born in 1970. These results are consistent with previous studies using sequence analysis, which found that women in the 1970 cohort adopted more 'male' patterns of career orientation (up to age 30) than those in the 1958 cohort, but that women's trajectories remained much more diverse than men's (Martin et al., 2008; Schoon, Ross, & Martin, 2009). Similarly, a sequence analysis of German men's and women's work and family life courses (derived separately) has shown the beginnings of convergence in relation to education and labour market participation, but persistent gender differences nevertheless (Bruckner & Mayer, 2005); and a sequence analysis of work histories in Switzerland found work trajectories to remain extremely gendered (Levy et al., 2013a,b). Even in France, where levels of full-time maternal employment and nursery school provision and attendance rates are relatively high (Gambaro, Stewart, & Waldfogel, 2013), a sequence analysis of employment trajectories within long-term couples found that only the female members adapted their work patterns in response to the birth of a child (Pailhe et al., 2013).

The most conspicuous cohort change in work–family life courses was the emergence of an adult life course characterised by strong labour market ties and minimal or no family ties to the early 40s, at least in terms of cohabiting partnership or parenthood (our 'Work, No Family' type). In the 1970 cohort, this biography was the most common for women and the second most common for men. Looking up to age 33, and using a latent class analysis, Schoon and colleagues (2009) also found a much higher proportion of couples without children and single people in this 1970 birth cohort compared with the 1958.

For those who do become parents, this transition occurs late in the life course for a greater proportion of people than it did for earlier generations. For the most recent cohort, this shift has been increasingly combined with much longer periods of unmarried cohabitation and continuous full-time employment—for both men and women. Like the 'Work, No Family' type, long-term cohabitation combined with parenthood and continuous

employment ('Work, Cohabitation, Later Parent') emerged in our analysis as a common work–family life course type for those born in 1970, at fourth most common for men and fifth most common for women. So, there is fairly strong evidence of the weakening of the social institution of marriage, but only for the most recent cohort examined here.

Individualisation encompasses, among other things, the weakening of the power of social institutions to structure life courses (Beck & Beck-Gernsheim, 2001). If the social institutions of marriage and the breadwinner-caregiver division of labour are likely targets for individualisation, we would expect to see greater complexity and diversity in relation to partnership trajectories and growing similarity between women's and men's work biographies. Our results clearly show decreasing employment complexity for women, as their trajectories become more like men's (although there is far less evidence of growing complexity in men's work trajectories)[8]. While the gender convergence seen in our study could be the result of social processes other than individualization, taken together our results are at least partially consistent with predictions based on the theory of individualisation.

4.3. Educational attainment and work–family life courses

Our study also investigated whether higher educational attainment predicted membership of work–family life courses characterised by continuous full-time employment and partnership and later parenthood transitions; characteristics that have been shown to be related to social advantage (Sobotka, 2010). Results indicated that it was employment and parenthood life courses that were most patterned by educational attainment: men and women with higher educational qualifications were the most likely to combine continuous employment with childlessness or delayed parenthood, while those with no educational qualifications were most likely to have weak work and family ties. Work–family life course types characterised by early transitions to parenthood were associated with lower educational attainment for both men and women. These educational patterns in timing of parenthood and ties to paid work have been observed using techniques other than sequence analysis (Berrington, 2001; Fry & Cohn, 2010; Martin, 2006). However, multichannel sequence analysis has enabled us to show that the *combination* of later parenthood or childlessness and continuous full-time employment is particularly linked with educational advantage. We have also demonstrated that, despite dramatic changes in both work–family life courses, and rising educational attainment, the links between educational qualifications and work–family life courses remained consistent across cohorts. While those in more recent cohorts blend paid work and family life in a greater

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[8] It must be emphasised that we have not investigated trajectories of domestic labour or conducted couple-level dyadic analysis in this study. Hence, our results cannot speak to the weakening of social institutions as it applies to the gendered division of domestic labour.

variety of ways, the links between educational attainment and these work–family combinations persist.

