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A Gendered Approach to Workforce Participation Patterns over the Life Course for an Australian Baby Boom Cohort

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Abstract

Population ageing and its future implications for governments and individuals have been central to much policy debate and research targeted to retain older people in the workforce. This study identified workforce participation patterns across the adult life course for women and men entering later life, and explored the influences of various early and adult life socio-demographic circumstances. Data were collected from 1,261 men and women aged 60 to 64 years in the *Life History and Health (LHH) Survey* (a sub-study of *the Sax Institute's 45 and Up study*, Australia) in 2010-11. LHH provides detailed information on personal histories of paid work, socio-economic resources from childhood (number of books and father's occupation) and adult life factors such as educational attainment, marital histories, childcare and informal caring. Latent class analysis (LCA) was undertaken to identify patterns of workforce participation for participants across their adult life. Significant gender differences were confirmed. Further analysis (LCA with covariates) showed that women who reported having books during childhood, and those who had post-school qualification, were more likely to have mostly been in paid work and less likely to have not been in paid work; while ever partnered women had significantly higher odds of increasing part time work over time. Men who had reported ever having had informal caring activities were likely to have had decreasing participation in paid work over time, and were highly likely to be not in paid work after 55 years. Ever partnered status was protective for being in paid work for men. These findings indicate the need for gender-specific policies and strategies to enable continued workforce participation throughout adult life and into later working years, particularly for people who had fewer social or economic opportunities earlier in life.

Key words:

Workforce participation patterns; Gender; Latent Class Analysis; Mature age; Workforce

1. Introduction

1.1. Mature age workforce and its challenges

'Population ageing' is a global phenomenon indicating rapid growth in the proportion of people aged 60 years and older. In the next few decades, younger people (aged 0 – 15 years) will be outnumbered by people aged 60 years and above (World Health Organization, 2014) and there will be declining numbers of younger adults in the workforce. This demographic and social change presents a number of challenges, with long term productivity and activity of mature age workers becoming increasingly important (Christensen, Doblhammer, Rau, & Vaupel, 2009; European Commission, 2000; Loh & Kendig, 2013). Mature age workers are a critical part of the workforce, and contribute years of knowledge and skill (Fasbender, Deller, Wang, & Wiernik, 2014). The exit of these workers from the paid workforce, combined with fewer younger workers to replace them, will have considerable impacts on the productivity and sustainability of industry, and on national economies (Loretto & White, 2006). Moreover, as populations age, successive generations are likely to be required to remain longer in paid work in order to maintain the tax base, to support their own ageing, and to minimise demands on public pensions and welfare.

Among the many challenges of population ageing, workforce participation of mature age workers and its associated economic and financial implications are of major concern to governments and have been widely discussed (Australian Treasury, 2010; European Commission, 2000; Li, Duncan, & Miranti, 2013). To alleviate these potential burdens, governments and institutions around the globe are proclaiming the necessity of retaining mature age workers (Australian Treasury, 2010; Loretto & White, 2006; Phillipson, 2013). Policies have been initiated to promote increased workforce participation and remove barriers to longer work life, and financial incentives have been introduced for people to remain in work (Spoehr, Barnett, & Parnis, 2009; Temple, Adair, & Hosseini-Chavishi, 2011; World Health Organization, 2002). In some countries like Australia and other OECD[1] countries, age-based anti-discrimination reforms have been implemented (Chomik & Piggott, 2012; Loretto & White, 2006; OECD., 2013). Many governments such as the United Kingdom, France, Netherlands and Australia are seeking to raise retirement ages and

[1] The OECD (Organisation for Economic Co-operation and Development) is an organisation dedicated to global development and is made up of 34 member countries (see http://www.oecd.org/about/membersandpartners/ for a full list of these countries).

pension eligibility age to retain mature age workers for longer into the future (Chomik & Piggott, 2012; ILC, 2011; OECD., 2013). However, despite raising pension eligibility ages, installing financial incentives, and increasing flexibility of working hours, many people do not remain in the workforce in their older ages (Abhayaratna & Lattimore, 2006; Spoehr et al., 2009). Among those who do continue to work, many people aged 60 years and above will work part time work, with different trends for men and women (Spoehr et al., 2009).

To date, most research interest in older workers has focussed on retirement with many studies investigating factors associated with early exit from the workforce (Alavinia & Burdorf, 2008; Dahl, Nilsen, & Vaage, 2003; Rice, Lang, Henley, & Melzer, 2011), or on the effects of retirement on health (Coe & Zamarro, 2011; van der Heide, van Rijn, Robroek, Burdorf, & Proper, 2013), or financial implications (Lusardi & Mitchell, 2007; Van Rooij, Lusardi, & Alessie, 2012) . For many people, retirement comes as a consequence of their own life decisions, 'at the right time', and is associated with a positive change in their lives and wellbeing (Byles, Tavener, et al., 2013; Hardy, 2002; Kim & Moen, 2001). For other people, retirement arises from external pressures including redundancy, the onset of ill health, or needing to care for a sick or disabled family member (Alavinia & Burdorf, 2008).

It has also been hypothesized that older age workforce participation is likely to depend on patterns of employment at earlier life stages, and the social and economic circumstances that prevail across the life course (Case, Fertig, & Paxson, 2005; Flores & Kalwij, 2014; Mazzonna & Havari, 2011). With greater focus on the heterogeneity in life course trajectories, the traditional expectation that people will exhibit a "normal work biography" whereby they commence work as young adults, continue to work until a normative retirement age, and then cease work and retire to a life of leisure is increasingly being brought into question. Two major criticisms of this traditional life course model are a) that it is highly gendered pertaining mostly to a male breadwinner role (Everingham, Warner-Smith, & Byles, 2007), and b) that it has been changed in the current economic and social order (Kendig, Wells, O'Loughlin, & Heese, 2013; Kohli, 2007).

Many older people report having left work at a relatively early age due to health problems, redundancy, to care for family, for lifestyle choices or due to other circumstances (Abhayaratna & Lattimore, 2006; Brooke & Taylor, 2005; Larsen & Pedersen, 2013; Radl, 2013; Shultz, Morton, & Weckerle, 1998); and they may

or may not return to work on a full or part-time basis when their circumstances change. Compared to men, women's working lives are likely to be more fragmented, combining family and caring roles with full or part time work at different life stages.

The purpose of this study is to ascertain different patterns of workforce participation among men and women over their working lives and to explore various factors associated with different workforce participation patterns. We also aim to investigate the relationship between early and adult life factors and patterns of workforce participation, and to examine differences by gender.

