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Birth Cohort, Ageing and Gender Ideology: Lessons from British and Australian Panel Data

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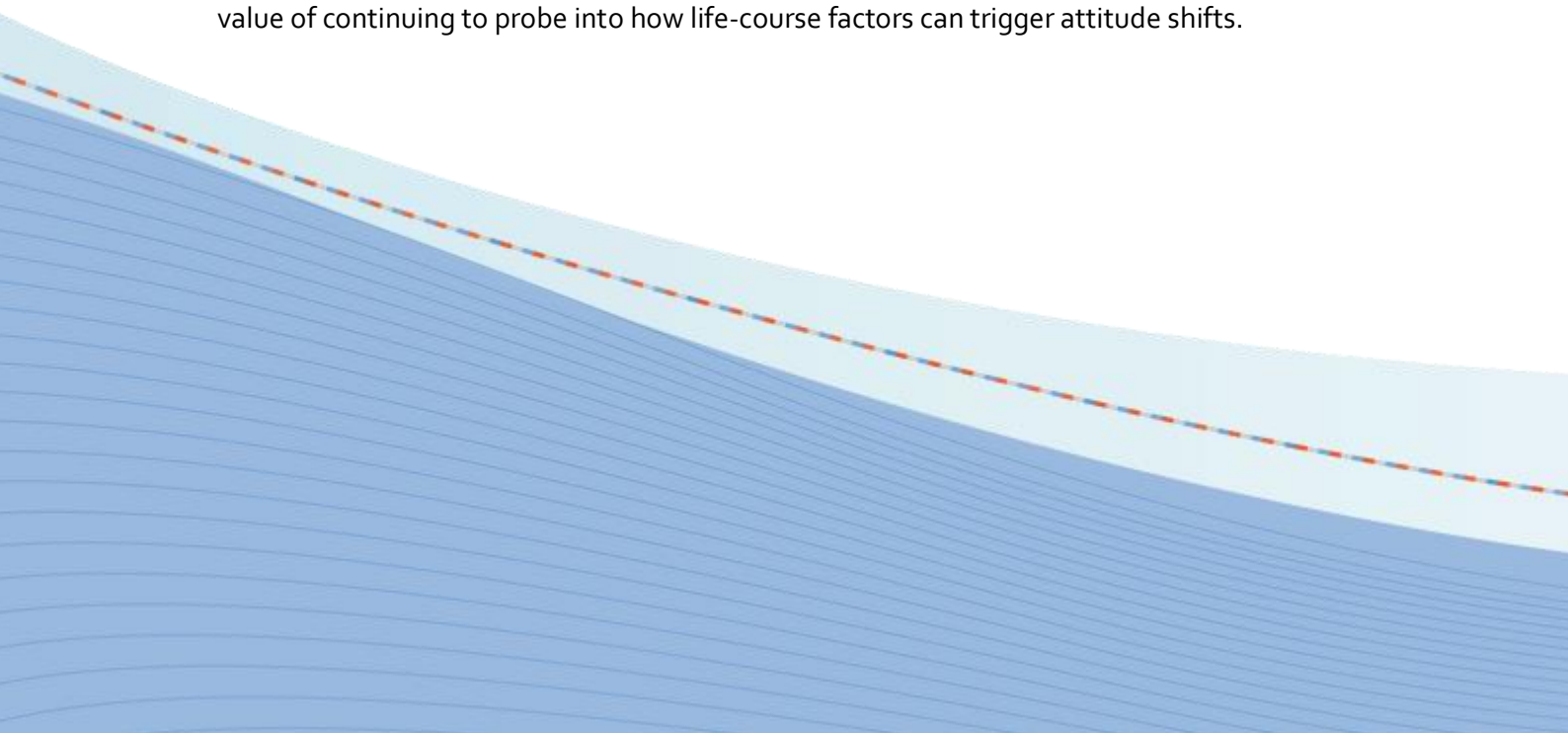
The second half of the 20th century brought about substantial falls in support for traditional gender ideologies, but these trends recently slowed down. This is important, as adherence to traditional gender ideology contributes to the (re)production of gender inequalities. Hence, understanding the factors that lie behind the stall in trends towards gender egalitarianism is important.

In this paper, we examine the separate and combined impacts of ageing and birth cohort on individuals' gender attitudes in Britain and Australia. By using unique longitudinal data including repeated measurements of the same gender-attitude items for the same individuals, we provide novel insights into how variable individual-level gender-attitude 'trajectories' are across birth cohorts and over the life course. We pay attention to whether and how ageing leads to different changes in gender ideology amongst individuals from different birth cohorts, as well as amongst different individuals within the same birth cohorts.

We find that (i) people from older cohorts hold more traditional gender attitudes, (ii) the effect of ageing on gender ideology is positive in Britain but negative in Australia, (iii) there are cohort-differences in these ageing effects, (iv) gender-attitude trajectories are less predictable in younger than older cohorts, and (v) factors capturing life-course experience explain little of the cohort differences.

This knowledge can help researchers and policymakers better comprehend and influence gendered choices and behaviours, gender-specific barriers to human capability development, and resulting gender gaps in outcomes across life domains. The also offer valuable insights into the likely pace and projection of the gender revolution, how population ageing is likely to affect its progress in the proximate future, and how policy levers to promote gender equality may be received and experienced

Additionally, our findings highlight promising research directions to be pursued by gender-attitude scholars, including the importance of considering individual variability in gender-attitude change, the need to expand the evidence base beyond the United States, and the value of continuing to probe into how life-course factors can trigger attitude shifts.



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Abstract

Individuals' gender attitudes influence their behaviors, and adherence to traditional gender ideology is an important mechanism contributing to the (re)production of gender inequalities. In developed nations, the 'gender revolution' was accompanied by marked societal shifts towards gender-egalitarian attitudes, but these trends have recently stalled. In this paper, we re-examine the role of birth cohort and ageing in influencing gender ideology through the lens of life-course theory and leveraging panel datasets from Britain and Australia. We contribute to the field by considering cohort-differences in ageing effects on gender ideology, documenting within-cohort variability in such effects and extending the analytic focus beyond the US. We find that (i) people from older cohorts hold more traditional gender attitudes, (ii) the effect of ageing on gender ideology is positive in Britain but negative in Australia, (iii) there are cohort-differences in these ageing effects, (iv) gender-attitude trajectories are less predictable in younger than older cohorts, and (v) factors capturing life-course experience explain little of the cohort differences. Our findings highlight important avenues for future research on gender ideology change, and offer insights into the likely pace and direction of social movements towards gender egalitarianism.

Keywords: gender ideology, gender roles, social change, panel data, age, cohort, Britain, Australia

1. Background

Gender ideology, defined as *“an individual’s level of support for a division of paid work and family responsibilities that is based on the notion of separate spheres”* (Davis and Greenstein 2009:89), has received substantial sociological attention. Robust evidence demonstrates that individuals’ beliefs concerning gender roles are intrinsically interwoven with their behaviors, opportunities and life outcomes. For example, relative to women holding egalitarian gender ideologies, women who hold more traditional views spend less time living independently (Cunnigham et al. 2005), become mothers earlier (Stewart 2003), are more involved in childcare (van Gameren 2013), and are less likely to report within-couple inequalities in domestic labor as unfair (Greenstein 1996). They also engage less often in paid employment and, when they do, they work fewer hours (Cunnigham et al. 2005; Corrigall & Konrad 2007) and receive lower wages (Christie-Mizell et al. 2007). Furthermore, men who hold traditional gender views contribute less to childcare (Gaunt 2006) and housework (Cunningham 2005), have wives which are less likely to work full time (Ciabattari 2001), and sometimes use traditional beliefs as a justification for domestic abuse (Totten 2003). As a result, adherence to traditional gender ideology is often held as an important mechanism contributing to the production and reproduction of gender inequalities in different spheres of personal and social life (Brooks and Bolzendahl 2004; Davis and Greenstein 2009).

The second half of the 20th century brought about unprecedented historical changes in the socio-economic standing of women in developed nations, collectively labelled as the ‘gender revolution’. Women’s educational participation first equated and then surpassed that of men and their labor force participation soared, with progressively more women entering full-time employment in high-status, well-paid and male-dominated occupations; there were also shifts towards more equitable domestic divisions of labor, increases in women’s political participation, and legislative changes promoting equality of opportunity and outlawing discrimination on the basis of gender (Thornton and Young-DeMarco 2001; Esping-Andersen 2009; Gerson 2009; England 2010). Both as a driver and a product of these transformations, average adherence to traditional gender ideologies shifted markedly within developed countries throughout the second half of the 20th century (Inglehart 1990). There are documented falls in support for traditional gender ideologies in countries such as the US (Brewster and Padavic 2000; Thornton and Young-DeMarco 2001; Cotter, Hermsen and Vanneman 2011), Australia (Van Egmond et al. 2010), Britain (Scott, Alwin and Braun 1996) and Japan (Schultz-Lee, Tufis and Alwin 2010), as well as analogous evidence from cross-national comparative studies (Scott et al. 1996; Inglehart and Norris 2003; Seguin 2007). However, for some of these countries there is also evidence of a slowdown (in some cases, a backlash) in national trends

towards more egalitarian gender attitudes in recent decades (Thornton and Young-DeMarco 2001; Bolzendahl and Myers 2004; Brooks and Bolzendahl 2004; Braun and Scott 2009; Van Egmond et al. 2010; Cotter et al. 2011). These findings have been taken as evidence of a ‘stall’ in the gender revolution (England 2010).

The well-documented effects of gender ideology on women’s outcomes across life domains coupled with the slowdown of gender egalitarian trends have elicited substantial interest in the factors that lie behind gender-attitude change. A key strand of this literature has focused on unveiling the roles and relative prominence of two mechanisms, intracohort ageing and cohort replacement.¹ Cohort replacement theory poses that early life experiences in adolescence and young adulthood leave a lasting print on individuals’ views and attitudes, which remain fairly stable over adulthood (Krosnick and Alwin 1989). Within this approach, shifts in average societal attitudes occur as younger cohorts socialized within a different social climate replace older cohorts (Danigelis, Hardy and Cutler 2007). Intracohort ageing theory, on the other hand, argues that individuals have the capacity to change their views as they age. Attitudes are not rigid, but flexible and malleable in response to the experience of life-course transitions, exposure to historical events or contact with individuals of other ages (Bolzendahl and Myers 2004; Danigelis et al. 2007). From this perspective, population-level attitude change is (at least partially) driven by attitude change within individuals over time.

Gaining a deeper understanding of these mechanisms and how they interact with each other is important in explaining the slowdown of trends towards gender egalitarianism in countries such as Australia, Britain and the US. It is also critical for our ability to anticipate and make predictions about the future of such trends, and thus about the plausible prospects for gender equality in society. Yet, our understanding of how gender attitudes change across cohorts and over the life course remains limited. First, prior research has studied these two mechanisms in isolation or as additive processes. Their interplay has been largely neglected. Second, studies in the field have relied almost exclusively on data from repeated cross-sections of different individuals. This not only limits analyses of how ageing and birth cohort interact to shape individuals’ attitudes to gender roles, but also precludes examination of how the gender attitudes of the *same* individuals evolve over their life courses. Third, the bulk of the literature has concentrated on the US. As a result, we know very little about the ‘universality’ or

¹ As others before us, we refrain from attempting to disentangle age-period-cohort effects (see also Danigelis et al. 2007). Despite progress in the field (see Yang and Land 2013), attempts to accomplish this have been subject to severe criticism since Glenn (1976) and the merits of different solutions remain contested (Bell and Jones 2013, 2014).