4.4. Limitations

The scope of this study – comprising 26 years of work and family states and transitions for both men and women across three large British cohort studies – has allowed us to document continuity and change in gendered work–family life courses. However, that scope has also precluded an investigation of more detailed information, such as qualitative aspects of work and family relations (e.g., satisfaction, trust, reciprocity, support or control), and aspects of identity, agency, motivation or aspiration as potential drivers of life course change (Elder et al., 2003). We have also been unable to examine gender differences in divisions of domestic labour or childcare amongst those combining paid work and parenthood, or gender and cohort differences in hours worked (beyond broad categories of full- or part-time) within trajectories. In addition, we have not taken the dramatic cohort differences in the distribution of educational qualifications into account empirically in our analysis of educational qualifications as predictors of work–family life courses, although the results shown are only descriptive in nature.

5. Conclusion

This study has shown increasing diversity in the work–family life courses of British men and women, providing some empirical support for the notion that social institutions which previously structured work and family trajectories for men and women have weakened, as proposed by the individualisation thesis (Beck & Beck-Gernsheim, 2001; Beck-Gernsheim, 2002). For example, marriage is less pervasive, both for the increasing number of childless middle-aged adults and for those with children. Similarly, women's working lives are less complex as they become more like men's, consistent with a weakening of the breadwinner-caregiver model that structures gender divisions of labour. At the same time, our results bear out the incomplete nature of the change in gender roles: women's lives appear to have become more like men's, but there is less evidence of the reverse process. Time will tell whether reorganised gender practices and policy reforms to support working families (Children and Families Act, 2014) will edge women and men in subsequent cohorts towards greater gender convergence.