2. Conceptual framework and Hypotheses

There is substantial literature on gender differences in workforce participation at various points over the life course. However, here has been little work conceptualizing how the differences in employment probabilities of mature age men and women reflect the continuation of their earlier life employment patterns, and other earlier life circumstances (Ruhm, 1996). Social factors in later life, such as needing to care for a disabled parent or spouse, will be overlayed on these established patterns, potentially creating a disruption or interruption to work. In this paper, we hypothesize on how employment patterns and their predictors over the life course are different for men and women, as a result of gender related roles, expectations, opportunities and constraints since this baby boom cohort reached adulthood in 1960's.

2.1. Workforce participation by gender

Women have complex workforce participation patterns because of their varying family and work roles (Gerber, Wittekind, Grote, & Staffelbach, 2009; Huang, El-Khouri, Johansson, Lindroth, & Sverke, 2007). They exhibit different workforce participation trajectories over the life course depending on their age, social and economic situations and family life (Gerber et al., 2009). Many women choose to remain out of work or to work part time during child bearing ages, and in their middle ages while they still have children living at home (Arnold, 2003; Australian Bureau of Statistics, 2010; Gerber et al., 2009; Spoehr et al., 2009). Some of these women will return to full-time work in later life, but many remain mostly out of paid work through the remainder of their life (Australian Bureau of Statistics, 2006; Yerkes, 2010). However, the

gender patterns are changing, and increasing proportions of women work full time throughout their lives (Australian Bureau of Statistics, 2006; Evans & Kelley, 2002; Yerkes, 2010).

Men traditionally exhibit workforce participation patterns that vary depending on their individual and family circumstances. In Australia, for example, men mostly remain in full-time work up until 60 years of age (Australian Bureau of Statistics, 2010; Spoehr et al., 2009), and they have a lower rate of participation in part time employment than women (Australian Bureau of Statistics, 2010). However, significant numbers of men will cease work after the age of 45 years due to poor health, or because they are unable to find suitable work (Rice et al., 2011). Based on these different working traditions and their gendered roles, we propose:

Hypothesis 1: That **women** and **men** in this birth cohort will have different patterns of workforce participation over the life course, with women being more likely to be in and out of work and have more part time work and men having more consistent participation in full time work.

2.2. Childhood socio-economic factors associated with workforce participation patterns

Many social factors such as parent's social status and childhood socio-economic conditions play an important role in the dynamics of workforce participation patterns for women and men, and have been well documented (Case et al., 2005; Currie, 2008; Currie, Stabile, Manivong, & Roos, 2010; Dal Bianco, Garrouste, & Paccagnella, 2013; Flores & Kalwij, 2014; Luo & Waite, 2005; Mazzonna & Havari, 2011; Otero-Rodríguez et al., 2011). For this study we chose two indicators of childhood socio-economic conditions that have been shown to be important predictors of later life circumstances: books and fathers occupation. These are discussed below.

2.2.1. Books

The number of books available in the childhood home has been frequently used as an important indicator of the intellectual and educational background of family; with their availability usually measured in terms of number of shelves/ bookcases filled with books (Cavapozzi, Garrouste, & Paccagnella, 2011; Dal Bianco et al., 2013; Flores & Kalwij, 2014; Mazzonna & Havari, 2011). Studies have reported that the better the

educational background of family, the better are the chances for children to attain better employment later in life (Case et al., 2005; Currie, 2008; Currie et al., 2010). Based on these previous findings, we propose:

Hypothesis 2: Among **women** and **men**, having at least one shelf of books during childhood will be associated with greater participation in paid work across the life course, including older ages.

2.2.2. Father's Occupation

Parental occupation and especially father's occupation is regarded as an important indicator of childhood socio-economic factors and associated future life and employment outcomes (Currie, 2008; Luo & Waite, 2005; Mazzonna & Havari, 2011). Previous literature found that children whose fathers had higher level of occupation and thus more income were more likely to be better employed themselves (Case et al., 2005; Currie, 2008; Luo & Waite, 2005; Mazzonna & Havari, 2011). On the basis of this argument, a third hypothesis for this study was:

Hypothesis 3: Among **women** and **men,** higher level of father's occupation is associated with greater participation in paid work across the life course, including older ages.

2.3. Adult life factors associated with workforce participation patterns

Many social factors that operate throughout adult life are also associated with employment prospects and work patterns. These include education, marital status and informal caring responsibilities (Larsen & Pedersen, 2013; Ruhm, 1996; van der Wel, 2011).

2.3.1. Education

National and international studies found level of education to be strongly associated with increased workforce participation by mature age people (Australian Institute of Family Studies. Australian Government, 2008; Flores & Kalwij, 2014; Radl, 2013; van der Wel, 2011). Results from these studies suggested the presence of a relationship between education level and labour force participation, with women and men having some higher education being more likely to be in some kind of paid job at older ages. On the basis of these findings, our fourth hypothesis is:

2.3.2. Hypothesis 4: Among **women** and **men**, having higher level of education is associated with greater participation in paid work across the life course, including older ages. Marital Status

Varying and contrasting findings have been reported by studies regarding the association of marital status and workforce participation. Dahl et al. (2003), Larsen & Pedersen (2013) and Ruhm (1996) found that partnered women were less likely to remain in work at later ages; while partnered men were more likely to participate in the workforce. In contrast, Li et al (2013) and Haider & Loughran (2001) reported marriage or partnered relationship to have a protective effect from underemployment, regardless of gender. Based on these arguments our fifth hypothesis is:

Hypothesis 5a: Among **women**, being partnered is associated with lesser participation in workforce across the life course, particularly at older ages.

Hypothesis 5b: Among **men,** being partnered is associated with greater participation in workforce across the life course, particularly at older ages.

2.3.3. Caring Responsibilities

Of the various social roles affecting employment in later life, care giving responsibilities have been identified as an important barrier to retain employment for mature age workers (Berecki-Gisolf, Lucke, Hockey, & Dobson, 2008; Ruhm, 1996; Spoehr et al., 2009; Temple et al., 2011). Bittman et al. (2004), Gray et al.(2008) and Spoehr et al.(2009) reported caring as a particular issue for women who are the primary care givers for sick or disabled family memebers. Considering these findings, we hypothesized that:

Hypothesis 6: Among **women** and **men**, having caring responsibilities are associated with reduced workforce participation across the life course, particularly at older ages.

2.4. Gaps in literature

The existing literature reports associations between labour force participation in older age and early and adult life socio-economic factors. However, previous studies do not examine patterns of employment over complete adult life, nor do they examine how socio-economic factors are associated with life course patterns of workforce participation from a gendered perspective. Many past reports and studies target the

retirement issues (Burtless, 2012; Dahl et al., 2003; Møller Danø, Ejrnæs, & Husted, 2005; Palmore, 1965; Radl, 2013; Rice et al., 2011; Riphahn, 1997; Shultz et al., 1998), and only a few explored the gender differences in employment (Abhayaratna & Lattimore, 2006; Australian Bureau of Statistics, 2010; Ruhm, 1996).

