Social age deadlines for the childbearing of women and men

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BACKGROUND: This study examines whether social age deadlines exist for childbearing in women and men, how they vary across countries, whether they are lower than actual biological deadlines and whether they are associated with childbearing at later ages and the availability of assisted reproduction techniques (ARTs).

METHODS: This study is based on the European Social Survey, Round 3 (2006–2007), which covers 25 countries. Data were gathered on social age deadlines for childbearing in women (21,909 cases) and men (21,239 cases) from samples of representative community-dwelling populations aged 15 and older.

RESULTS: Social age deadlines for childbearing were perceived more frequently for women than men. These deadlines are often lower than actual biological limits, and for women and men alike: 57.2% of respondents perceived a maternal social age deadline ≤ 40 years of age; 46.2% of the respondents perceived a paternal social age deadline ≤ 45 years of age. There is also considerable variability in deadlines across countries, as well as within them. At the country level, the presence of social age deadlines for the childbearing of women was negatively associated with birth rates at advanced ages and the prevalence of ART, and later deadlines were positively associated with these factors.

CONCLUSIONS: It is important to understand the factors that increase and limit late fertility. While biological factors condition fertility, so do social expectations. These findings provide widespread evidence across Europe that social limits exist alongside biological ones, though both sets of factors are more binding for women.

Key words: maternal age / paternal age / life course / fertility / assisted reproductive technology

Introduction

One of the most important changes in reproductive behaviour in recent decades has been the rising proportion of births among mothers at advanced ages (Prioux, 2005; Billari et al., 2007). In the EU, the share of births to mothers aged 40 and over has increased from 1.6% in the late 1980s to 3.0% in 2006 (Sobotka et al., 2010). Nevertheless, contemporary levels of fertility at later ages remain substantially below women’s biological potential. Leridon (2008) estimates that only 16.6% of 40-year-old women are definitively sterile (compared with 54.6% at the age of 45 and 91.9% at the age of 50), and that, in the absence of contraception and ‘proceptive’ behaviour, an average of 1.1 children could be born to women between the ages of 40 and 44.

One explanation for the discrepancy between potential and achieved childbearing after age 40 that is put forward within the ‘life course’ literature in the behavioural and social sciences is that childbearing is influenced by social age deadlines, i.e. proscriptions against engaging in certain behaviours too early or too late (Settersten, 2003). Social age deadlines wield the greatest power when there is widespread consensus about them within a population. Social age deadlines for childbearing may be related to, but not necessarily equal to, biological or physiological deadlines, and they are most likely to influence actual reproductive behaviour if they are lower than these biological limits. Earlier studies in a range of countries revealed the existence of age deadlines related to both starting childbearing and completing childbearing for women and, interestingly, for men, albeit looser than the one for women (Settersten and Hagestad,
Age deadlines sometimes become de facto legal age deadlines. Adoption is an example. Several countries impose a maximum age difference between prospective adoptive parents and the adopted child. The maximum legal age difference is usually 40, 45 or 50 years (ISS/IRC International Reference Centre for the Rights of Children Deprived of their Family, 2005). IVF is another example. Legal age limits that indirectly affect childbearing relate to sperm donation (e.g. 45 years of age in France or the UK). These facts are consistent with prior research on social age deadlines in that limits are readily given and expressed with ‘round’ decade or mid-decade points (that is, ages ending with zero or five). Similarly, the ubiquitous presence of age categories (e.g. 5-year age categories) can be found throughout studies of human reproduction. The medical literature often refers to 35 as a threshold age for pregnancy outcomes, and much research on fertility is carried out according to discrete age categories for both men and women (see, for example, Bianco et al., 1996; Bray et al., 2006; de La Rochebrochard et al., 2006; Lampinen et al., 2009).