Acknowledgements

Appendix A. Halpin method of imputation for sequence data

The use of frequently-implemented multiple imputation methods, such as multiple imputation by chained equations (MICE), are problematic with categorical time series data, such as that used in this study. Firstly, there is a high degree of collinearity between the repeated work, partnership and parenthood status variables which makes fitting the imputation models difficult. Second, any gaps in sequences are likely to be imputed inaccurately. For example, if an individual who has five years of missing data has been in full-time employment for five years prior to this and is observed to be in part-time employment in the five years subsequent to their missing data (e.g. FFFFF[xxxxx]PPPPP, where F = full-time employed and P = part-time employed), their missing information is likely to be imputed as FFFFF[FPFPF]PPPPP when in fact that individual is more likely to have the following sequence FFFFF[FFPPP]PPPPP. The multiple imputation approach developed by Halpin (2012, 2013) is designed to overcome these problems. Halpin's approach uses observed preceding and subsequent information, as these are likely to be the most reliable predictors for imputing missing information. History – i.e. the length of time an individual has spent in preceding and subsequent states – and information either side of an internal gap are used in the imputation model. The imputation of initial (at the beginning of the sequence) and terminal (at the end of the sequence) gaps uses information following and preceding, respectively. As suggested by Halpin (2012), maximum internal gaps of 13 years (50% of the total sequence length of 26 years) and maximum initial and terminal gaps of 7 years (∼50% of the maximum internal gap length of 13 years) were imputed in this study.
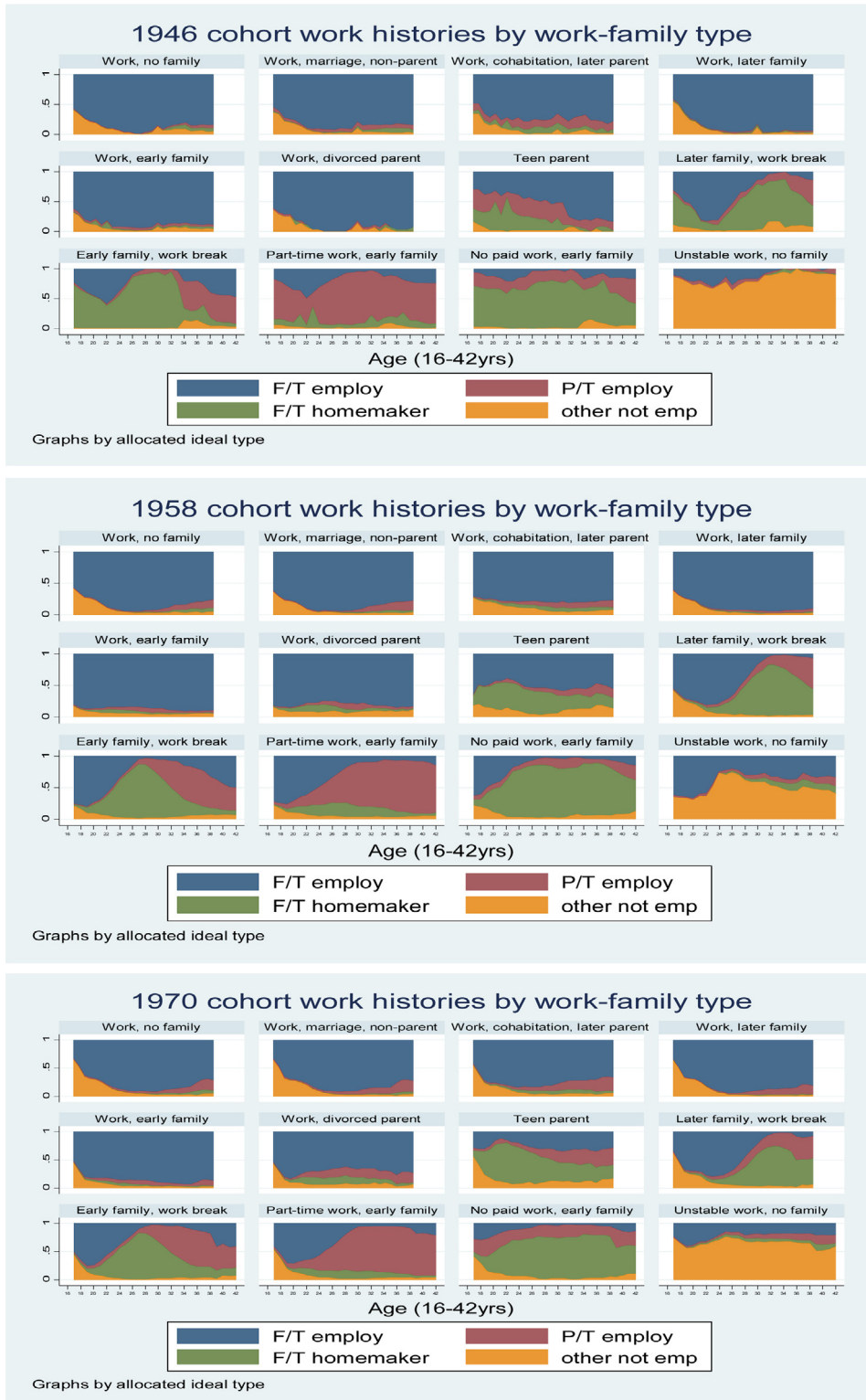
Appendix B

(Fig. B1).