This study examines gender differences in workforce participation patterns over the life course, taking into consideration various childhood and adult life factors. The findings of this study will help to identify different patterns of workforce participation for men and women, with emphasis on various social and economic factors over the life course. The findings will contribute towards developing effective strategies to address barriers to working longer and increasing workforce participation for both men and women in later life.

3. Methods

3.1. Data source

The Australian *Life History and Health (LHH) Survey* was conducted as a sub-study of the Sax Institute's 45 and Up Study, which recruited residents of New South Wales (NSW, Australia) aged 45 years and older by sampling from Medicare, Australia's national public health insurance database (45 and Up Study Collaborators, 2007; Kendig et al., 2014; The 45 and Up Study, 2012). The details of the 45 and Up Study are given elsewhere (45 and Up Study Collaborators, 2007; Kendig et al., 2014).

3.2. Participants

Participants of Sax Institute's 45 and Up Study were invited to participate in LHH Survey if they were born between 1947 – 1951, aged 60 – 64 at the time of pilot study in 2011 (Kendig et al., 2014). These participants born during post-war baby boom in the 1940s and 50s are usually referred to as early baby boomers (Buckley et al., 2013). Of the 2,800 invited participants, 1,261 participants provided consent, completed the survey questionnaire and participated in follow-up telephone interviews with the use of self-administered life history calendars (Kendig et al., 2014). Those who agreed to participate were more educated, many had trade qualifications and were more likely to be in full time or part time work, as compared to those who did not participated in LHH survey(Kendig et al., 2014). This data provided

detailed retrospective information where individuals reported on their health status and living conditions in childhood, as well as their experiences in health and education and specific information about their employment across their adult life (Kendig et al., 2014).

3.3. Measure of workforce participation patterns

3.3.1. Work status

The LHH survey used telephone interviews to obtain details on participants' work and employment history. For each job, the commencement and finish year was provided, as well as relevant attributes of the position (e.g. whether it was shift work, physically demanding work, dangerous or had an injury risk, full-time or part-time, etc.). Each job was also matched to a three digit code from Australian and New Zealand Standard Classification of Occupations (ANZSCO). Based on the retrospective data, it was possible to construct longitudinal data with observations of workforce participation at five year intervals over the life course (e.g. at age 20, age 25, up to age 65). At each time point, work status ('full time', 'part time' or 'not in paid work') was determined. If participants had more than one job, it was assumed that they were working equivalent to full time workers. These indicator variables for work status from age 20 to 65 at five yearly intervals were used to determine the patterns of workforce participation (latent variable).

3.4. Covariates

3.4.1. Number of books when aged 10 years

Participants were asked about the number of books in their home when they were 10 years old. The response categories were none/few, enough to fill one book shelf, enough to fill one book case, enough to fill two book cases, enough to fill three or more book cases. The original responses options were collapsed into a binary variable for analysis purposes ('having books' and 'not having any books').

3.4.2. Father's occupation

Participants provided their father's occupation which made the most significant financial contribution, which were categorised according to ANZSCO codes. The eight occupation categories identified

(managers, professionals, technicians, personal services, clerical/ admin, machinery and labourers) were then dummy coded to three main variables representing the father's occupation: (i) managerial/ admin jobs – 'office jobs'; (ii) 'technical and personal services job'; and (iii) 'physical labour jobs'.

3.4.3. Education (Post school qualification)

The question about participants' post school qualifications was included in the analysis. They responded to the question as 'yes' if they had any post school education.

3.4.4. Marital status

Participants indicated their marital status according to the response categories: single, married, defacto/ partner, divorced/ separated, and widowed. Participants responding yes to being single, divorced/ separated or widowed were recoded as 'not partnered' and participants who were married or lived in a defacto/ partnered relationship were labelled as 'partnered'.

3.4.5. Caring Responsibilities (Informal care)

Participants responded 'yes' if they provided long term care to a disabled/ sick friend or family. This dichotomous variable was included as informal care.

4. Analysis – Latent Class Analysis (LCA)

LCA is finite mixture model and is used for the identification of subgroups of population, based on dichotomous responses to multiple observed variable (S. T. Lanza & Collins, 2010; Nylund, Asparouhov, & Muthén, 2007). This analytic technique was used to identify and explore workforce participation patterns and to examine differences between men and women. The latent class theory posits that underlying latent variable is not observed, but derived from a set of categorical, observed indicator variables (S. T. Lanza & Collins, 2010). In this study, the latent variable (workforce participation) was measured by observed variables 'work status' over the life course at five year intervals i.e. 'work status at age 20' up to 'work status at age 65'. This approach was the basis of our 'person oriented' approach for conducting LCA (S. T. Lanza & Collins, 2010) by grouping participants into latent classes who had common individual work

status (full time work, part time work and not in paid work) throughout their life course. More details of LCA and its extensions are detailed elsewhere (S. T. Lanza & Collins, 2010; S. T. Lanza, Collins, L. M., Lemmon, D. R., & Schafer, J. L. , 2007; S. T. Lanza et al., 2010; Nylund et al., 2007).

4.1. Baseline LCA model and assessment of model fit

For both women and men, separate LCA models were run, specifying two to six classes with three categories of work status over life course (full time paid work, part time paid work and not in paid work). Covariates were not included in baseline model. These models were compared in order to select a model with best possible fit and parsimony. Using the principle of parsimony and provided information criteria (Akaike's Information Criterion (AIC), Bayesian Information Criterion (BIC) and Entropy) an optimal baseline model with low AIC, BIC and higher Entropy was selected (S. T. Lanza & Collins, 2010). The main parameter estimates in LCA are latent class membership and item response probabilities which provided the basis for the interpretation and distinct labelling of each latent class (S. T. Lanza & Collins, 2010; Nylund et al., 2007)

4.2. LCA with covariates – Two step approach

In the next stage of analysis, covariates were incorporated in the latent class model to identify characteristics that predicted the latent class membership in the various workforce participation classes. The association of covariates with workforce participation in predicting membership in various classes was done in following two steps following the methods of Lanza & Collins (2010)and Dayton et al.(2002):

4.2.1. LCA model with single covariate

All of the covariates (books, father's occupation, education, marital status and caring responsibilities) were initially included separately in the latent class model. This allowed identifying the extent to which the each covariate predicted the membership in workforce participation classes.

4.2.2. LCA model with entire set of covariates

Lastly, the entire set of covariates (books, father's occupation, education, marital status and caring responsibilities) were introduced in the latent class model to estimate the unique contribution of each covariate in predicting the class membership in workforce participation (latent variable) in the overall model. The model with individual covariates and entire set of covariates were statistically compared to baseline model (without any covariates) by means of likelihood ratio χ^2 test and the level of significance was set at $p<0.05$ (S. T. Lanza & Collins, 2010). Item response probabilities, regression coefficients (β's) and odds ratios (OR) were estimated and compared. Analyses were carried out separately for men and women.