Social age deadlines for childbearing among women are likely to be driven, in part, by concerns about the health risks for both mother and child. Risks at advanced maternal age include chromosome abnormalities (Hassold and Chiu, 1985), foetal death, stillbirth and loss (Frets et al., 1995; Andersen et al., 2000; Reddy et al., 2006) and other pregnancy complications (Luke and Brown, 2007; Cerdá et al., 2008; Smith et al., 2008). Interestingly, there is evidence that for obstetric outcomes, increasing age is a continuum rather than a threshold effect (Cleary-Goldman et al., 2005). While advanced maternal age has been a longstanding topic of research (van Katwijk and Peeters, 1998), advanced paternal age has only recently captured the interest of researchers (ESHRE Capri Workshop Group, 2005). It has been shown that men’s biological clocks affect hormone levels, fertility and sperm quality (Lambert et al., 2006; Lewis et al., 2006). Both advanced maternal and paternal age are associated with the risk of autism spectrum disorders (Croen et al., 2007) and miscarriage (de La Rochebrochard and Thonneau, 2002). Advanced paternal age is associated with lower success for IVF (de La Rochebrochard et al., 2006), higher occurrence of malformations (Thacker, 2004; Zhu et al., 2005), schizophrenia (Sipos et al., 2004) and higher risk for infertility (de La Rochebrochard and Thonneau, 2003). For these and other conditions, the literature seems to suggest that the age of 45 is generally a turning point for men (Hassan and Killick, 2003). At the same time, there are those who have argued that advanced paternal age is not an independent risk factor for adverse birth outcomes (Chen et al., 2008) or negligible (Yang et al., 2007).

Materials and Methods

Though shed light on social age deadlines on childbearing, we analyse data from a module of the ongoing European Social Survey (ESS), representative of the population aged 15 and over in each of the 25 participating countries. The ESS is a bi-annual survey conducted using face-to-face interviews. To enhance comparability, the same sampling plan is applied in each country and the questionnaires are carefully translated with sensitivity to country contexts. The ESS Round 3 (ESS-3) in 2006–2007 contained a module on ‘The timing of life: the organization of the life course in Europe’, designed by members of our team and led by Billari, Hagestad, Liefbroer and Spéder (European Social Survey, 2008). Twenty-five countries participated in ESS-3: Austria, Belgium, Bulgaria, Cyprus, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine and the UK. Response rates varied between 46% (France) and 73% (Portugal and Slovakia). Final sample sizes varied from as low as 1505 individuals (Denmark) to a maximum of 2916 individuals (Germany). Design-related sampling weights are provided for all countries, except Latvia and Romania. We present un-weighted estimates for Latvia and Romania, and these countries are excluded from our general estimates. Our analyses mainly use one survey item that was specifically designed to ascertain social age deadlines for childbearing. After extensive pilot testing, the final version of the question was: ‘After what age would you say a woman [or man] is generally too old to consider having any more children?’ Possible answers included a specific age (in integer numbers), ‘never too old’ (although not explicitly mentioned by interviewers to respondents) and ‘don’t know’. Interviewers were instructed to explain that ‘having any more children’ referred to either the first or any additional children a person may have. Interviewers were also instructed to probe for a specific age if respondents first mentioned a broader range of ages. If respondents could not provide a specific age, answers were coded as ‘don’t know’.

Given our interest in comparing maternal and paternal age deadlines, a split ballot design was implemented in which a random sample of about half of the respondents was asked to answer the question about women and the other half about men (the word ‘woman’ was substituted with ‘man’). In some countries, this split ballot was performed with pre-determined randomization or software-based randomization, while in other countries, randomization was based on the day of interview.

We compare data across countries, looking separately at maternal and paternal age deadlines and at variability across different birth cohorts. Our measures include the share of respondents reporting a specific age deadline, the mean and standard deviations (SDs) of these deadlines and the share of respondents who provide an age limit at or below a specific threshold (40 for women and 45 for men). For analyses that pool data across countries, sampling weights are combined with population-size weights to ensure that each country in the sample is represented in proportion to its population aged 15 and older. We also correlate the ESS data on age deadlines for childbearing with the data on the prevalence of assisted reproduction techniques (ARTs) in European countries (Andersen et al., 2008) and data on birth rates published as part of the European Commission’s Eurostat database.

In order to measure the availability of ART across countries, we use the 2004 data generated from the European register by ESHRE (Andersen et al., 2008). Andersen et al. (2009) released 2005 data and we performed correlation analyses between the two ESHRE register data, i.e. number of clinics by countries in 2004 and 2005. The correlation coefficient between the two waves of data is equal to 0.99 and, with the exception of Austria and Latvia, all countries are included in both reports.