‘inevitability’ of the empirical associations, and whether or not these hold in other countries with differing institutional settings and historical profiles.

In this paper, we examine the separate and combined impacts of birth cohort and ageing on individuals’ gender attitudes in Britain and Australia. By using unique, long-running, multi-cohort, panel data including repeated measurements of the same gender-attitude items for the same individuals, we provide novel insights into how variable individual-level gender-attitude trajectories are across cohorts and over the life course. We pay attention to cross-cohort heterogeneity in the individual-level effects of ageing on gender ideology, as well as within-cohort heterogeneity in such effects. In addition, we extend previous research by moving the available evidence beyond its current narrow focus on the US. Our results unveil different layers of complexity in the relationships between age, birth cohort and gender attitudes, including different age and cohort relationships across national contexts and divergent ageing effects across cohorts. These findings offer important insights into the likely pace and direction of social movements towards gender egalitarianism.

2. Previous research and hypothesis development

A fundamental question when investigating public opinion is whether any observed shifts are due to changes in the composition of the population, or changes in individuals’ opinions (Firebaugh 1992). Attitude changes at societal level due to shifts in population composition are commonly referred to as ‘cohort replacement effects’, whereas changes due to movement in individuals’ opinions are referred to as ‘intracohort ageing effects’.² We will first discuss each of these processes in the context of gender ideology, and their associated theoretical expectations, and then add to theory by bringing these perspectives together.

2.1 Cohort replacement theories of attitude change

Cohort replacement (or population turnover) theories of attitude change maintain that social change in attitudes occurs when individuals from younger birth cohorts replace

² A separate literature in the US has concerned itself with evaluating the relative importance of cohort replacement and intracohort ageing in explaining population-level changes in gender attitudes. While there is some consensus that both processes play a role, there is disagreement as to which component is most important. Mason and Lu (1988) found that intracohort ageing is responsible for a greater share of aggregate change in gender ideology, whereas Davis (1996) reached the opposite conclusion. Others, such as Brewster and Padavic (2000) or Brooks and Bolzendahl (2004), report that cohort replacement and intracohort ageing account for a similar share of the change. Decomposing population-level changes in gender ideology is nevertheless not the goal of this paper.

individuals from older birth cohorts –a process also known as ‘demographic metabolism’ (Ryder 1965:843). In this approach, the key defining element of a cohort is its historical context, which influences the early-life socialization, formal education and lived experiences of its members. Together, these factors determine how traditional individuals’ social attitudes are, producing generational differences (or ‘generation gaps’) in such attitudes.

For cohort replacement to drive attitude change, attitudes need to have their origins in early life (the ‘impressionable youth’ assumption). This resonates with developmental psychology perspectives arguing that ‘core attitudes’ emerge and are shaped through socialization processes during childhood and adolescence (Krosnick and Alwin 1989). Cohort replacement theory also requires ‘individual persistence’, that is, once individuals reach adulthood, their values and attitudes no longer change –or at least change much less than in early life (Krosnick and Alwin 1989). One explanation for such persistence is that older individuals become progressively more integrated into the social system and have a greater stake in maintaining the *status quo* (Danigelis et al. 2007). A third tenet of cohort replacement theory (the ‘cohort effect’ assumption) is that cohorts differ from each other in substantial ways that go beyond compositional differences in their socio-demographic characteristics (Firebaugh 1992). Particularly, historical conditions experienced during early life have been argued to leave a lasting and distinct impression on individuals’ attitudes. For gender attitudes, these conditions may include written and unwritten laws concerning women’s rights, normative divisions of paid and household labor, and prevailing gender attitudes. Individuals from younger cohorts are exposed to more gender-neutral environments during early life than individuals from older cohorts, which should result in them holding more egalitarian gender attitudes. This is largely consistent with empirical accounts (see e.g. Bolzendahl and Myers 2004; Brooks and Bolzendahl 2004; Pampel 2011a).

Our first research hypothesis follows from cohort replacement theory and previous evidence; we expect that:

Hypothesis 1. Individuals from older cohorts will display more traditional gender attitudes than individuals from younger cohorts.

While this premise has been recurrently tested in previous research using repeated cross-sections from the US, we innovative by evaluating it (i) in the Australian and British contexts, and (ii) using panel data.

2.2 Intracohort ageing: A life-course perspective on within-individual attitude change

In contrast to cohort replacement theory, intracohort ageing theory argues that individuals have the continued capacity to change their attitudes as they grow old (Krosnick and Alwin 1989; Ryder 1965). While intracohort ageing theory does not reject the possibility that early socialization processes leave a lasting imprint on individuals' attitudes, it poses that such attitudes can change over adulthood in response to factors such as life events and transitions, historical events and interpersonal interaction (Brooks and Bolzendahl 2004; Danigelis et al. 2007). Hence, attitude change at the aggregate level is driven, at least partially, by within-individual attitude change at the micro-level, through individual learning, reactions to experiences, adaptation and reassessment of attitudes (Danigelis et al. 2007; Fan and Marini 2000). This is consistent with empirical evidence indicating that social attitudes do indeed change as people age (Baxter et al. 2015; Davis 2007; Fan and Marini 2000; Lendon and Silverstein 2012; Moen, Erickson and Dempster-McClain 1997).

In intracohort ageing theory, age is not seen as a causal driver of attitude change, but as a proxy for life-course experience (Brooks and Bolzendahl 2004). 'Life courses' can be conceptualized as trajectories of states linked through transition events in parallel life domains (such as family and employment) that unfold over time (Elder 1985). As people move through life-course stages linked to socio-structural positions, they become embedded in new social environments, which creates unique life experiences (Brooks and Bolzendahl 2004; Vespa 2009). Concerning gender attitudes, different life-course transitions have been shown to influence within-individual attitude change, including union formation, parenthood, completion of education, and entry into employment (Baxter et al. 2015; Cunningham et al. 2005; Davis 2007; Fan and Marini 2000; Schober and Scott 2012).

These transitions affect individuals' gender ideologies by shifting both (i) their exposure to different contexts and environments in which gender is a salient element (exposure-based theories), and (ii) their interest structures concerning gender egalitarianism (interest-based theories) (Jarallah, Perales and Baxter 2016). Exposure-based explanations pose that individuals' gender attitudes change in response to contact with new ideas and situations that challenge their views –a socialization process of sorts that continues into adulthood. For instance, more egalitarian gender attitudes may emerge among women who join the labor force if they become subject to discrimination at work, realize that women can do their jobs as well as men, or meet egalitarian women at the workplace (Bolzendahl and Myers 2004). Similarly, education may expose individuals to egalitarian ideals and a system based on meritocratic achievement (Cunningham et al. 2005). Gender attitudes have been argued to be especially likely to change through

exposure, as they are often based on erroneous, stereotypical representations of women that are easily refuted with experience (Danigelis et al. 2007).

Interest-based explanations of attitude change pose that individuals have interest structures consistent with their life goals, such as economic gain or self-actualization. These structures are not fixed, and can change in response to changes in individuals' contexts and circumstances. If people's interests become more dependent on gender equality, then people will become more likely to hold egalitarian attitudes (Bolzendahl and Myers 2004). For instance, women are expected to hold more egalitarian gender attitudes after entry into employment, as it is in their best interest to have equal opportunities in the labor market compared to men (Cunningham 2008). The same can be said of men whose partners enter the labor market, or who become fathers of daughters (Jarallah et al. 2016). Importantly, such interests need not be objectively defined, but are instead self-perceived and culturally influenced.

Intracohort ageing theory does not predict the direction in which individuals' gender attitudes shift with age, as this depends on individuals' specific life-course pathways. However, empirical evidence in the US unambiguously reveals shifts towards more traditional gender attitudes as people grow older (Fan and Marini 2000; Firebaugh 1992; Vespa 2009). Our second research hypothesis follows from this body of theory and evidence; we expect that:

Hypothesis 2. Ageing will lead to more traditional gender attitudes.

While this is not a new hypothesis, we are the first to explicitly test this using panel data from Australia and Britain.

2.3 Between-cohort variation in ageing effects on individuals' gender ideology

A wealth of research has examined how ageing and birth cohort affect gender ideology, but their interactions have been largely ignored. In particular, few studies pay attention to the possibility that ageing effects on gender ideology vary across cohorts, or whether such effects have become more dispersed within younger cohorts. We argue that these differences may in fact exist, as individuals' life courses are historically situated and subject to contextual influences (Elder and Rockwell 1979; Mayer 2004).

Treating age as a proxy for life-course experience, cohort differences in individuals' typical life-course trajectories may give rise to cohort differences in the effect of ageing on gender ideology. There is ample evidence that the nature, order and timing of life-

course events and transitions experienced by individuals in (post-)industrialized countries has evolved since World War II. For example, labor market entry occurs at progressively older ages amongst individuals from younger cohorts, as a byproduct of longer spells in the education system to participate in tertiary education (Brückner and Mayer 2005). In addition, traditional family life-course trajectories, characterized by early entry to marriage and parenthood, have become less prevalent (Elzinga and Liefbroer 2007). Instead, delays in parenthood and increases in cohabitation before and after the transition to parenthood are becoming more frequent (Elzinga and Liefbroer 2007). In addition, men and women from younger cohorts are more likely to experience spells being single or divorced in their mid-life years (McMunn et al. 2015). Due to these changes, women in younger cohorts are exposed to full-time employment for longer spells of time (Frejka and Sobotka 2008). In general, women's life courses have become progressively more similar to men's in terms of their education and employment pathways (Brückner and Mayer 2005; McMunn et al. 2015).

Overall, we expect that delays in (or skipping of) marriage and parenthood may lead to a postponement in (or absence of) the traditionalizing effect of family formation on gender ideology for women and men in younger cohorts. Extended education, particularly tertiary education (e.g. via increasing participation, longer spells, and a higher prevalence of returns) should flatten the positive gradient between age and gender ideology amongst individuals in these cohorts. In addition, longer exposure to full-time employment before family formation may lead to more rapid liberalization in gender ideology amongst women. Altogether, the net effect of these changes lead us to hypothesize that:

Hypothesis 3. The traditionalizing effect of ageing on gender ideology will be stronger amongst individuals from older cohorts than individuals from younger cohorts.

Because ageing here is a proxy for life-course experience, we also expect that:

Hypothesis 4. Intercohort differences in the traditionalizing effect of ageing on gender ideology will be (at least partially) explained by compositional differences in factors capturing life-course experience.