5. Results

Of the 1,261 participants, there were 577 women and 684 men. The results for baseline latent class model for both women and men are presented concurrently for ease of interpretation of differences in patterns of workforce participation (*Hypothesis 1*). However further analysis results (*Hypotheses 2a and b – 6a and b*) are presented separately for women and men.

5.1. Latent class analysis – model selection

For both women and men, a four class latent model with optimal balance of fit and parsimony was finally selected after consideration of results of model fit statistics from five possible models (See Table 1). Models with more than four classes lacked sufficient reliable estimation based on AIC and BIC; while the four class model had the higher entropy in each case.

(Table 1 placed here)

5.1.1. Item Response Probabilities for Selected Model - Women

Figure 1 presents the item response probabilities of responding 'Yes' to either full time paid work or part time paid work or being not in paid work for women. These four classes for workforce participation over the life course of women were labelled as '*mostly full time work*'; '*decreasing full time work after 55 years*';

'*increasing part time work*' and '*mostly not in paid work*'. These classes as seen in Figure 1 were distinct, non-trivial and well distinguishable from each other.

(Figure 1 placed here)

5.1.2. Item Response Probabilities for Selected Model - Men

Among men, four latent classes were identified on the basis of item response probabilities for endorsing either 'full time'; 'part time' or 'not in paid work' for their work status at five yearly age intervals (age 20 to age 65). Figure 2 shows item response probabilities and the four latent classes for men which were labelled as '*mostly full time work*'; '*decreasing full time work after 40 years*'; '*early and late full time work*' and '*not in paid work after 55 years'.*

(Figure 2 placed here)

As seen in Figure 1 and Figure 2, there were distinct differences between workforce participation patterns of women and men; with majority (62%) of men being '*mostly in full time work*' compared to only 35% of women in classed in same category. Moreover majority of men were classed as '*decreasing full time work'* or '*mostly not in paid work*' after 40 – 50 years, while women showed increased participation in part time work and 17% were also classed as '*mostly not in paid work*'. These results support our *Hypothesis 1- workforce participation patterns are different for men and women*.

To further describe how class membership might vary according to participant's own occupation, each of the latent class was also cross tabulated against participant's own most recent occupation (Table 2). Women who were '*mostly in full time work'* were more likely to be managers and professionals, whereas women in '*increasing part time work'* were more likely to be in clerical/ admin jobs or personal services. Men who were '*mostly in full time work'* were more likely to be managers or professionals, as were those classed as in '*early and late full time work'*. Men with '*decreasing full time work after 40 years*' had more people in trade/ technicians as compared to other groups, while '*not in paid work after 55 years'* included highest proportion of men whose job was clerical and trade/technicians.

(Table 2 placed here)

5.1.3. LCA with covariates in women– models with single covariates

To test hypothesis 2 – 6, individual characteristics (i.e. books, father's occupation, post school qualification, marital status and caring responsibilities) were included as independent predictors of patterns of workforce participation for men and women separately. All covariates were significantly associated with patterns of workforce participation for women (p=<0.05, Table 3), with the exception of father's occupation and informal caring. Relative to women who were categorized as '*mostly full time work'*; women who had books at home during childhood had 50% decreased odds of being classed as '*mostly not in paid work*' (OR=0.50) and more than four times increased odds of classed as '*increasing part time work*' (OR=4.16, overall p=0.0003). Compared to women classed as '*mostly full time work*'; women with post school qualifications had significantly decreased odds of being *'mostly not in paid work'* (OR=0.44). However no significant associations were observed between post school qualification and being in '*increasing part time work*' and '*decreasing full time work after 55 years*'. Being in a partnered relationship significantly increased the odds of being classed as '*decreasing full time work after 55 years*' (OR=1.76) and being classed as *'increasing part time work'* (OR=1.10).

Among women, there is evidence to support *Hypotheses 2, 4 and 5a* (i.e. greater workforce participation is associated with having books during childhood, having post school qualification and being partnered) for selected latent classes.

(Table 3 placed here)

5.1.4. LCA with covariates in women– overall model

Results from the overall model where all covariates were included simultaneously in the LCA model are shown in Table 4. Books, post school qualification and marital status were found to be significant predictors of patterns of workforce participation, when each covariate was controlling for others (p= 0.0006, 0.0555 and 0.0245 respectively). The association between patterns of workforce participation and women having books when aged ten years remained unchanged, even after taking into account other factors, which supports *Hypothesis 2*. Compared to women categorized as '*mostly in full time work*', those who had some post school qualification were 61% less likely to be classed as '*mostly not in paid work*';

whereas other patterns were not found to be significantly associated with post school qualification. This indicates that association between post school higher education and patterns of workforce participation was impacted by other factors and supports *Hypothesis 4*. Partnered women were significantly less likely to be categorized as '*decreasing full time work after 55 years*' (OR=0.56), although other associations were not statistically significant. This result rejects *Hypothesis 5a* as stated, and is partly in favour of the alternate hypothesis that partnered women have greater workforce participation particularly at older ages. *Hypothesis 3* and *Hypothesis 6* were not supported by our data. Father's occupation and informal caring had no statistically significant association with workforce participation patterns of middle age women, even when other factors were considered.

(Table 4 placed here)

5.1.5. LCA with covariates in men– models with single covariates

The results of the single covariate models for men are shown in Table 5. None of the covariates were found to be significantly associated with patterns of workforce participation, with the exception of marital status (being in partnered relationship p=0.0032) and informal caring (p=0.0025).For men in partnered relationship, there were 66% less odds of being classed as '*decreasing full time work*' (OR=0.34) compared to *"mostly full-time work"*. *Hypothesis 5b* was therefore partly supported by our data. Men who responded as having informal caring responsibilities were five times more likely to be in '*early and late full time work*' class and also had increased likelihood of being classed as '*mostly not in paid work after 55 years*' (OR=4.97 and 2.27 respectively); p=0.0025. This finding supports *Hypothesis 6* for men.

Even though *Hypothesis 2, 3 and 4* were rejected due to statistically non-significant results (p>0.05), all the covariates were examined in the overall model.

(Table 5 placed here)

5.1.6. LCA with covariates in men– overall model

The association of patterns of workforce participation with marital status and informal caring remained statistically significant after adjustment for other covariates (p=0.0002 and 0.0008 respectively, Table 6).

This result supports *Hypothesis 5b and 6*. Other covariates had no significant association with workforce participation patterns in the overall model, thus rejecting *Hypothesis 2, 3 and 4*.