Results

A total of 21 909 responses were available on social age deadlines for the childbearing of women. The vast majority (96.4%) of the respondents readily cited a maternal age deadline, with a mean of 41.7 years (SD = 5.2), and 57.2% of respondents perceived a maternal age deadline of 40 or earlier. A total of 21 239 responses were available on social age deadlines for the childbearing of men. Most (90.2%) of the respondents readily cited a paternal age deadline, with a mean of 47.3 years (SD = 7.6) and 46.2% of the respondents indicated that men should not have children after age 45. In order to reveal...
Table I Social age deadlines for the childbearing of women and men, by country.

<table>
<thead>
<tr>
<th>Country</th>
<th>Women No. observed</th>
<th>% acknowledging the existence of a limit</th>
<th>% perceiving a deadline ≤40 Mean SD</th>
<th>Men No. observed</th>
<th>% acknowledging the existence of a limit</th>
<th>% perceiving a deadline ≤45 Mean SD</th>
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<td>96.8</td>
<td>37.1</td>
<td>987</td>
<td>91.0</td>
<td>23.1</td>
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<td>859</td>
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<td>67.5</td>
<td>920</td>
<td>97.3</td>
<td>60.2</td>
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<td>Bulgaria</td>
<td>555</td>
<td>89.6</td>
<td>57.6</td>
<td>582</td>
<td>79.0</td>
<td>48.2</td>
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<td>52.7</td>
<td>458</td>
<td>93.9</td>
<td>48.2</td>
</tr>
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<td>68.6</td>
<td>743</td>
<td>97.7</td>
<td>45.3</td>
</tr>
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<td>43.5</td>
<td>672</td>
<td>85.7</td>
<td>51.2</td>
</tr>
<tr>
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<td>95.3</td>
<td>49.7</td>
<td>887</td>
<td>92.3</td>
<td>31.2</td>
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<td>54.5</td>
<td>949</td>
<td>100.0</td>
<td>50.3</td>
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<td>57.2</td>
<td>1362</td>
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<td>45.2</td>
</tr>
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<td>77.3</td>
<td>721</td>
<td>89.2</td>
<td>49.9</td>
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<tr>
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<td>51.3</td>
<td>768</td>
<td>86.1</td>
<td>44.4</td>
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<tr>
<td>Netherlands</td>
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<td>66.9</td>
<td>930</td>
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<td>58.9</td>
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<td>Norway</td>
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<td>47.4</td>
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<td>Poland</td>
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<td>776</td>
<td>90.9</td>
<td>46.6</td>
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<td>97.3</td>
<td>48.4</td>
<td>951</td>
<td>80.7</td>
<td>35.4</td>
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<tr>
<td>Russia</td>
<td>1034</td>
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<td>60.6</td>
<td>972</td>
<td>80.6</td>
<td>39.8</td>
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<td>Slovakia</td>
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<td>95.1</td>
<td>62.5</td>
<td>812</td>
<td>87.8</td>
<td>41.7</td>
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<td>Slovenia</td>
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<td>53.0</td>
<td>684</td>
<td>86.7</td>
<td>34.5</td>
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<td>843</td>
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<td>35.4</td>
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<td>48.5</td>
<td>926</td>
<td>96.0</td>
<td>44.7</td>
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<td>56.1</td>
<td>819</td>
<td>96.3</td>
<td>50.6</td>
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<td>49.6</td>
<td>1126</td>
<td>91.7</td>
<td>43.2</td>
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<tr>
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<td>95.4</td>
<td>58.1</td>
<td>775</td>
<td>88.0</td>
<td>50.1</td>
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<tr>
<td>Latviaa</td>
<td>818</td>
<td>77.3</td>
<td>31.7</td>
<td>812</td>
<td>68.2</td>
<td>23.2</td>
</tr>
<tr>
<td>Romaniaa</td>
<td>976</td>
<td>94.1</td>
<td>49.4</td>
<td>908</td>
<td>88.2</td>
<td>42.1</td>
</tr>
<tr>
<td>Countries averagea</td>
<td>21 909</td>
<td>96.4</td>
<td>57.2</td>
<td>21 239</td>
<td>90.2</td>
<td>46.2</td>
</tr>
</tbody>
</table>

Authors’ computations, ESS, 2006–2007. Values below 26 and above 80 were dropped from analyses. In order to obtain accurate estimates, data were weighted by design weights. See text and ESS website (http://www.europeansocialsurvey.org/) for additional information.

Latvia and Romania were not included in average country values because the appropriate design weights are not available.
whether men and women differ in their likelihood of prescribing an age deadline, the analyses for each split ballot (i.e. gender of the target) were also broken down by the gender of the respondent. Since the differences in the perception of deadlines across genders were negligible and statistically insignificant, these analyses were not included in the results section.