Fig. B1. (A) Chronograms of work–family types by work histories and cohort. (B) Chronograms of work–family types by partnership histories and cohort. (C) Chronograms of work–family types by parenthood histories and cohort.
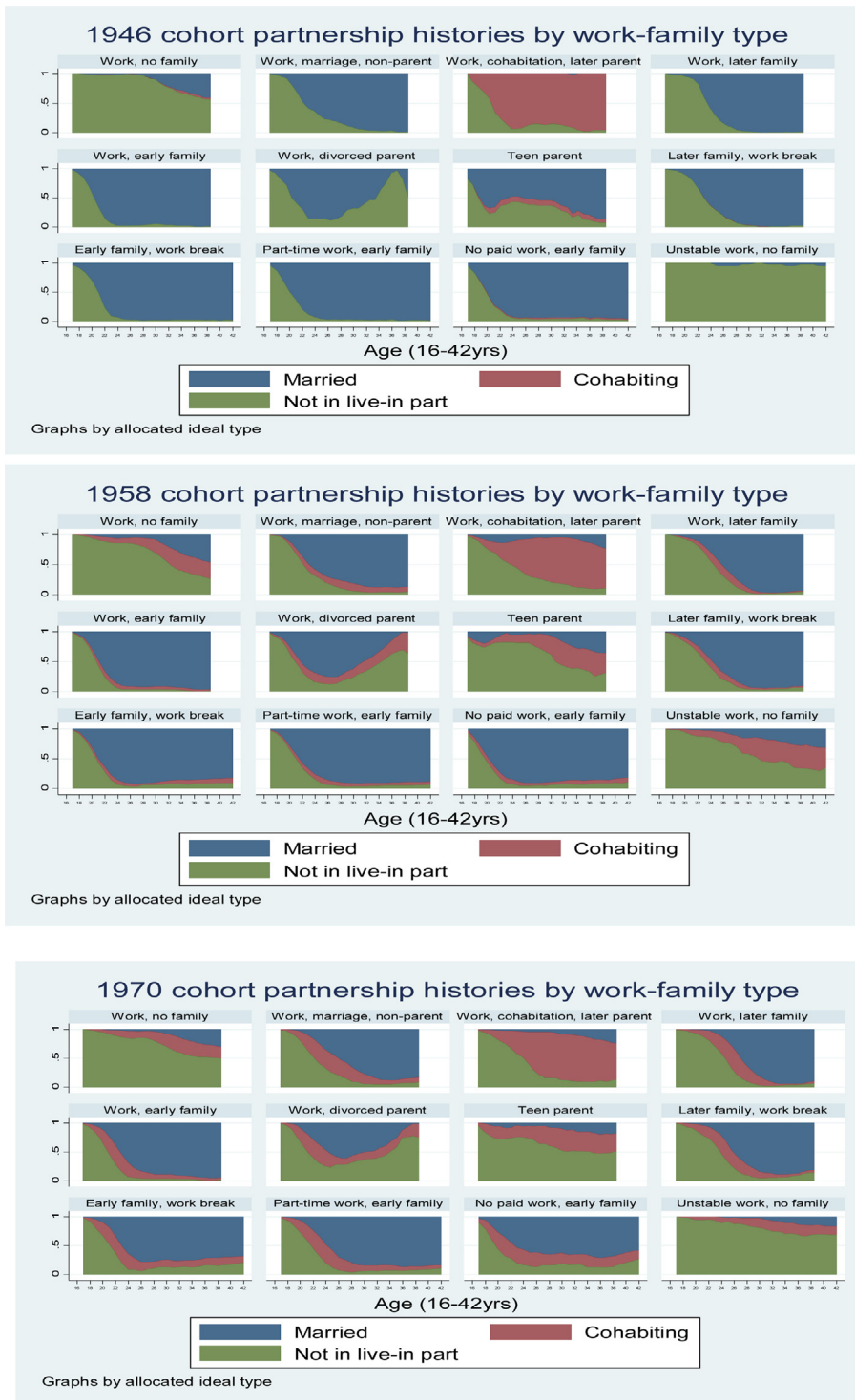
1946 cohort partnership histories by work-family type