Between World War II and the early 1970s there was a high degree of standardization in the life courses of individuals living in (post-)industrialized countries, as reflected by the nature, order and timing of key life-course events and transitions (Brückner and Mayer

2005; Mayer 2004). From the mid-1970s, the so-called post-industrial (or post-Fordist) life-course regime led to increasing diversification in individuals' life-course trajectories, especially in the domain of family life (Mayer 2004). For example, the variance in age at first marriage and age at first birth is higher among individuals from younger than older cohorts (Elzinga and Liefbroer 2007). There is also increasing heterogeneity in partnership options among individuals from younger cohorts, e.g. concerning cohabitation and living-apart-together arrangements (Elzinga and Liefbroer 2007). Family transitions have also become de-coupled from individuals' other socio-structural positions, e.g. marriage no longer depends on having secure, full-time employment, and parenthood is no longer contingent on marriage (Brückner and Mayer 2005). Together, these processes have led to the diversification of family trajectories in younger cohorts (McMunn et al. 2015). While women's life-course employment trajectories have become more similar to those of men, this has resulted in increasing heterogeneity in work-family choices amongst women and a diversification of their life-course trajectories (Brückner and Mayer 2005).

Increasing variation in life-course trajectories within younger cohorts may have led to increasing heterogeneity in the effects of ageing on gender ideology. That is, the pace and direction of changes in gender ideology as individuals grow older should be less patterned amongst individuals from younger cohorts than individuals from older cohorts, as the former should have a lower probability of experiencing similar life-course trajectories. For instance, an increasing share of individuals in younger cohorts will not experience life-course transitions, such as marriage and parenthood, which typically lead to traditional gender ideology. However, many others will still experience such life-course landmarks. Hence, increasing diversity in life-course trajectories may have resulted in higher dispersion in changes in gender ideology over the life courses of individuals from younger cohorts (Pampel 2011a). We formally hypothesize that:

Hypothesis 5. The individual-level effects of ageing on gender ideology will be more heterogeneous amongst individuals from younger cohorts than individuals from older cohorts.

Testing this premise requires panel data, and the analysis of between-individual variances in ageing effects. Again, as we consider individual ageing a proxy for life-course experience, we also expect that:

Hypothesis 6. Intercohort differences in the variance of the ageing effects on gender ideology will be (at least partly) explained by compositional differences in factors capturing life-course experience.

In addition to explicitly testing these six interrelated hypotheses, we also contribute to the literature on ageing, birth cohort and gender ideology more broadly by examining between-country variation in the associations.

2.4 Between-country variation in ageing effects on individuals' gender attitudes

The ways in which age and birth cohort affect gender ideology are likely shaped by context. Cross-national comparative research is important to understanding whether the associations between age, birth cohort and gender ideology are country-specific (Scott et al. 1996). A country's institutional setting can exert substantial influence on individuals' exposure to different social contexts and environments, and their interests in gender equality (Pampel 2011b). For instance, policies that support dual-earner families increase women's exposure to employment and men's exposure to working women, both of which are likely to lead to the emergence of egalitarian gender attitudes (Sjöberg 2004). This also applies to welfare and tax policies that incentivize employment, such as individual-level taxation. These policies should also increase women's and partnered men's interest in gender equality, as gender equality would result in improvements in their economic standing (Yu and Lee 2013). A final contribution of our study is that we test our hypotheses across two new country contexts, Britain and Australia, and compare the results to those of the more advanced body of evidence for the US. *A priori*, one would expect more similar patterns of association in Britain and Australia, and more different patterns in these countries compared to the US. Britain and Australia share many institutional features as part of their common history. They are both liberal welfare states (Esping-Andersen 2009) and 'family accommodating' countries. In both Britain and Australia, female labor force participation decreases with motherhood, and is neither actively supported nor hindered by social policy, with families often relying on market solutions, e.g. private childcare (Scott et al. 1996; Treas and Widmer 2000). These contextual conditions facilitate a traditional division of labor with men as primary earners and women as secondary earners, with comparatively high rates of female part-time employment (Sainsbury 1999). This sets Britain and Australia apart from 'work-oriented' countries such as the US (Treas and Widmer 2000).

2.5 The current study: Aims and contributions

Our study leverages recent, long-running, multi-cohort panel data from Britain and Australia to improve our understandings of how birth cohort and ageing are associated with individuals' gender attitudes over the life course. We begin by reassessing the effects of birth cohort and ageing on individuals' gender attitudes using panel data from Britain and Australia and innovate by paying attention to the interactions between these two mechanisms. We do so by considering whether and how the effects of ageing on gender attitudes diverge across individuals in different birth cohorts in these two countries. Further, we exploit the panel data to provide first-time evidence on the degree of variability in the effect of ageing on individuals' gender attitudes, and whether or not such variability differs across birth cohorts. More broadly, we contribute to the existing literature by extending its narrow focus on the US to other valuable comparators, Australia and Britain, and by using more recent data than previous studies.

3. Data and methods

3.1 Cross-national, cross-cohort panel data on gender attitudes

Very few data sources satisfy the conditions necessary for the simultaneous analysis of within-individual over-time changes in gender attitudes and cross-cohort differences in such changes. Specifically, the dataset should: (i) contain repeated measurements of the same questionnaire items capturing gender attitudes, (ii) collect such information for the same individuals on multiple occasions, (iii) cover a relatively long period of time, (iv) incorporate a sufficient number of individuals from several birth cohorts, and (v) be based on a sample that is representative of the national population. Only two major international surveys satisfy all the requirements: the British Household Panel Survey (BHPS) and the Household, Income and Labour Dynamics in Australia (HILDA) Survey.³

The BHPS is a multipurpose panel survey that between 1991 and 2008 collected annual information on a range of topics from individuals aged 16 and older in a sample of British households (Taylor et al. 2010).⁴ In its first wave, the BHPS sample was representative of the British population and comprised about 10,000 individuals living in 5,500 households. The BHPS contains information on gender attitudes from the same

³ The design characteristics and structure of these two surveys are highly comparable. The HILDA Survey was initiated several years after the BHPS and used the latter as a model. Both the HILDA Survey and the BHPS are part of the Cross-National Equivalent File (CNEF) of household panel surveys.

⁴ In both the BHPS and the HILDA Survey individuals who were not part of the survey in Wave 1 but who began sharing a residence with an original sample member are also interviewed. If such individuals marry or have a child with an original sample member they are subsequently followed over time.

respondents in up to nine occasions, on years 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005 and 2007. These data were collected using a self-complete questionnaire, within a module in which respondents are instructed as follows: *“Here are some questions about the family and women’s role and work outside the household. Do you personally agree or disagree ...”*. The possible response options are [1] ‘strongly agree’, [2] ‘agree’, [3] ‘neither agree nor disagree’, [4] ‘disagree’ and [5] ‘strongly disagree’.

The HILDA Survey is also a multipurpose panel survey which, since 2001, collects annual information on a range of topics from individuals age 15 and older living in a sample of Australian households (Summerfield et al. 2014). The sample in Wave 1 of the HILDA Survey comprised almost 14,000 individuals from 7,500 households, and was largely representative of the Australian population (with the exception of some communities in remote areas). The HILDA Survey collects information on gender attitudes from the same individuals on five occasions, in years 2001, 2005, 2008, 2011 and 2015. As for the BHPS, this information is collected via a module within a self-complete questionnaire. The guidelines given to respondents read: *“The following statements are about your attitudes towards parenting and work. Please indicate, by crossing one box on each line, how strongly you agree or disagree with each”*. Response options are on a scale from [1] (‘strongly disagree’) to [7] (‘strongly agree’), in which only the two extreme categories are labelled.

We use seven attitude items from the BHPS and six from the HILDA Survey.⁵ The wording of all items is shown in Table 1. These tap different dimensions of gender ideology, including the roles of men and women in child upbringing, housework divisions of labour, financial contributions to the household, the impact of women’s work on family life and relationship quality, and women’s sense of independence through employment. However, both surveys lack items on other dimensions of gender ideology, such as women’s capabilities as leaders and politicians or the acceptance of male privilege (see David and Greenstein 2009: Table 1). We reverse coded some of the items so that high values represent more traditional gender attitudes, and added up the scores on all items to construct an additive gender ideology index (GII) for each survey. We do not impute missing data, and so the GIIs are constructed using only information from individuals who answered the full set of questions on gender attitudes. For ease of interpretation and comparison, the GIIs were subsequently rescaled to range from 0 to 100.⁶

⁵ The HILDA Survey includes other gender-attitude items which are not available on all occasions. For simplicity, we do not use these in our analyses.

⁶ The reliability of the resulting GIIs is moderate, as denoted by Cronbach Alpha statistics of 0.6 for Australia and 0.7 for Britain. Nevertheless, in both countries, principal-component factor analyses yielded only one factor with an Eigenvalue over 1, and all items loaded positively on such factor. We take this as evidence of index uni-dimensionality.

We restrict our analyses to observations in which individuals are aged 18 to 80 with no missing information on analytical variables. Table 1 provides descriptive statistics on the gender-attitude measures for our analytical sample. While the GIs in Britain and Australia are not strictly comparable (they are derived from different items and over different time periods), their average scores, on a scale of 0 to 100, are very similar: 42.66 in the British sample and 39.98 in the Australian sample.

We use the survey data to construct birth cohorts using 10-year intervals, as recommended by Brooks and Bolzendahl (2004). As an exception, this range was increased for the first and last cohorts to incorporate a sufficient number of survey respondents. In Britain, individuals are separated into the following birth cohorts: cohort 1 (<1935; n=11,535 observations), cohort 2 (1935-1944; n=9,259), cohort 3 (1945-1954; n=13,063), cohort 4 (1955-1964; n=15,110), and cohort 5 (1965-1974; n=14,805), and cohort 6 (1975-1989; n=7,953). Given the recency and shorter time span of the HILDA Survey data relative to the BHPS data, cohorts for Australia are similar but not identical to those for Britain. In Australia, survey respondents are separated into the following birth cohorts depending on their date of birth: cohort 1 (<1945; n=8,506 observations), cohort 2 (1945-1954; n=9,295), cohort 3 (1955-1964; n=12,055), cohort 4 (1965-1974; n=11,603), cohort 5 (1975-1984; n=9,725), and cohort 6 (1985-1994; n=7,244). This method yields relatively large and reasonably consistent sample sizes across cohorts in both countries.

Table 1. Content and descriptive statistics for measures of gender ideology, Britain and Australia

	Survey	Mean	sd	min	max
Gender ideology index	BHPS	42.66	13.21	0	100
‘A preschool child is likely to suffer if his or her mother works’	BHPS	3.12	1.06	1	5
‘All in all, family life suffers when the woman has a full time job’	BHPS	2.97	1.07	1	5
‘A woman and her family would all be happier if she goes out to work’	BHPS	3.14	0.75	1	5
‘Both the husband and wife should contribute to the household income’	BHPS	2.52	0.90	1	5
‘Having a fulltime job is the best way for a woman to be an independent person’	BHPS	2.83	0.94	1	5
‘A husband's job is to earn money; a wife's job is to look after the home and family’	BHPS	2.48	1.06	1	5
‘Children need a father to be as closely involved in their upbringing as the mother’	BHPS	1.88	0.80	1	5
Gender ideology index	HILDA	39.98	15.50	0	100
‘Many working mothers seem to care more about being successful at work than meeting the needs of their children’	HILDA	3.37	1.68	1	7
‘If both partners in a couple work, they should share equally in the housework and care of children’	HILDA	1.97	1.23	1	7
‘Whatever career a woman may have, her most important role in life is still that of being a mother’	HILDA	5.39	1.73	1	7
‘Mothers who don’t really need the money shouldn’t work’	HILDA	3.49	1.94	1	7
‘Children do just as well if the mother earns the money and the father cares for the home and the children’	HILDA	2.69	1.54	1	7
‘A working mother can establish just as good a relationship with her children as a mother who does not work for pay’	HILDA	3.48	1.81	1	7

Notes: Britain (BHPS, years 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005 & 2007) and Australia (HILDA Survey, years 2001, 2005, 2008, 2011 & 2015). BHPS: 71,725 observations from 16,444 individuals; HILDA Survey: 58,428 observations from 21,979 individuals.