(Table 6 placed here)

Another important finding was the impact of covariates on the class membership of workforce participation (results not shown). As compared to women, the addition of covariates in overall model for men significantly impacted the membership in workforce participation patterns.

6. Discussion and Conclusion

This study aimed to identify workforce participation patterns for men and women in the Australian baby boom cohort across the adult life course, and to explore associations between these patterns and various childhood and adult life factors. The results provide evidence to support our hypotheses regarding the presence of different underlying workforce participation patterns throughout life course for women and men. Compared to men, women were less likely to be classed as mostly working full time over their adult life, and with a higher proportion participating in part time work.. Women also had more even distribution across different workforce participation patterns. For men, the dominant workforce participation pattern was '*mostly in full time work*'. These results corroborate findings from previous research (Dahl et al., 2003; Gerber et al., 2009; Huang et al., 2007; Ruhm, 1996) who discuss gender differences in retirement behaviour, but add further insight into different patterns of workforce participation for women and men throughout their life course. The fact that many women and men will have low or declining rates of workforce participation from relatively early ages is also of great importance to prevalent debates about working longer. Pertinent discussions should concern not only how to encourage people to work past "retirement age" but to enable greater workforce participation up to retirement age.

The patterns of workforce participation revealed by this study highlight 'gender roles' in relation to work and their evolution over the life course, and also reflect the changing dynamics and development of work across the life course of this cohort. When this cohort entered the workforce, almost 50 years ago, the Australian work environment was very different and largely characterized by expected roles of men and women in society. Men were the main breadwinners and women were mostly expected to be homemakers and look after families. This trend began to change in the 1960's when the "women's movement" asserted

the rights of women to equal work and equal pay. Over the last 50 years, women's workforce participation has considerably increased (from 34% in 1961 to 59% in 2011)(Australian Bureau of Statistics, 2011), alongside increasing participation of women in higher education and in other aspects of public life. Also, the substantial growth of part time work has enabled women to combine paid work with their family and social commitments (Australian Bureau of Statistics, 2011; Birch, 2005; Evans & Kelley, 2002). Moreover, women's wages have increased relative to men, indicating that value of women's work is increasing (Birch, 2005). The patterns of women's workforce participation in our study illustrates a mix between women who appear to have adopted a more traditional model involving low levels of work across their lives (*not in paid work*), and those who defied this model and had consistently high levels of workforce participation often mixing their work with marriage and family responsibilities, and mirroring the dominant workforce patterns observed among men (*mostly full time work, decreasing full time work after 55*). An alternative pattern also indicates a group of women with increasing participation in part-time work later in life. This fourth model potentially embodies the "new, creative forms of living" identified by Onyx J. (1998) whereby women wished not equality with male models of the work/non-work dichotomy, but a better balance between work and other life activities.

Increased flexible work practices, should mean that men's workforce participation patterns also become more diverse. However, this diversity was not seem among men in this cohort with most working full-time across the entirety of their working lives, or not in paid work. We found few men were adopting part-time work, with men being more likely to have a pattern of leaving paid work after age 55. This finding is consistent with the Australian Bureau of Statistics who report a decline in men's employment after middle age (2011), with the average male retirement age being 58.5 years(Australian Bureau of Statistics, 2013). Research into men's early retirement indicates that for many men this exit from the workforce is not due to their own choice, but necessitated by health concerns or due to redundancy(Alavinia & Burdorf, 2008)

Our study findings also suggest the influence of early and late factors such as childhood socioeconomic factors, education, marital status and informal caring in defining the patterns of workforce participation, but with different effects for women and men. Childhood books were used as a predictor of early life socio-economic opportunities, and were found to be associated with workforce participation patterns for women but not for men. Similar findings have been reported by some other studies that showed positive

associations between books as a marker of childhood socio-economic status and workforce participation at older ages (Case et al., 2005; Currie, 2008; Currie et al., 2010; Flores & Kalwij, 2014; Mazzonna & Havari, 2011), and studies showing education to be a strong predictor of workforce participation status in later life (Flores & Kalwij, 2014; Radl, 2013). Contrary to findings by Currie (2008), Luo and Waite(2005) and Mazzonna and Havari(2011),we did not find any significant association between father's occupation and workforce participation patterns among women.

Having post school higher education was associated with patterns of workforce participation among women. Education has a positive role for retaining employees in paid employment for longer time, with educated women less likely to be out of paid work (Australian Bureau of Statistics, 2010, 2012; Australian Institute of Family Studies. Australian Government, 2008; Flores & Kalwij, 2014; Radl, 2013). Higher education levels may strengthen the attachment of women to the labour market, enable their participation in higher status occupations, and increase their wage earning capacity. All of these factors may increase women's participation in work at later ages, particularly after their children have left home. The lack of a similar association among men, suggests men engage in paid work regardless of their level of education. However, education does play an important role in type of occupation (such as managerial or physical labour), and men in physically demanding jobs tend to retire early due to health issues (Modrek & Cullen, 2012). We found that partnered women and men were less likely to have decreasing full time work, as compared to mostly full time work. The findings of international and Australian studies by Gerber et al.(2009), Huang et al.(2007), Haider and Loughran (2001) and Li et al.(2013) are in agreement with ours, that partnered women were more likely to be in some paid work. However some Danish, Norwegian and US researchers reported that women with partners were less likely to continue working in later years (Dahl et al., 2003; Larsen & Pedersen, 2013; Ruhm, 1996). Our sample was more highly educated (Kendig et al., 2014), compared to other studies (Larsen & Pedersen, 2013) which might explain the contrasting results to other studies.

Our results did not show any significant association between informal caring responsibilities and workforce participation among women over the life course. This finding is in conflict with some previous studies, for example Berecki-Gisolf et al.(2008), Bittman et al.(2004), Dentinger and Clarkberg(2002), Gray et al.(2008) and Spoehr et al.(Spoehr et al., 2009) as in these studies most carers were women and this

affected their workforce participation. However other studies suggest that women who undertake caregiving roles are those who are more likely to either not be in paid work, or likely to leave work for other reasons (Lee & Gramotnev, 2007). In contrast, our study did identify workforce participation patterns of men to be highly associated with informal caring. This finding is in accordance with the results of Nolan (Nolan, 1994).who found that men are more likely than women to be not in paid work due to their caring roles. This finding could be explained by combined impact of socio-economic conditions and caring responsibilities which may directly influence the decision of men to leave workforce early (Dentinger & Clarkberg, 2002), and higher proportion of taking caring roles as they age (Dahlberg, Demack, & Bambra, 2007). The results may also reflect less availability of options for flexible work options for men who need to take on these responsibilities.