We report the results on maternal and paternal social age deadlines by country in Table I. With the single exception of Bulgaria, in all countries, maternal age deadlines are perceived by >90% of the respondents. The mean maternal age deadline varies from 39.3 years (Hungary) to 43.8 years (Austria). In all countries, there is also substantial variation within the population (the SD is always higher than 4 years). In 16 of the 23 countries included in these analyses, the majority of people mention an age deadline of 40 or lower (the highest percentage was Hungary, at 77.3%, and the lowest percentage was Austria, at 37.1%).

Relative to women, a smaller proportion of respondents mention social age deadlines for childbearing of men. Once again, Bulgaria has the lowest share, with 79.0% of the respondents mentioning a paternal age deadline, followed closely by Russia, at 80.6%. As expected, mean age deadlines for men are significantly higher than those for women, varying from 45.3 (Denmark) to 51.2 (Estonia). There is a substantial variation within each country (the SD is always larger than 6 years, except for Denmark), and variation is greater for men than for women. The average difference between paternal and maternal age deadline ranges between 3.1 years (Spain) and 7.9 years (Finland). In only 7 of the 23 countries do most (over-half) of the respondents perceive a paternal age deadline of 45 or earlier. The highest percentages of respondents who think that a man should not have a child after the age of 45 are observed in Belgium and Denmark (60.2%), while the lowest percentage is observed in Austria (25.1%).

Within countries, both the share of respondents who mention an age deadline for childbearing and the variation in mean age deadlines are indicators of how much normative consensus exists. Because the proportions who perceive an age deadline for women are higher than for men in almost all countries (with the exception of France), and because the SDs are uniformly larger for men than for women, the evidence for normative consensus around childbearing deadlines is stronger for women than it is for men.

Figure 1 provides additional information on the pooled (across countries) distribution characteristics of maternal and paternal age deadlines. The modal age deadline, among those respondents who declare to perceive a limit, for women is 40 (mentioned by 40.5% of respondents) and for men 50 (30.6%). It is noteworthy that these modes—and indeed most of specific ages given—are highly concentrated on ‘round’ ages (35, 40, 45 and 50).

Table II shows how social age deadlines for childbearing vary by age. Norms related to childbearing deadlines for women seem to be slightly weaker among younger respondents than older ones. For example, the percentage of respondents who feel that women should not have children after age 40 is higher among older than among younger respondents. Among men, the youngest age group is actually more likely to oppose men having children after age 45 (47.9 versus 44.7 and 40.3%) and to mention lower mean age deadlines (46.7 versus 47.7 and 48.1 years) than the oldest age group.

Country-level correlation analyses were performed in which variation in age deadlines across countries is linked to differences in the availability of ART and in actual childbearing behaviours at advanced ages. Correlation analyses linking age deadlines (ESS, 2006–2007) to the availability of ART were computed for 17 countries and those linking to childbearing behaviours at advanced ages were computed for 22 countries. This is because the analyses were performed only for those countries on which we hold information on the availability of ART (the number of clinics per thousand women in reproductive age, based on Andersen et al., 2008) and a comparable measure of ASFR at ages 40+ (Eurostat, accessed March 2008).

Both the availability of ART and the prevalence of childbearing at age 40 and older are positively correlated with maternal age deadlines.
Table II  Social age deadlines for the childbearing of women and men (by age group).

<table>
<thead>
<tr>
<th>Age class</th>
<th>No. observed*</th>
<th>% acknowledging the existence of a limit</th>
<th>% perceiving a deadline ≤ 40</th>
<th>Mean</th>
<th>SD</th>
<th>No. observed*</th>
<th>% acknowledging the existence of a limit</th>
<th>% perceiving a deadline ≤ 45</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>15–24</td>
<td>2636</td>
<td>93.9</td>
<td>55.9</td>
<td>41.9</td>
<td>5.8</td>
<td>2666</td>
<td>91.8</td>
<td>47.9</td>
<td>46.7</td>
<td>7.8</td>
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<tr>
<td>25–34</td>
<td>3034</td>
<td>96.7</td>
<td>54.8</td>
<td>42.2</td>
<td>5.4</td>
<td>3002</td>
<td>88.4</td>
<td>45.9</td>
<td>47.3</td>
<td>7.5</td>
</tr>
<tr>
<td>35–44</td>
<td>3568</td>
<td>96.7</td>
<td>50.5</td>
<td>42.2</td>
<td>5.0</td>
<td>3462</td>
<td>90.0</td>
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<td>45–54</td>
<td>3488</td>
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<td>58.0</td>
<td>41.6</td>
<td>4.9</td>
<td>3376</td>
<td>89.2</td>
<td>45.6</td>
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</tr>
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<td>55–64</td>
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<td>96.8</td>
<td>63.3</td>
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<td>377</td>
<td>97.9</td>
<td>64.2</td>
<td>41.2</td>
<td>5.3</td>
<td>367</td>
<td>88.7</td>
<td>40.3</td>
<td>48.1</td>
<td>7.8</td>
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</table>