3.2 Analytic strategy

To test Hypotheses 1 and 2 we fit random-intercept panel regression models (Wooldridge 2010: 292 ff), estimated using Stata MP 14.0. These allow a random intercept capturing person-specific unobserved heterogeneity:

$$GII_{it} = a + \beta_1 cohort_i + \beta_2 age_{it} + \beta_3 controls_{it} + u_i + e_{it} \quad (1)$$

Here, the i and t subscripts denote individual and time period, respectively; GII is the gender ideology index score; a is the model's grand intercept; $cohort$ is a categorical measure of birth cohort; age is a continuous measure of age, expressed in years; $controls$ relates to a vector of base control variables (gender, ethnicity, migrant background); β are coefficients (or vectors of coefficients) to be estimated; e_{it} is the idiosyncratic error term; and u_i is a person-specific random effect capturing unobserved heterogeneity that allows the intercept to vary between individuals. The random effect is assumed to be independent and identically distributed with a mean of 0 and constant variance.

Testing Hypothesis 3 requires the addition of a cross-level interaction term between birth cohort and age ($cohort*age$):

$$GII_{it} = a + \beta_1 cohort_i + \beta_2 age_{it} + \beta_3 cohort_i * age_{it} + \beta_4 controls_{it} + u_i + e_{it} \quad (2)$$

The estimated effects on these terms, i.e. β_3 , provide information on whether the slope of age differs across cohorts. To test Hypothesis 4, we add control variables for socio-demographic factors that approximate life-course experience ($lifecourse$):

$$GII_{it} = a + \beta_1 cohort_i + \beta_2 age_{it} + \beta_3 cohort_i * age_{it} + \beta_4 controls_{it} + \beta_5 lifecourse_{it} + u_i + e_{it} \quad (3)$$

These life-course factors include parenthood, presence of young children in the household, partnership status, divorce history, educational attainment, full-time student status, employment status, and income. Details on the operationalization and descriptive statistics of all control and life-course variables are presented in Table A1 (BHPS) and Table A2 (HILDA Survey) in the Appendix. Changes in the magnitude, direction and/or

statistical significance in the estimated effects on the β_3 coefficients between the models in equation 2 and 3 are taken as evidence of mediation.

To test Hypotheses 5 and 6 (and provide an additional test of Hypothesis 3), we fit cohort-specific random-slope models (Rabe-Hesketh and Skrondal 2012: 362 ff), estimated jointly via iterative generalised least squares (equivalent to maximum likelihood) using MLwiN 2.36 software (Rashbash et al., 2000). These take the following form:

$$GII_{it} = a^c + \beta_1^c age_{it} + \beta_2^c controls_{it} + u_i^c + v_i^c age_{it} + e_{it}^c \quad (5)$$

Here, the cohort superscript (c) denotes that the model allows for cohort-specific intercepts (a), coefficients (β_1, β_2), random terms (u_i, v_i), and stochastic errors (e_{it}) within a single equation. In addition, the random effect v_i allows the age slope to vary across individuals within each cohort. To evaluate Hypothesis 5 we test whether these cohort-specific v_i terms are statistically significantly different from each other. We accomplish this by re-estimating Equation (5) for each pair of cohorts, first constraining v_i to be equal across cohorts, and then not imposing such constraint. We then compare the log-likelihood of the constrained and unconstrained models through log-likelihood ratio tests. Where the unconstrained model has a better fit, we conclude that the variances in the age coefficients between the respective pair of cohorts are statistically different (see West and Elliot 2014).

To test Hypothesis 6, we add control variables for socio-demographic factors that approximate life-course experience (*lifecourse*):

$$GII_{it} = a^c + \beta_1^c age_{it} + \beta_2^c controls_{it} + \beta_3^c lifecourse_{it} + u_i^c + v_i^c age_{it} + e_{it}^c \quad (6)$$

Changes in the magnitude and/or statistical significance of the cohort-specific variance components on the ageing effects (v_i^c) are taken as evidence that life-course factors account for cohort differences in the variance components.

4. The age, cohort, gender-attitude puzzle: New empirical evidence from cross-national, cross-cohort panel data

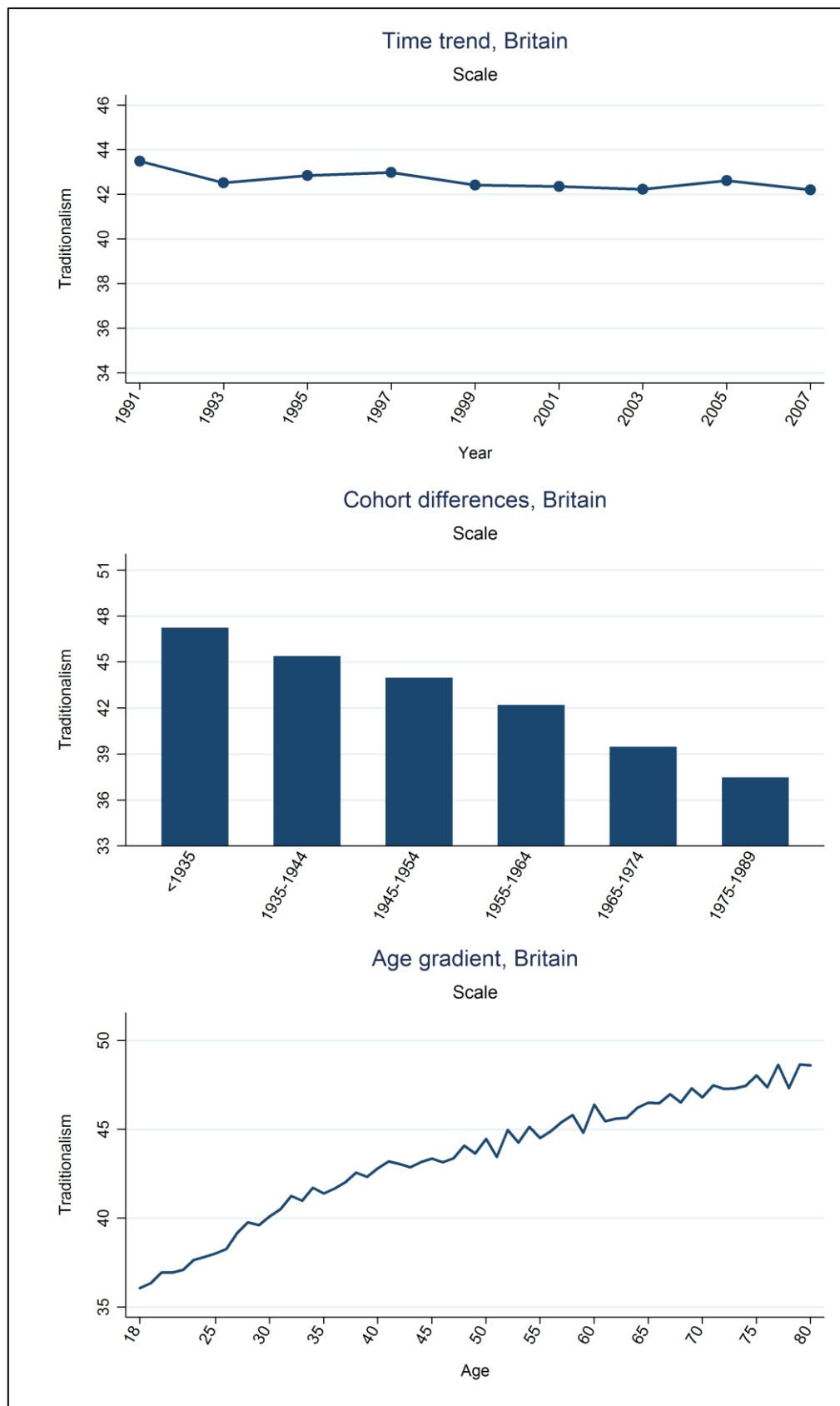
4.1 Age, cohort and year trends

We begin by reporting unadjusted trends in gender ideology by period, cohort and age in Britain and Australia over the observation window. These are displayed visually in Figure 1 (Britain) and Figure 2 (Australia). In Britain, the BHPS data reveal a rather flat period trend in gender ideology. The mean value of the GII (which can range from 0 to 100) declined only slightly in the 16-year observation period, from 43.49 in 1991 to 42.21 in 2007. There are however marked cohort differences in gender ideology, whereby younger cohorts consistently feature more egalitarian gender attitudes than older cohorts. The most traditional gender attitudes are held by survey respondents in the oldest cohort, born before 1935 (mean GII=47.25), and the most egalitarian attitudes are held by survey respondents in the youngest cohort, born in or after 1975 (mean GII=37.47). There is also a positive age gradient in gender ideology, whereby age is associated with more traditional gender attitudes. For example, mean GII amongst 18 year olds is 36.07, whereas mean GII amongst 80 year olds is 48.61.

In Australia, the HILDA Survey enables examination of a more recent but slightly shorter observation period. The value of the GII decreased markedly in this time period: from 43.97 in 2001 to 36.35 in 2015. Age and cohort patterns in Australia are similar to those reported for Britain. Individuals from younger birth cohorts feature less traditional attitudes than those from older birth cohorts. The most traditional attitudes are held by respondents in the oldest cohort, born before 1945 (mean GII=47.74), and the most egalitarian attitudes by respondents in the youngest cohort, born in or after 1985 (mean GII=34.82). Traditionalism in gender ideology in Australia also increases linearly with age: the mean GII is 36.21 amongst 18 year-old respondents, and a much higher 48.62 amongst 80 year-old respondents.