1958 cohort partnership histories by work-family type

1970 cohort partnership histories by work-family type
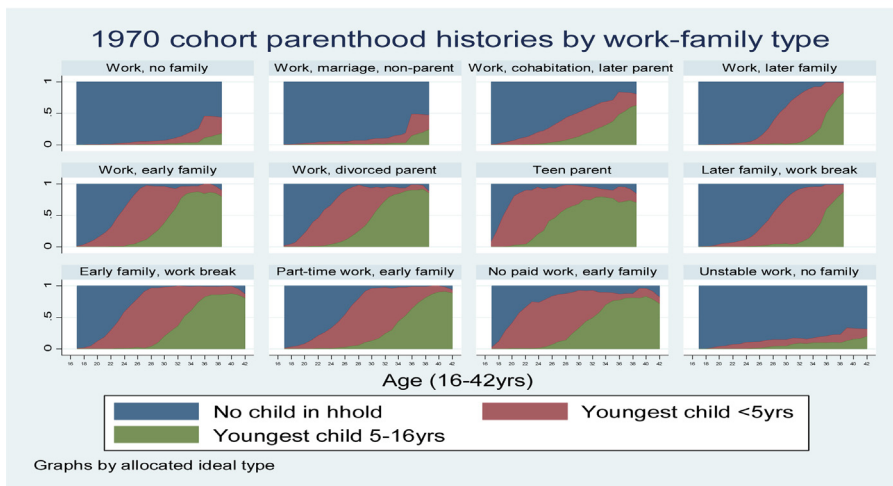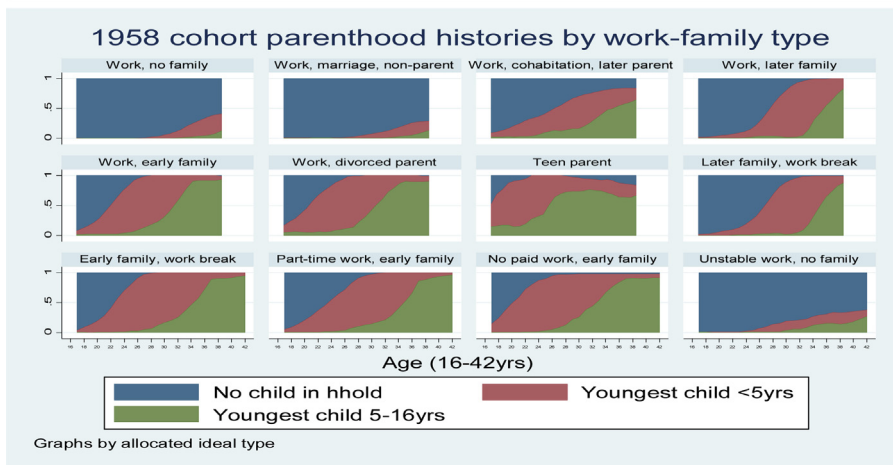
37
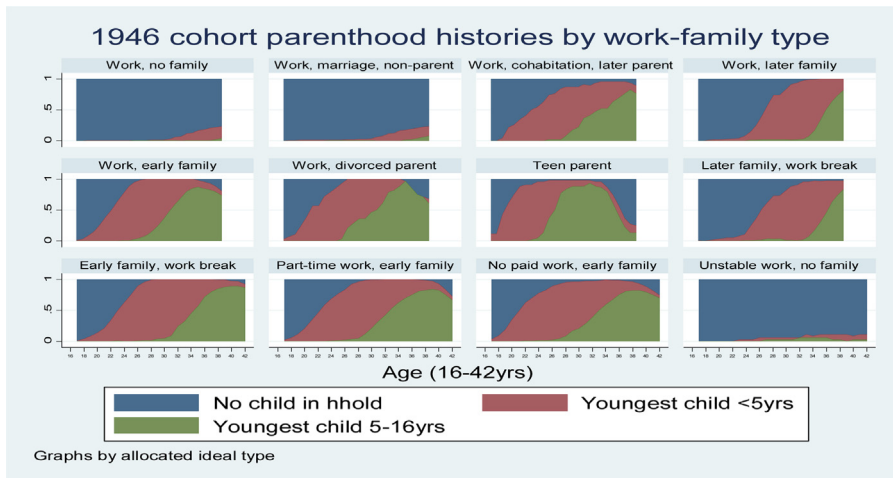
Fig. B1 (*Continued*).

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Fig. B1 (*Continued*).

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