6.1. Theoretical and practical implications

The results add new dimensions to the existing body of literature about gender differences in workforce participation patterns. We identified clearly distinguishable workforce participation patterns over the life course, which differed for women and men. We provide evidence that childhood and adult life circumstances (especially books during childhood, education, marital status and informal caring) are associated with distinct patterns workforce participation across the life course and these associations differ among women and men. This study emphasized the importance of understanding gender inequalities in workforce participation, along with identifying some key concern areas over the life course which are strongly associated with later life work experiences. Consistent with human capital theory (Loh & Kendig, 2013) our findings suggest that early investment in women's intellectual development may make a crucial difference in their life-long motivation and capacity for employment over midlife. Yet these same resources of books in the childhood home did not influence adult workforce patterns among men. It may be that, given cultural expectations for men serving as primary earners, their workforce participation patterns over the life course were consistently high irrespective of childhood human capital; the effects of this capital on boys was more likely to be observed in their level of occupational attainment rather than their workforce participation.

Policies shape the longer term experiences and attitudes of people, and currently little attention is being paid to the longer term importance of early life intellectual opportunities on later life workforce participation. Similarly, the effects of intense disadvantage earlier in mid-life – such as long term unemployment, marital dissolution, and mental and physical health problems – needs to be further explored in terms of their consequences for health, employment, and housing security later in life (Quine, Kendig, Russell, & Touchard, 2004). A range of practical approaches are needed to address issues at different points in the life course; while also looking at factors which might affect men and women differently. Socially and economically disadvantaged people, who have problems in workforce engagement, need to be given better opportunities and training options so they are encouraged to work in paid employment. If governments aim to engage mature and older workers in workforce for longer, more research and some practical actions are needed to be taken to ensure that they are socially and physically prepared to do so.

6.2. Strengths and potential limitations

A strong feature of this study was the use of Australian Life History and Health Survey, which provided rich data about workforce participation, childhood and adult influences affecting individuals over the life course. These retrospective data permitted the identification of distinct patterns of workforce participation over the life course between men and women. The participants were residents of New South Wales and may not be representative of all the Australians. Life history interviews may be subject to recall bias and other potential problems relating to the ability of respondents in remembering correctly details about events that took place several years in the past. However, the use of the life history calendar which worked as a memory aid minimised the problem of recall bias to a great extent (Kendig et al., 2014).

With regard to generalizability, these data show patterns of workforce participation for early baby boomers in Australia that could be different for earlier or later cohorts as well as baby boomers in other countries (Kendig et al, 2013). Employment and other outcomes also will be affected by prevailing policies and opportunities relating to work and other social factors.

6.3. Conclusion

Our results show different patterns of workforce participation for men and women, with men exhibiting more of a work/ non-work dichotomy and women exhibiting a more diverse range of workforce

participation patterns including greater engagement in part time work. Higher education was associated with greater workforce participation among women, and caring was associated with less workforce participation (after age 55) among men. Engagement in work at older ages is affected not only by late life circumstances, but also by early socioeconomic factors and by events that prevail across the life course. Attempts to enable people to work for longer must consider gender roles, the influence of early life factors, and the impact of caring and other mid-life events which may limit men (and women's) options to remain in paid work. This knowledge about workforce participation patterns over the life course needs to be translated and further researched.

Ethics Approvals

The conduct of the 45 and Up Study and Australian Life History and Health (LHH) survey was approved by the University of New South Wales and University of Newcastle Human Research Ethics Committee (HREC), Protocol ID: H-2010-1208.

Disclosure Statement:

No competing financial, personal and other interest exists.

Submission Declaration

This paper has arisen from an original and empirical research project, has not been published elsewhere and is not currently under consideration for publication elsewhere.

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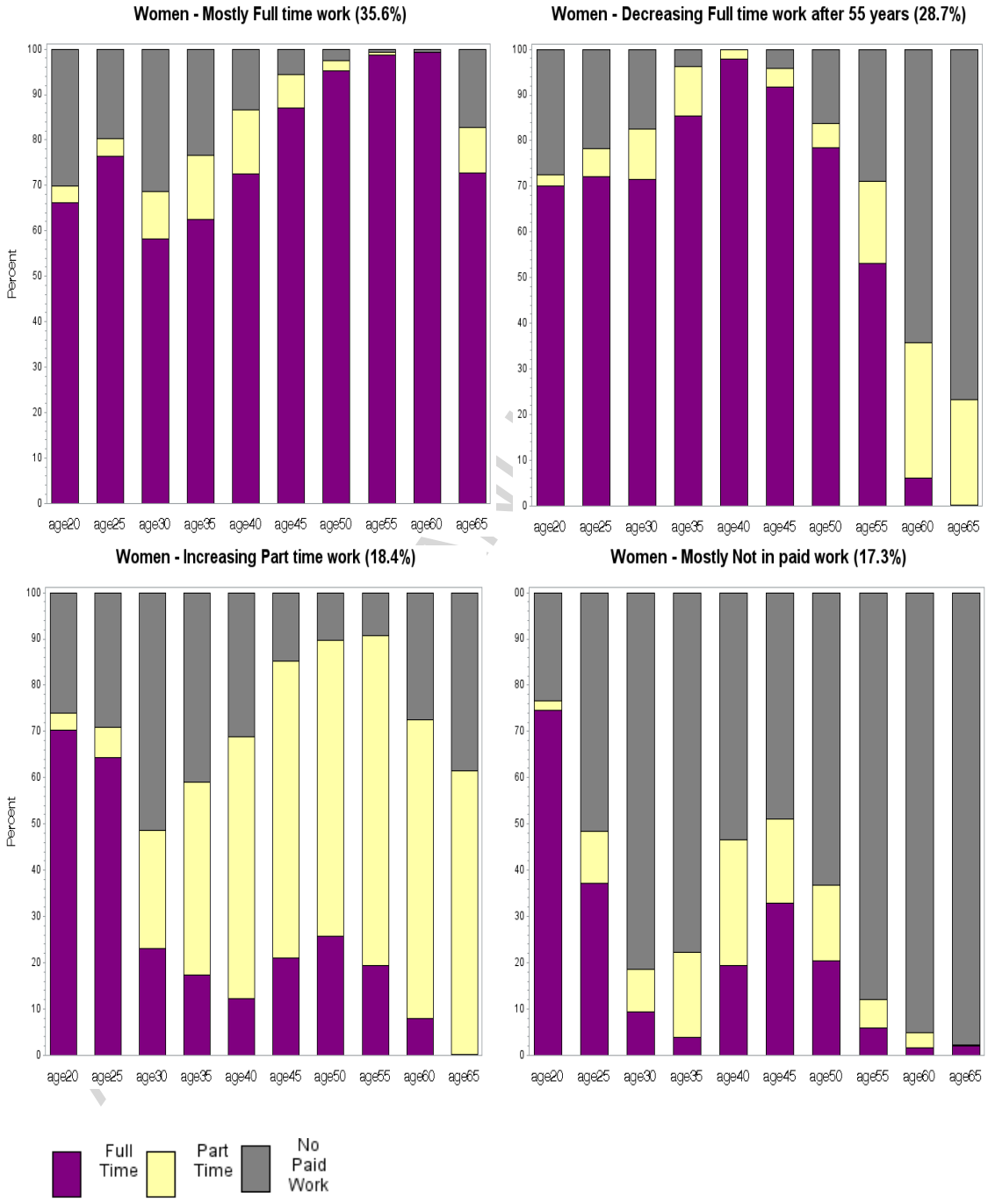