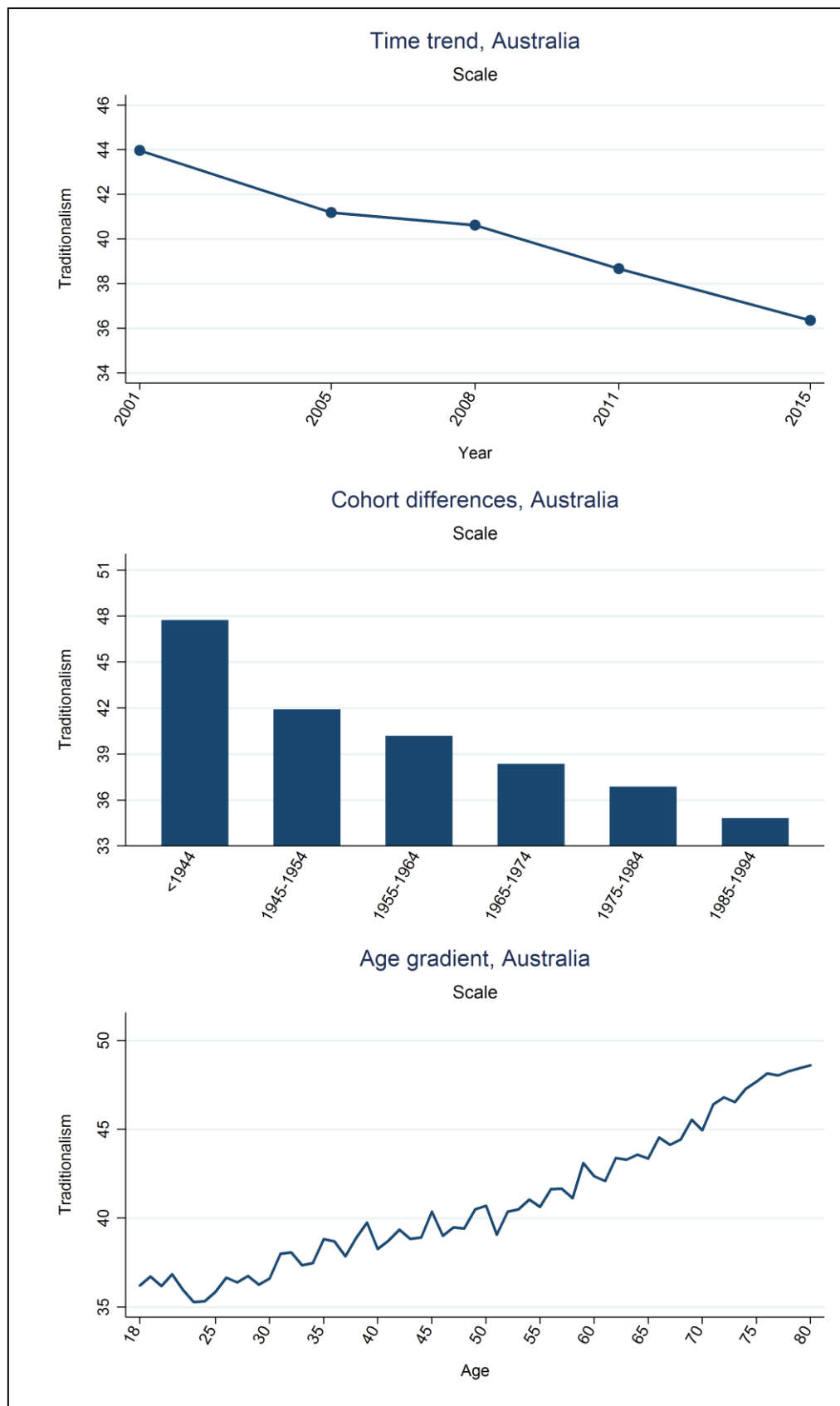
Altogether, these descriptive trends suggest that there has been more progress towards gender egalitarian attitudes in Australia than Britain. They also portray similar age and cohort gradients across the two countries. However, our panel data comprise only a relatively small time window, and we do not observe complete life courses for individuals from different cohorts. Hence, the age and cohort effects are confounded by the fact that individuals from older cohorts tend to be observed at older ages and individuals from younger cohorts tend to be observed at younger ages. It follows that age and cohort effects must be considered jointly to ascertain their net effects on gender ideology.

Figure 1. Period, cohort and age trends in gender ideology, Britain



Notes: Britain (BHPS, years 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005 & 2007). N: 71,725 observations from 16,444 individuals.

Figure 2. Period, cohort and age trends in gender ideology, Australia



Notes: Australia (HILDA Survey, years 2001, 2005, 2008, 2011 & 2015). N: 58,428 observations from 21,979 individuals.

4.2 Birth cohort and ageing effects

Model 1 in Table 2 present a first set of multivariate estimates of the effects of ageing and birth cohort on individuals' gender ideology, adjusting for base controls (gender, ethnicity and migrant background).

As individuals in Britain grow older, their attitudes become significantly more traditional ($\beta_{\text{ageing}}=0.13$; $p<0.001$). In addition, there are statistically significant birth cohort differences in individuals' gender ideology. Relative to individuals in the first and oldest cohort, individuals in the third ($\beta_{\text{cohort3}}=-0.77$; $p<0.05$), fourth ($\beta_{\text{cohort4}}=-1.53$; $p<0.001$), fifth ($\beta_{\text{cohort5}}=-3.28$; $p<0.001$) and sixth and youngest ($\beta_{\text{cohort6}}=-3.96$; $p<0.001$) cohorts hold progressively more egalitarian gender attitudes. In contrast, ageing in Australia leads to the emergence of less traditional gender attitudes ($\beta_{\text{ageing}}=-0.28$; $p<0.001$). There are also substantially more pronounced birth cohort differences in gender ideology in Australia than in Britain. Relative to individuals in the first and oldest cohort, individuals in the second ($\beta_{\text{cohort2}}=-9.68$; $p<0.001$), third ($\beta_{\text{cohort3}}=-14.33$; $p<0.001$), fourth ($\beta_{\text{cohort4}}=-18.86$; $p<0.001$), fifth ($\beta_{\text{cohort5}}=-23.28$; $p<0.001$), and sixth and youngest ($\beta_{\text{cohort6}}=-27.17$; $p<0.001$) cohorts hold progressively more egalitarian gender attitudes.

The divergence in results between Britain and Australia is a surprising finding. For both countries, there is evidence in favor of Hypothesis 1, which posed that individuals from older cohorts should display more traditional gender attitudes than individuals from younger cohorts. The evidence is however markedly stronger for Australia than Britain. However, Hypothesis 2, which postulated that ageing should lead to more traditional gender attitudes is only supported in Britain. In Australia, the opposite is in fact true.

4.3 Cohort-specific ageing effects

To examine cohort-specific ageing effects on gender ideology we add variables capturing interactions between age and birth cohort to the previous models. These results are presented in Model 2 in Table 2.

In Britain, there is some evidence of cohort differences in the effect of ageing on gender ideology. The traditionalizing effect of ageing on gender ideology is larger amongst individuals in the fourth ($\beta_{\text{ageing*cohort4}}=0.09$; $p<0.001$), fifth ($\beta_{\text{ageing*cohort5}}=0.26$; $p<0.001$), and sixth and youngest ($\beta_{\text{ageing*cohort6}}=0.32$; $p<0.001$) cohorts, than amongst individuals from the first and oldest cohort. That is, ageing produces comparatively more traditional attitudes amongst individuals from younger cohorts in Britain. This pattern of results is easily observed in the graphical representation of the model, located in the top panel of Figure 3. Fewer differences are evident in the results for the Australian sample. In Australia, ageing leads to the emergence of less traditional attitudes. This pattern is

slightly more pronounced amongst individuals from the third ($\beta_{\text{ageing*cohort3}}=-0.06$; $p<0.01$) and sixth and youngest ($\beta_{\text{ageing*cohort6}}=-0.09$; $p<0.05$) cohorts than individuals from the first and oldest cohort. The lack of substantial cohort differences in ageing effects in the Australian sample is also apparent in the graphical depiction of the model, presented in the top panel of Figure 4.

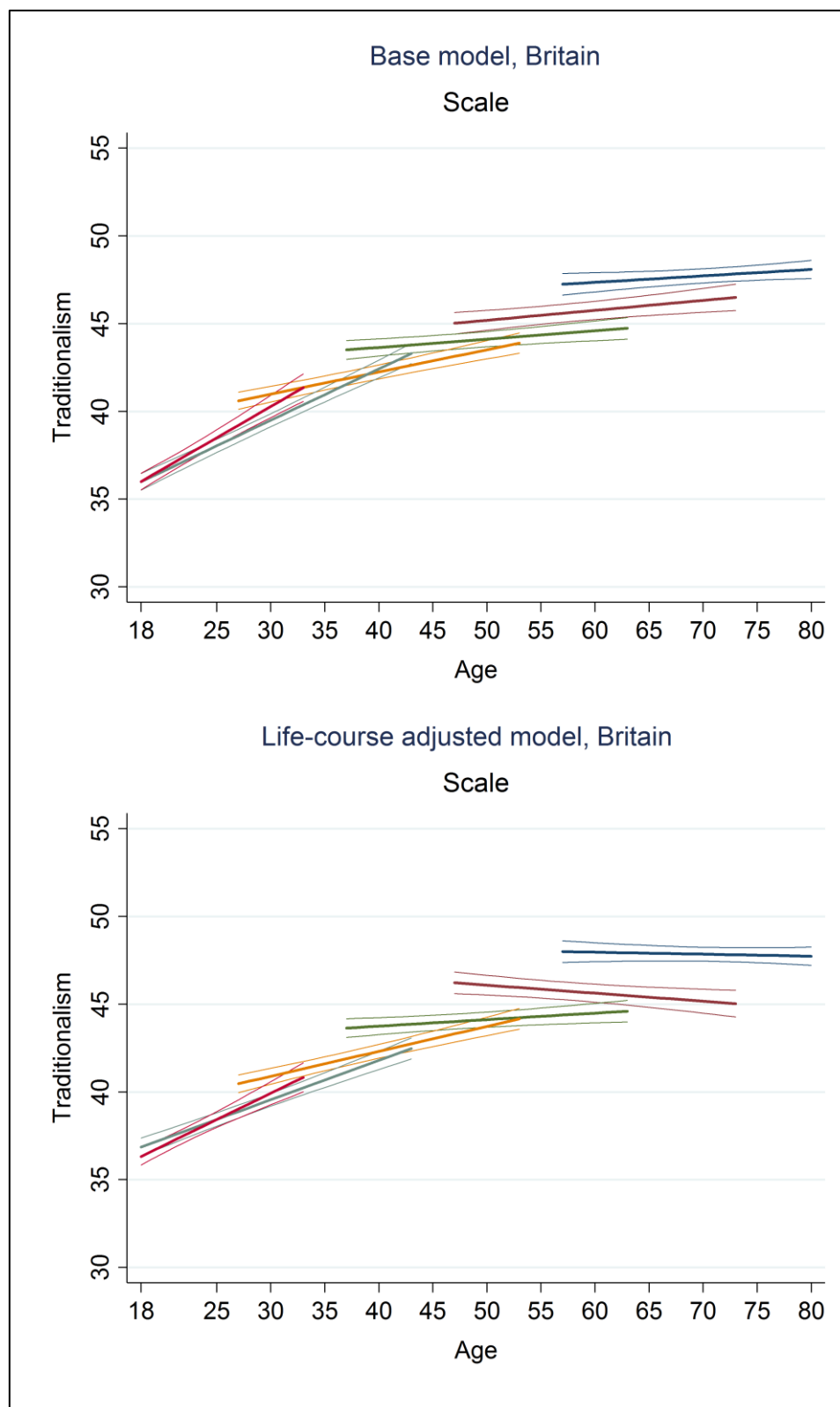
Altogether, the pattern of results for Britain goes against the predictions of Hypothesis 3. Ageing has a comparatively more traditionalizing effect on gender ideology for the younger, not the older, cohorts in Britain. In Australia, the few cohort differences in ageing effects are in the hypothesized direction.

Table 2. Random-intercept regression models, Britain and Australia

	Britain			Australia		
	(1)	(2)	(3)	(1)	(2)	(3)
Age	0.13*** (0.01)	0.04* (0.02)	-0.01 (0.02)	-0.28*** (0.01)	-0.25*** (0.02)	-0.28*** (0.02)
Birth cohort (reference: Cohort 1)						
Cohort 2	-0.43 (0.34)	-2.85 (1.62)	0.66 (1.62)	-9.68*** (0.35)	-6.48** (2.10)	-3.70 (2.09)
Cohort 3	-0.77* (0.34)	-3.43* (1.45)	-4.52** (1.45)	-14.33*** (0.37)	-10.33*** (1.91)	-10.97*** (1.91)
Cohort 4	-1.53*** (0.37)	-8.02*** (1.37)	-9.91*** (1.39)	-18.86*** (0.42)	-16.43*** (1.85)	-15.98*** (1.87)
Cohort 5	-3.28*** (0.40)	-14.50*** (1.33)	-13.03*** (1.37)	-23.28*** (0.49)	-22.01*** (1.81)	-17.57*** (1.85)
Cohort 6	-3.96*** (0.44)	-15.58*** (1.44)	-14.11*** (1.50)	-27.17*** (0.54)	-21.07*** (1.92)	-19.11*** (1.98)
Age/Cohort interactions						
Age * Cohort 2		0.02 (0.02)	-0.03 (0.02)		-0.05 (0.03)	-0.07* (0.03)
Age * Cohort 3		0.01 (0.02)	0.05* (0.02)		-0.06* (0.03)	-0.00 (0.03)
Age * Cohort 4		0.09*** (0.02)	0.15*** (0.02)		-0.03 (0.03)	0.02 (0.03)
Age * Cohort 5		0.26*** (0.02)	0.24*** (0.02)		0.01 (0.03)	-0.02 (0.03)
Age * Cohort 6		0.32*** (0.04)	0.31*** (0.04)		-0.19*** (0.05)	-0.10* (0.05)
<u>Base controls</u>	Yes	Yes	Yes	Yes	Yes	Yes
<u>Life-course factors</u>	No	No	Yes	No	No	Yes
R ² (overall)	0.068	0.070	0.096	0.096	0.096	0.155

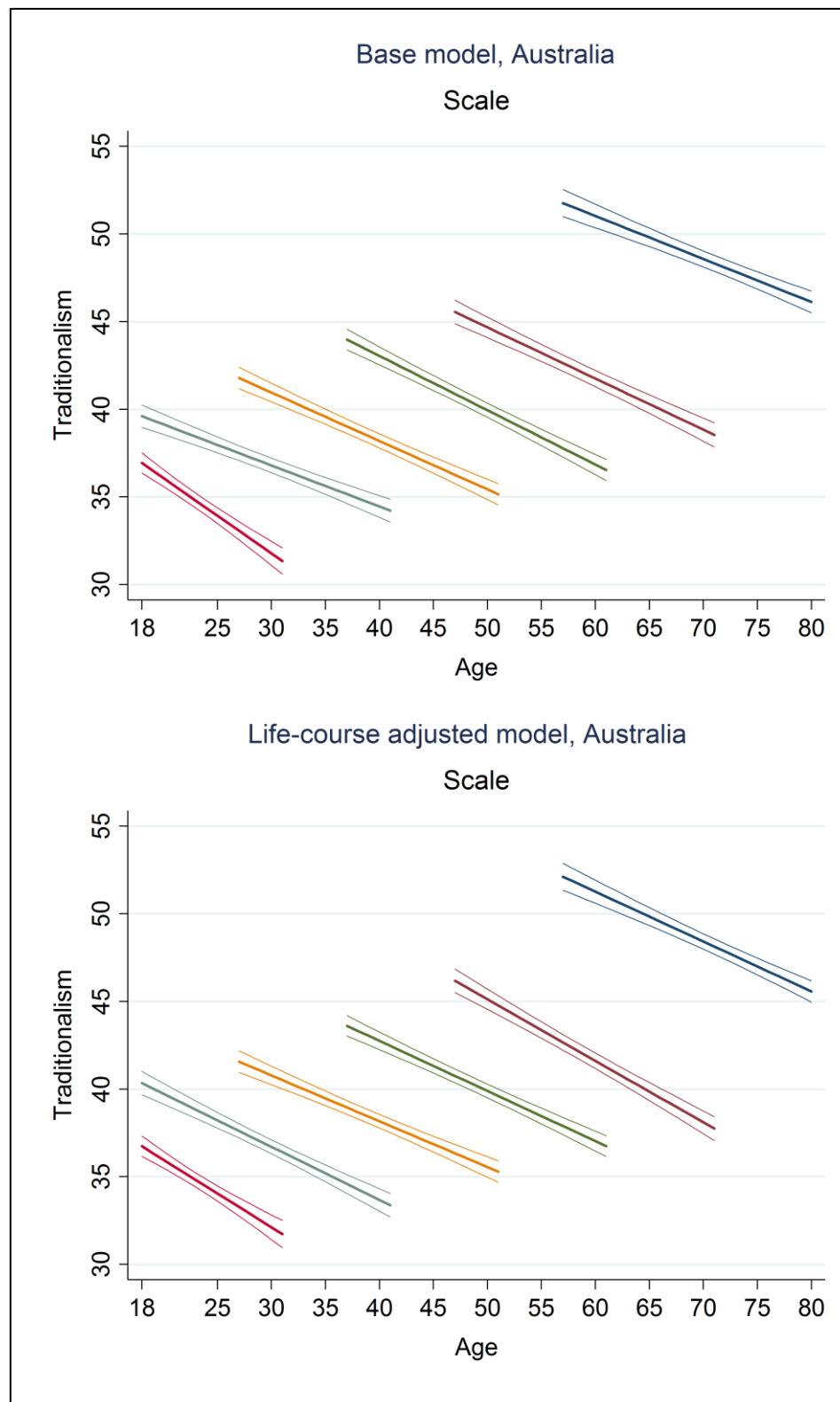
Notes: Britain (BHPS, years 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005 & 2007) and Australia (HILDA Survey, years 2001, 2005, 2008, 2011 & 2015). BHPS: 71,725 observations from 16,444 individuals; HILDA Survey: 58,428 observations from 21,979 individuals. Model coefficients, standard errors in parentheses. Control variables include gender, ethnicity and migrant background. Variables capturing life-course experience include number of children ever had, presence of children under 5 years in the household, marital status, divorce history, highest educational qualification, whether currently a full-time student, employment status, and income. The full set of model estimates is available from the authors upon request. Statistical significance: * 0.05, ** 0.01, *** 0.001.

Figure 3. Cohort-specific age trends in gender ideology index, Britain



Notes: Britain (BHPS, years 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005 & 2007). N: 71,725 observations from 16,444 individuals. Base models control for gender, ethnicity and migrant background. Life-course adjusted models additionally control for number of children ever had, presence of children under 5 years in the household, marital status, divorce history, highest educational qualification, whether currently a full-time student, employment status, and income. 95%-level confidence intervals

Figure 4. Cohort-specific age trends in gender ideology index, Australia



Notes: Australia (HILDA Survey, years 2001, 2005, 2008, 2011 & 2015). N: 58,428 observations from 21,979 individuals. Base models control for gender, ethnicity and migrant background. Life-course adjusted models additionally control for number of children ever had, presence of children under 5 years in the household, marital status, divorce history, highest educational qualification, whether currently a full-time student, employment status, and income. 95%-level confidence intervals..

4.4 Cohort-specific ageing effects: Accounting for life-course experience

Our fourth hypothesis stated that inter-cohort differences in ageing effects on gender ideology should be explained by cohort differences in life-course factors. To test this, we compare the results of Model 2 in Table 2 described before with the results of Model 3, which adds a set of variables which together approximate differences in life-course experience.

In both Britain and Australia, changes in the estimated coefficients on the age/cohort interactions between Models 2 and 3 are for the most part very small in magnitude, and only on a couple of occasions coefficients gain or lose statistical significance. In fact, 95% confidence intervals (not shown) overlap for all of the coefficients in Model 2 and their Model 3 counterparts. The lack of changes to the age/cohort interactions produced by the addition of life-course factors can also be appreciated by visual inspection of the top and bottom panels of Figures 3 and 4.

Altogether, these results provide little evidence in favor of Hypothesis 4, and suggest that something other than differences in life-course experience is responsible for differences in the ageing effects on gender ideology across cohorts.

4.5 Variability in within-individual gender-attitude trajectories

Results from joint cohort-specific random-slope models used to test our fifth and sixth hypotheses are presented in Table 3 (Britain) and Table 4 (Australia).⁷ Hypothesis 5 posed that the individual-level effects of ageing on gender ideology should be more heterogeneous amongst individuals from younger cohorts than older cohorts. The key piece of information is therefore the variance component of the ageing slope in the base models, which indicates how much individual-specific age coefficients vary around the average age coefficient estimated in the fixed part of the model.

Consistent with our expectations, the variance in the ageing effect in Britain increases with the recency of birth cohorts; it is smallest for the oldest cohort ($\sigma_{\text{age,cohort1}}=0.21$; $p<0.001$), and greatest for the youngest one ($\sigma_{\text{age,cohort6}}=0.81$; $p<0.001$). That is, people from younger cohorts in Britain have more varied and diverse gender-attitude trajectories as they age, compared to people from older cohorts. As shown at the bottom of Table 3, many of the cohort differences are statistically significant. A similar pattern of results emerges for Australia: the variance component of the ageing effect increases from

⁷ While these models are fitted using a different approach, it is reassuring that the fixed effect estimates on the age variable are virtually identical to those discussed in Table 2. We do not comment on these any further.

Cohort 1 ($\sigma_{\text{age,cohort1}}=0.17$; $p<0.01$) to Cohort 5 ($\sigma_{\text{age,cohort5}}=0.34$; $p<0.001$). We note though that for the youngest cohort, Cohort 6, this variance is small and not statistically significant ($\sigma_{\text{age,cohort6}}=0.20$; $p>0.1$). Results from log likelihood ratio tests presented at the bottom of Table 4 indicate that many of these differences are statistically significant.

Hypothesis 6 posed that intercohort differences in the variance of the ageing effects on gender ideology should be fully or partly explained by compositional differences in life-course experience. Testing this requires comparing the estimated coefficients on the variance component of the ageing slope between base and life-course adjusted models in Tables 3 and 4.

For Britain, there no evidence that addition of variables capturing life-course factors to the models changes the magnitude or statistical significance of these coefficients. In addition, the differences across cohort denoted by log-likelihood ratio tests remain unchanged. In Australia, differences across cohort denoted by log-likelihood ratio tests fade with the addition of variables capturing life-course experience. Yet the magnitude and statistical significance of the variances in the age slopes remain similar. Comparisons of 95% confidence intervals across models (not shown) confirm this lack of change for both countries. Altogether, there is little evidence that heterogeneity in life-course experiences is a key factor driving intercohort differences in the variance of the ageing effects on gender ideology.