Figure 1: Patterns of workforce participation over the life course for 577 middle aged women, using four latent classes

(Intended for colour reproduction)

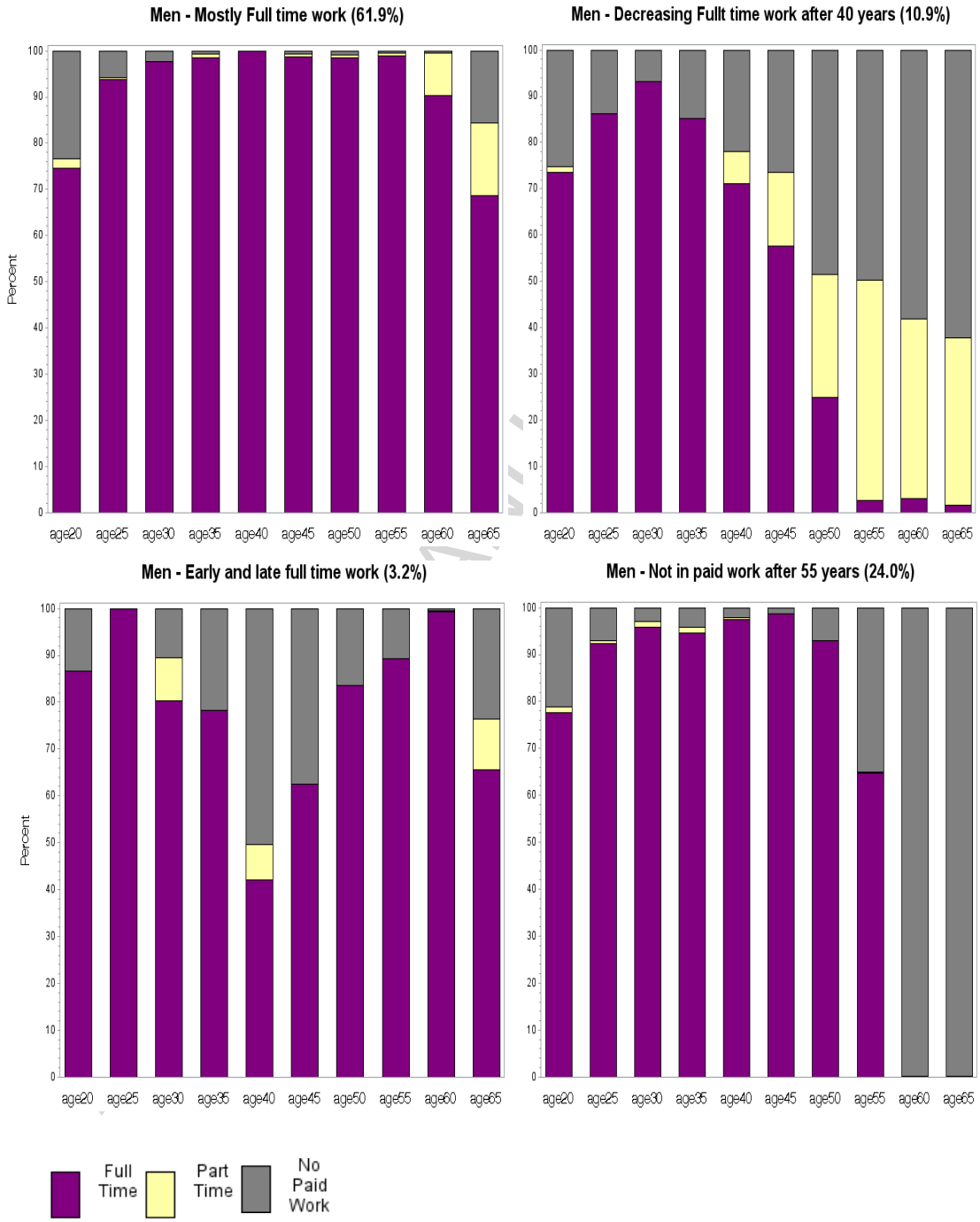

Figure 2: Patterns of workforce participation over the life course for 684 middle aged men, using four latent classes

(Intended for colour reproduction)

Table 1: Comparison of Information Criterion values for LCA models

Model fit Statistics	nclass=2	nclass=3	nclass=4	nclass=5	nclass=6
Women (N=577)					
AIC	3370.9	3035.6	2710.7	2760.9	2896.3
BIC	3549.6	3305.8	3072.4	3093.6	3110.6
Entropy	0.87	0.89	0.91	0.89	0.88
Men (N=684)					
AIC	1305.1	987.9	823.7	831.6	931.9
BIC	1490.7	1268.7	1040.8	1302.5	1454.9
Entropy	0.97	0.97	0.98	0.95	0.94

Table 2: Participant's occupation for baseline latent class model (nclass=4) for women and men

Women N= 577

Participants Occupation (ANZSCO)	Workforce participation patterns			
	Mostly FT* work N (%)	Decreasing FT* work after 55 yrs N (%)	Increasing PT** work N (%)	Mostly NPW*** N (%)
Managers	60 (28.4)	38 (23.5)	10 (9.5)	7 (7.3)
Professionals	65 (30.8)	54 (33.3)	32 (30.5)	15 (15.6)
Clerical/ Admin	64 (30.3)	48 (29.6)	37 (35.2)	37 (38.5)
Trade/ Technicians	1 (0.5)	5 (3.1)	3 (2.9)	3 (3.1)
Community/ personal services	12 (5.7)	9 (5.6)	11 (10.5)	20 (20.8)
Sales	5 (2.4)	6 (3.7)	6 (5.7)	4 (4.2)
Machinery driver/ operator	1 (0.5)	1 (0.6)	0 (0)	2 (2.1)
Labourers	3 (1.4)	1 (0.6)	6 (5.7)	8 (8.3)