Table 3. Joint cohort-specific random-slope regression models, Britain

	Base model						Life-course adjusted model					
	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6
<i>Fixed part</i>												
Age [†]	0.05*	0.05*	0.04*	0.13***	0.31***	0.34***	0.06**	0.05*	0.03	0.13***	0.21***	0.27***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.04)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.05)
Intercept	48.94***	47.67***	42.54***	40.18***	38.86***	37.79***	51.23***	48.76***	42.85***	39.28***	39.22***	38.30***
	(2.28)	(1.84)	(1.54)	(1.20)	(1.12)	(1.57)	(2.33)	(1.96)	(1.62)	(1.21)	(1.14)	(1.65)
<i>Variance components</i>												
Age	0.21***	0.21***	0.24***	0.37***	0.53***	0.81***	0.21***	0.21***	0.23***	0.33***	0.47***	0.74***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.09)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.08)
<i>Significant differences ($p < 0.05$) between cohorts (based on likelihood ratio tests)</i>												
Age, coefficient	4,5,6	4,5,6	4,5,6	1,2,3,5,6	1,2,3,4	1,2,3,4	4,5,6	4,5,6	4,5,6	1,2,3,5,6	1,2,3,4	1,2,3,4
Age, variance	4,5,6	4,5,6	1,2,4,5,6	1,2,3,5,6	1,2,3,4,6	1,2,3,4,5	4,5,6	4,5,6	1,2,4,5,6	1,2,3,5,6	1,2,3,4,6	1,2,3,4,5

Notes: Britain (BHPS, years 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005 & 2007). N: 71,725 observations from 16,444 individuals. Model coefficients, standard errors in parentheses. All models include cohort-specific random intercepts. Base models control for gender, ethnicity and migrant background. Life-course adjusted models additionally control for number of children ever had, presence of children under 5 years in the household, marital status, divorce history, highest educational qualification, whether currently a full-time student, employment status, and income. The full set of model estimates is available from the authors upon request. [†] Centered at 18. Statistical significance: * 0.05, ** 0.01, *** 0.001.

Table 4. Joint cohort-specific random-slope regression models, Australia

	Base model						Life-course adjusted model					
	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6
<i>Fixed part</i>												
Age [†]	-0.25*** (0.02)	-0.30*** (0.02)	-0.31*** (0.02)	-0.28*** (0.02)	-0.24*** (0.03)	-0.44*** (0.04)	-0.24*** (0.03)	-0.32*** (0.02)	-0.29*** (0.02)	-0.27*** (0.02)	-0.35*** (0.03)	-0.59*** (0.06)
Intercept	63.92*** (1.35)	56.47*** (1.00)	52.18*** (0.69)	46.37*** (0.55)	41.83*** (0.43)	39.28*** (0.37)	56.92*** (1.65)	49.23*** (1.32)	45.52*** (0.92)	41.63*** (0.72)	40.80*** (0.68)	38.47*** (0.88)
<i>Variance components</i>												
Age	0.17*** (0.04)	0.20*** (0.03)	0.23*** (0.03)	0.33*** (0.04)	0.34*** (0.05)	0.20 (0.13)	0.17*** (0.04)	0.19*** (0.03)	0.23*** (0.03)	0.30*** (0.04)	0.36*** (0.05)	-0.27 (0.84)
<i>Significant differences ($p < 0.05$) between cohorts (based on likelihood ratio tests)</i>												
Age, coefficient	6	6	5,6	6	3,6	1,2,3,4,5	2,5,6	1,6	6	6	1,6	1,2,3,4,5
Age, variance	4,5	4,5	4	1,2,3	1,2		4,5	4,5	5	1,2	1,2,3	

Notes: Australia (HILDA Survey, years 2001, 2005, 2008, 2011 & 2015). N: 58,428 observations from 21,979 individuals. Model coefficients, standard errors in parentheses. All models include cohort-specific random intercepts. Base models control for gender, ethnicity and migrant background. Life-course adjusted models additionally control for number of children ever had, presence of children under 5 years in the household, marital status, divorce history, highest educational qualification, whether currently a full-time student, employment status, and income. The full set of model estimates is available from the authors upon request. [†] Centered at 18. Statistical significance: * 0.05, ** 0.01, *** 0.001.

5. Discussion and conclusion

5.1 Summary of contributions and results

In this paper we have drawn on life-course theory and long-running, nationally representative, high-quality panel data from Britain and Australia to provide novel insights into the relationships between birth cohort, ageing and gender ideology. We contributed to the field by considering whether and how ageing effects on gender attitudes differ by birth cohort, exploiting the panel data to document variability in the effect of ageing on individuals' gender attitudes, extending the focus from the US to other valuable comparators (Australia and Britain), and using more recent data than previous studies.

We began by testing the separate associations of birth cohort and individual ageing with gender ideology. While these associations have been established for the US, we innovatively considered them in two new country contexts: Britain and Australia –and with panel data. Consistent with our first hypothesis, people from older cohorts held more traditional gender attitudes than people from younger cohorts in both Britain and Australia, *ceteris paribus*. However, all else being equal, the effect of ageing on gender ideology differed across countries: it was positive in Britain (as posed in our second hypothesis), but negative in Australia (against the predictions of our second hypothesis). That is, as individuals grow older, their gender attitudes become more traditional in Britain (as for the US), but more egalitarian in Australia. This constitutes new, important evidence that the associations between ageing and gender ideology are context-dependent, and knowledge of these for a single country cannot be readily extrapolated to other environments.

The pattern of results for Australia is particularly significant, as it stands in direct contrast to that reported for other countries and could not be attributed to compositional changes in the population. One possibility is that the marked trends towards more progressive gender attitudes in Australia across all age strata are due to period effects, i.e. changes that occur at a particular time and affect individuals in all cohorts and age groups uniformly. However, this is inconsistent with other markers of period effects, e.g. the political ideology of the parties in power over the 15-year observation window (2001-2015). In this time span, the left-wing Labor party governed for just 6 years (2007-2013), whereas the conservative party (the Coalition) governed for 8 years (2001-2007 & 2013-2015) and during the preceding 1996-2001 period. The national shift towards gender egalitarian attitudes in Australia is also at odds with increases in the national gender pay gap over the observation period (Workplace Gender Equality Agency, 2016a). It is however consistent with the nationwide implementation of important pieces of gender equity legislation in the 2000s and early 2010s, which was somewhat delayed relative to

other highly developed countries. This included new or amended regulations pertaining to paid parental leave, childcare affordability, family tax benefits, sex-based harassment, domestic and family violence, pay equity and support for employees with caring responsibilities (including opportunities flexible work) (Adema, 2013; Workplace Gender Equality Agency, 2016b).

A natural step forwards given the availability of multi-cohort panel data on gender attitudes was to explore whether the ageing effects on gender ideology were consistent across the different birth cohorts. *A priori*, as *per* our third hypothesis, we expected that ageing would have a stronger traditionalizing effect on gender ideology amongst individuals from older cohorts. Generally, we found evidence that ageing effects on gender ideology followed the same direction for all of the birth cohorts within each country: ageing led individuals from all birth cohorts to become more traditional in Britain and less traditional in Australia. There were however cohort-differences in effect magnitudes: ageing had a stronger traditionalizing effect on gender ideology for the younger cohorts in Britain, and a stronger effect towards gender egalitarianism for the younger cohorts in Australia.

In a second set of analyses we further exploited the unique panel data at hand by examining within-individual variance in life-course, gender-attitude trajectories. To date, the sociological study of gender ideology has exclusively focused on *average* trends for populations (and sometimes subpopulations), and largely neglected *within-individual variance* contributing to such trends. However, we know from life-course theory and evidence that individuals' life-course histories are becoming more varied, 'fuzzy' and de-standardized. Hence, we hypothesized increasing heterogeneity in individual experiences of life-course processes associated with intra-generational attitude change (e.g. tertiary education experiences, union formation and dissolution, labor force participation, parenthood). Following from this premise, we examined whether heterogeneity in individual gender-attitude trajectories over the life course was cohort dependent. Consistent with our fifth hypothesis and life-course theory, we found evidence of this: gender-attitude trajectories were more diverse and variable amongst individuals from younger cohorts than older cohorts in both Britain and Australia.

The remaining two hypotheses posed that factors capturing life-course experience would explain at least some of the cohort differences in (i) ageing effects on gender ideology (Hypothesis 4) and (ii) the within-individual variance of these ageing effects (Hypothesis 6). We found little evidence in either Britain or Australia that life-course experience explained such effects. This finding can be read in two ways. First, it is possible that the information on life-course experience to which we have access is not encompassing or

detailed enough. For example, we lack robust data on individuals' complete employment and residential 'careers'. Second, as discussed below, period effects may be at play.

The implications of these findings for theory and practice are manifold and are discussed below.

5.2 Implications for theory and practice

*The importance of cohort*ageing intersections*

A long tradition of research has concerned itself with documenting and explaining historical trends in social attitudes towards a number of social issues (e.g. family life, political institutions, income inequality, race relations, homosexuality, etc.), of which gender relations is one. This use of social survey data has been motivated by its value in helping scholars and policymakers develop an informed judgment about the prospects for attitude trends in the proximate (and not so proximate) future, and the associated implications for the substantive domains to which they relate. We argue that, by using panel data and considering the intersections between birth cohort and age (not just historical time series), we can develop better projections around the prospective pace of societal-level gender ideology. By extension, we can also make better-informed predictions about the likely impact this may have on gender relations and gender gaps in life outcomes. If individuals from younger cohorts hold more egalitarian attitudes than individuals from older cohorts, cohort replacement will be a mechanism producing a trend towards more egalitarian societal level gender ideology. We observe this for both Britain and Australia, as did colleagues focusing on the US. The effect of birth cohort operates jointly with the ageing effect. In this regard, the key factor is whether or not (and to what extent) ageing leads to the emergence of more traditional viewpoints (see Danigelis et al. 2007). Our empirical findings yield diverging evidence for Britain and Australia. In Britain, ageing leads to more traditional attitudes, whereas in Australia it leads to less traditional attitudes. The end product is that, as demonstrated, the overall pace of change towards gender egalitarianism in Australia has been considerably faster than in Britain.

While prior research has studied cohort replacement and intracohort ageing as isolated or additive processes, we further considered their interplay. This adds to the picture in several ways. First, such interactions are informative about any distinctiveness in gender-attitude trajectories across different population cohorts. This is important, as different scenarios imply that different policy levers may be useful to address gender inequalities –assuming, of course, that gender inequalities partially stem from the normalization of traditional worldviews that undervalue women and their labour. Identifying the specific

cohorts and life-course stages in which this traditionalizing effect begins to transpire and becomes steeper is valuable in devising targeted interventions aimed at preventing the emergence, diffusion and intergenerational transmission of attitudes and worldviews that hamper women's futures. Arguably, traditionalization in gender attitudes is of most concern amongst women and men in younger cohorts, as these attitudes will likely permeate their life decisions and outcomes over a longer period of time. Considering our empirical findings, the picture is clearly less optimistic for Britain than Australia, as their younger generations appear to be set out to reproduce the life-course model of gender ideology of their predecessors. In Australia, however, the initial egalitarianism exhibited by younger generations does not seem to stall.

Second, examination of not just overall but also cohort-specific life-course trends in gender ideology enables us to contribute to debates on ageing and social attitudes, and the likely prospects for attitude trends with population ageing. If ageing is linearly related to traditionalism in gender attitudes, increasing longevity will inevitably lead to a process of 'social stagnation' and hamper progress towards gender equality (Danigelis et al. 2007; Van Egmond et al. 2010: 148). Our findings challenge this notion and reinforce the view that attitude change at older ages is not only possible, but also prevalent. Older people in both Britain and Australia experienced significant gender-attitude shifts, even when controlling for life-course and other factors. In addition, our results demonstrate that old people in Australia not only have the potential to change their worldviews, but can in fact do so towards more egalitarian standpoints and at a pace comparable to that for younger people. This evidence calls into question everyday stereotypes and previous scholarly claims that older people hold more fervently to their views, and hold attitudes which are inherently conservative and inflexible (see Danigelis et al. [2007] for a discussion).

The importance of context

Most research on the effects of birth cohort and individual ageing on gender ideology has focused on the US. We expanded this evidence base by bringing into the picture two other countries: Britain and Australia. This is important, as gathering evidence from new contexts is necessary to 'validate' the universality of US-based theories and documented processes of attitude change. In fact, this exercise revealed important country-level nuances in the associations between birth cohort, ageing, and gender attitudes. While our results for Britain resemble those of US studies (Fan and Marini 2000; Firebaugh 1992; Vespa 2009), we find an important deviation from that pattern in the Australian data. The latter is distinctive in that the results challenge the assumption that ageing is a process leading to the emergence and maintenance of inflexible and conservative worldviews (Danigelis et al., 2007).

The reported effect heterogeneity is particularly salient given that Britain and Australia are two countries which are typically argued to share important socio-demographic and institutional profiles. For example, they feature comparable normative economic roles for women, gender equality legislation, and welfare models (Esping-Andersen 2009; Sainsbury 1999; Scott et al. 1996; Treas and Widmer 2000). This suggests that the degree of cross-country heterogeneity in the effect of ageing on gender ideology is likely to be even greater when comparing countries with more dissimilar institutional features. Nevertheless, given our research design, we are unable to pinpoint the specific institutional features that may produce cross-country differences in the relationships of interest. Accomplishing this requires cross-national panel data from a greater number of countries, and matching gender ideology measures. However, to our knowledge, the HILDA Survey and the BHPS are the only multi-cohort panel studies which contain repeated measurements of gender ideology from the same individuals over the life course. Therefore, further inquiry into the macro-level mechanisms producing cross-national heterogeneity in the associations of interest may require the collection and maturation of suitable multi-cohort panel data.

The importance of individual variance

Recent shifts in the social sciences have resulted in scholars in many fields moving beyond theorizing and analyzing average population effects and into the examination of individual heterogeneity and variance. Arguably, this has been the product of a combination of factors, including the progressive availability of large, panel datasets with high statistical power, significant advances in relevant statistical techniques (e.g. multilevel modelling), and growing substantive interest in processes of modernization and individualization. For example, while it is well-established that *on average* family breakdown negatively affects children, recent research focuses on the factors that produce heterogeneity in such effects, including resilience (Amato and Anthony 2014).

We brought this ‘fresh thinking’ into the analysis of gender ideology by considering variability in within-individual, life-course, gender-attitude trajectories. In our specific application, this perspective enabled us to theorize, test and identify evidence of theoretically-sound, cohort-specific differences in the variance of the effect of ageing on gender ideology. This constitutes a novel finding, but is just a first step in realizing the potential of this analytic approach within the field. Future research may borrow methodological and theoretical elements from the current study to examine issues such as the predictors and consequences of typical and atypical individual gender-attitude trajectories, or to categorize such trajectories into theoretically-meaningful sequences, profiles or latent classes. In doing this, future scholarship on attitude change will be in a

position to arrive at more holistic and nuanced understandings of how attitude change is initiated and sustained, and at processes of attitude diffusion.

5.3 Limitations and further research

While our contributions to the literature are manifold, there are important limitations to our study which must be acknowledged.

First, despite our use of unique panel data tracking the gender attitudes of the same individuals over time, there are significant *caveats* concerning the data structure. For example, the content and number of items used to measure gender ideology differs across datasets. Hence, while the results for Britain and Australia are complementary, they are not strictly comparable. Additionally, we are unable to observe individuals' complete life histories, as our datasets only track within-individual gender attitudes for a maximum of 17 years (BHPS) and 15 years (HILDA Survey). Therefore, the ages of individuals from different birth cohorts in our data only overlap amongst individuals from neighbouring cohorts, and only for a portion of the observation window. It follows that we are unable to fully separate ageing and birth cohort effects on gender ideology. In fact, many of the cohort differences in the age coefficients and their variances fade in models considering only adjacent cohorts for the age ranges in which they overlap (results available upon request). In addition to this, other known limitations of panel data, such as panel attrition and progressive underrepresentation of some population groups also apply. Particularly, it is possible that people holding gender egalitarian attitudes are more likely to remain in the study, given that such individuals are also more likely to hold liberal attitudes towards personal privacy and have a higher openness towards participation in social activities. Despite these data imperfections, our study substantially extends the bulk of previous research using cross-sectional data and methods, and constitutes a stepping stone in the field of gender-attitude change both analytically and theoretically. Concerning the former, future research can extend our analyses using a greater number of time points as the panel datasets that we leverage continue to mature. Concerning the latter, our theoretical framework linking ageing and birth cohort to general and within-individual gender-attitude trajectories through life-course theory is an important contribution that should inform the development of new longitudinal analyses.

Theoretically, it remains unclear why ageing and birth cohort retain such strong effects on individuals' gender ideologies net of factors capturing life-course experience in education, employment, and family life. Other than our inability to control for an encompassing set of life-course factors, an alternative answer to this question may be found in the fact that, as all other studies in the gender-attitude field, we are unable to

separate age, period and cohort effects on gender ideology change –as there is little consensus about how to best accomplish this (or whether it is indeed possible to do so). The implication is that period effects may be responsible for part of the explained and unexplained ageing and cohort effects reported here. Testing this premise requires very specific data properties and a mature, unified approach to disentangling age-period-cohort effects. We leave this avenue of enquiry for future studies.

5.4 Concluding remarks

As Davis and Greenstein (2009:100) put it, gender ideology *“functions as a lens through which many social processes and events are viewed, interpreted, and acted upon”*. Hence, understanding the individual and social processes underpinning how people develop their attitudes towards gender, and how these attitudes change over the life course is essential to understanding the drivers of social change in what concerns gender (in)equality. At the individual level, this knowledge can help researchers and policymakers better comprehend and influence gendered choices and behaviors, gender-specific barriers to human capability development, and resulting gender gaps in outcomes across life domains (Davis and Greenstein 2009). At the aggregate level, it can offer valuable insights into the likely pace and projection of the gender revolution, how population ageing is likely to affect its progress in the proximate future, and how policy levers to promote gender equality may be received and experienced (Danigelis et al. 2007). This research has highlighted important aspects surrounding these relationships and promising research directions to be pursued by gender-attitude scholars, including the importance of considering within-individual variability in gender-attitude change, the need to expand the evidence base beyond the US, and the value of continuing to probe into how life-course factors can trigger attitude shifts.

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Appendix

Table A1. Descriptive statistics on model variables, Britain

Variable	Notes	Mean/% (SD)	min	max
<i>Base controls</i>				
Female		54%	0	1
Born within the UK		99%	0	1
Ethnic white		97%	0	1
<i>Life-course factors</i>				
Total children ever had			0	1
Zero	Uses information from the Consolidated Marital, Cohabitation and Fertility Histories, 1991-2009 (Pronzato 2011), which combine from interview and retrospective data.	35%	0	1
One		16%	0	1
Two or more		49%	0	1
Children under 5 in the household		12%	0	1
<i>Marital status</i>				
Married		58%	0	1
Cohabiting		12%	0	1
Single		30%	0	1
Ever divorced	Uses information from the Consolidated Marital, Cohabitation and Fertility Histories, 1991-2009 (REFERENCE), which combine from interview and retrospective data.	14%	0	1
<i>Highest educational qualification</i>				
Degree or higher	Degree or higher includes 'Higher degree' and 'First degree'. Trade certificate includes 'Teaching qualification', 'Nursing qualification', and 'Other higher qualification'. Secondary education includes 'GCE A Levels or equivalent', 'GCE O Levels or equivalent', 'Commercial qualification', 'CSE grade 2-5, or Scot grade 4-5', 'Apprenticeship' and 'Other qualification'. 'No qualification' includes 'No qualification' and 'Still at school, no qualification'.	12%	0	1
Trade certificate		26%	0	1
Secondary education or equivalent		40%	0	1
No qualification		22%	0	1
Current full-time student		3%	0	1
<i>Employment status</i>				
Working full time	'Unemployed' & 'Not in the labour force' are based on ILO definitions. Part-time work defined as working 30 or fewer hours per week in all jobs.	50%	0	1
Working part time		13%	0	1
Unemployed		4%	0	1
Not in the labour force		33%	0	1
Personal income	Inflation-adjusted financial-year gross personal income. Imputed. Expressed in £10,000s.	1.5 (1.6)	0	133.7

Notes: Britain (BHPS, years 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005 & 2007). N: 71,725 observations from 16,444 individuals.

Table A2. Descriptive statistics on model variables, Australia

Variable	Notes	Mean/% (SD)	min	max
<i>Base controls</i>				
Female		53%	0	1
Ethnic/Migrant background				
Australian born, not Indigenous	Follows conventions within the Australian literature and data availability. Indigenous Australians include individuals identifying as Aboriginal, Torres Strait Islanders, or both.	76%	0	1
Migrant, English-speaking background		11%	0	1
Migrant, other background		12%	0	1
Australian born, Indigenous		2%	0	1
<i>Life-course factors</i>				
Total children ever had			0	1
Zero		30%	0	1
One		12%	0	1
Two or more		58%	0	1
Children under 5 in the household		13%	0	1
Marital status				
Married		55%	0	1
Cohabiting		14%	0	1
Single		31%	0	1
Ever divorced				
Highest educational qualification	Degree or higher includes ‘Doctorate’, ‘Masters’, ‘Graduate diploma’, ‘Graduate certificate’, ‘Bachelor’s degree’ and ‘Honors degree’. Professional qualification includes ‘Advanced diploma’, ‘Diploma’, ‘Certificate III’ and ‘Certificate IV’. Secondary education includes completion of ‘Year 12’. Lower than secondary education includes ‘Year 11 or lower’, and ‘Undetermined’.			
Degree or higher		25%	0	1
Professional qualification		31%	0	1
Year 12		15%	0	1
Lower than Year 12		29%	0	1
Current full-time student		5%		
Employment status				
Working full time	‘Unemployed’ & ‘Not in the labour force’ are based on ILO definitions. Part-time work defined as working 30 or fewer hours per week in all jobs.	48%	0	1
Working part time		19%	0	1
Unemployed		3%	0	1
Not in the labour force		30%	0	1
Personal income	Inflation-adjusted financial-year gross personal income. Imputed. Expressed in AU\$10,000s.	5.2 (5.9)	0	292.5

Notes: Australia (HILDA Survey, years 2001, 2005, 2008, 2011 & 2015). N: 58,428 observations from 21,979 individuals.