Men N= 684

	Mostly FT* work N (%)	Decreasing FT* work after 40 yrs N (%)	Early and late FT work N (%)	NPW after 55 yrs N (%)
Managers	184 (43.0)	20 (29.4)	7 (43.8)	55 (32.5)
Professionals	97 (22.7)	13 (19.1)	5 (31.3)	38 (22.5)
Clerical/ Admin	24 (5.6)	2 (2.9)	0 (0)	21 (12.4)
Trade/ Technicians	60 (14.0)	18 (26.5)	2 (12.5)	20 (11.8)
Community/ personal services	13 (3.0)	4 (5.9)	0 (0)	9 (5.3)
Sales	17 (4.0)	3 (4.4)	0 (0)	2 (1.2)
Machinery driver/ operator	24 (5.6)	5 (7.4)	1 (6.3)	18 (10.7)
Labourers	9 (2.1)	3 (4.4)	1 (6.3)	6 (3.6)

*Where %= row percentages; *FT= Full time; **PT= Part time; ***NPW= Not in Paid Work*

Table 3: Odds ratios for individual effects of predictors on workforce participation patterns, among 577 middle aged women

Covariates	Workforce participation patterns				
	Mostly FT* work (ref)	Decreasing FT* work after 55 yrs	Increasing PT** work	Mostly NPW***	Likelihood test p-value
Books at age10 (Yes)	1	1.12 (0.60, 2.08)	4.16 (1.43, 12.07)†	0.50 (0.27, 0.92)†	**0.0003**
Father's occupation					
Office/admin (reference)	1	1	1	1	
Technicians/ personnel	1	1.34 (0.81, 2.22)	0.94 (0.52, 1.73)	1.41 (0.79, 2.20)	0.48
Physical labour	1	1.37 (0.78, 2.38)	1.30 (0.70, 2.41)	1.13 (0.58, 2.20)	0.70
Post School Qualification (Yes)	1	1.24 (0.63, 2.64)	0.79 (0.39, 1.64)	0.44 (0.30, 0.83) †	**0.0270**
Marital status (Partnered)	1	1.76 (1.06, 2.94)†	2.34 (1.23, 4.45)†	1.34 (0.75, 2.39)	**0.0263**
Informal caring (Yes)	1	1.59 (0.88, 2.88)	1.10 (0.59, 2.05)	0.46 (0.19, 1.13)	0.09

*Where *FT= Full time; **PT= Part time; ***NPW= Not in Paid Work †= statistically significant p<0.05*

Table 4: Parameter estimates from the full prediction model for patterns of workforce participation for 577 middle aged women

Covariates	Workforce participation patterns				
	Mostly FT * work (ref)	Decreasing FT* work after 55 yrs	Increasing PT** work	Mostly NPW***	Likelihood test p-value
Books at age10 (Yes)	1	0.86 (0.09, 1.26)	3.33 (1.26,8.79) †	0.49 (0.26, 0.95)†	**0.0006**
Father's occupation					
Office/admin (reference)	1	1	1	1	
Technicians/ personnel	1	0.78 (0.41, 1.45)	0.77 (0.46, 1.27)	0.91 (0.49, 1.67)	0.78
Physical labour	1	0.73 (0.42, 1.26)	1.06 (0.55, 2.03)	0.68 (0.34, 1.36)	0.48
Post School Qualification (Yes)	1	0.80 (0.41, 1.53)	0.57 (0.27, 1.20)	0.39 (0.20, 0.79)†	**0.0555**
Marital status (Partnered)	1	0.56 (0.40, 0.91)†	1.26 (0.65, 2.44)	0.79 (0.43, 1.46)	**0.0245**
Informal caring (Yes)	1	0.66 (0.39, 1.09)	0.72 (0.38, 1.38)	0.88 (0.47, 1.60)	0.47

*Where *FT= Full time; **PT= Part time; ***NPW= Not in Paid Work †= statistically significant p<0.05*

Table 5: Odds ratios for individual effects of predictors on workforce participation patterns, among 684 middle aged men

Covariates	Workforce participation patterns				
	Mostly FT * work (ref)	Decreasing FT* work	Early and late FT* work	Mostly NPW** after 55 years	Likelihood test p-value
Books at age10 (Yes)	1	0.70 (0.38, 1.27)	0.42 (0.15, 1.21)	0.97 (0.61, 1.55)	0.37
Father's occupation					
Office/admin (reference)	1	1	1	1	
Technicians/ personnel	1	0.86 (0.45, 1.65)	0.82 (0.21, 3.17)	1.52 (1.02, 2.27)	0.18
Physical labour	1	1.62 (0.94, 2.81)	1.17 (0.37, 3.66)	0.73 (0.47, 1.16)	0.13
Post School Qualification (Yes)	1	0.44 (0.14, 1.36)	1.13 (0.57, 2.23)	1.29 (0.70, 2.37)	0.18
Marital status (Partnered)	1	0.34 (0.19, 0.60)†	2.31 (0.30, 6.98)	1.38 (0.77, 2.71)	**0.0032**
Informal caring (Yes)	1	1.12 (0.41, 3.07)	4.97 (1.70, 8.98)†	2.27 (1.24, 4.15)†	**0.0025**

*Where *FT= Full time; **NPW= Not in Paid Work †= statistically significant p<0.05*

Table 6: Parameter estimates from the full prediction model for patterns of workforce participation for 684 middle aged men

Covariates	Workforce participation patterns				
	Mostly FT * work (ref)	Decreasing FT* work	Early and late FT* work	Mostly NPW** after 55 years	Likelihood test p-value
Books at age10 (Yes)	1	0.70 (0.38, 1.27)	0.42 (0.15, 1.21)	0.97 (0.61, 1.55)	0.37
Father's occupation					
Office/admin (reference)	1	1	1	1	
Technicians/ personnel	1	0.86 (0.45, 1.65)	0.82 (0.21, 3.17)	1.52 (1.02, 2.27)	0.18
Physical labour	1	1.62 (0.94, 2.81)	1.17 (0.37, 3.66)	0.73 (0.47, 1.16)	0.13
Post School Qualification (Yes)	1	0.44 (0.14, 1.36)	1.13 (0.57, 2.23)	1.29 (0.70, 2.37)	0.18
Marital status (Partnered)	1	0.34 (0.19, 0.60)†	2.31 (0.30, 6.98)	1.38 (0.77, 2.71)	**0.0032**
Informal caring (Yes)	1	1.12 (0.41, 3.07)	4.97 (1.70, 8.98)†	2.27 (1.24, 4.15)†	**0.0025**

*Where *FT= Full time; **PT= Part time; ***NPW= Not in Paid Work; †= statistically significant p<0.05*

Highlights:

- We identified dominant workforce patterns for women & men with latent class analysis.
- Associations of workforce patterns with life course experiences were also explored.
- Among women, education & more books in childhood increased odds of being in paid work.
- Among men, informal caring was associated with decreased participation in paid work.
- Findings could inform policy for equitable work options for less advantaged individuals.