Own computations based on the ESS. Values below 26 and above 80 have been dropped. In order to obtain accurate estimates, the data have been weighted by design weights. See text and ESS website (http://www.europeansocialsurvey.org/) for additional information.

*The number of observations does not include respondents from Latvia and Romania since these countries are excluded from the computation of the estimates.

Discussion

In light of the recent increase in fertility at advanced ages, it is important to understand both the factors that drive this increase and the factors that limit it. Biology and reproductive technology set ultimate limits on fertility, especially for women. In this study, we documented cross-national variation in social age deadlines for childbearing using data from 25 European countries. One key finding is that the large majority of women and men perceive social age deadlines for childbearing, with the percentage of respondents in a country who oppose women having a child after age 40 (with a correlation coefficient of −0.41) and men after age 45 (with a correlation coefficient of −0.40) corresponding to the percentage of respondents who perceived a deadline and in the percentage of people who feel that women should not have children after age 40 (with a correlation coefficient of −0.40). In addition, the prevalence of age-related childbearing behaviour is negatively correlated with the percentage of respondents who perceived a biological or medical deadline to childbearing for both women and men. At the same time, a considerable amount of variation across and within countries in these deadlines exists. Moreover, an important question is whether deadlines for childbearing are perceived in the context of the availability of ART and the actual prevalence of late childbearing for both women and men. This study further documents considerable variation across and within countries in these deadlines for late childbearing, as well as considerable differences between men and women in the actual prevalence of late childbearing.

The relationship between accessibility to ART and later childbearing, in turn, may help explain some of these differences across and within countries. For instance, the prevalence of ART varies considerably across countries, with some countries allowing later childbearing than others. This suggests that the prevalence of ART may be an important factor in determining the perceived deadline for childbearing, as well as the actual prevalence of late childbearing. In this way, the relationship between accessibility to ART and later childbearing might reflect the development of new technologies and the effect of these technologies on reproductive behaviour.

Social age deadlines for childbearing are also important to understand, as they may play a role in constraining reproductive behaviour. Still, work on fertility intentions suggests that people adapt their fertility intentions down ward even before they reach the biological deadline, which would accord with the fact that social ideas about the ages at or after which it is inappropriate to have children are minimally conditioned by the cultural context. In fact, the appropriateness of late fertility, as well as the cultural constraints on later fertility, may be considered to be an important factor in the development of social age deadlines.

We found little variation across countries in terms of mean upper age limits, but considerable heterogeneity in both the percentage of people who perceive a deadline and in the percentage of people who would rather have children later. For example, a similar proportion of people in Europe are more aware of recent medical insights into the possibility of late parenthood rather than late motherhood, and more people in Europe are more aware of recent medical insights into the possibility of late parenthood rather than late motherhood. Moreover, the cross-national variation in social age deadlines is related to differences in the development of new technologies and the effect of these technologies on reproductive behaviour.

In light of the recent increase in fertility at advanced ages, it is important to understand both the factors that drive this increase and the factors that limit it. Biology and reproductive technology set ultimate limits on fertility, especially for women. In this study, we documented cross-national variation in social age deadlines for childbearing using data from 25 European countries. One key finding is that the large majority of women and men perceive social age deadlines for childbearing, with the percentage of respondents in a country who oppose women having a child after age 40 (with a correlation coefficient of −0.41) and men after age 45 (with a correlation coefficient of −0.40) corresponding to the percentage of respondents who perceived a deadline and in the percentage of people who feel that women should not have children after age 40 (with a correlation coefficient of −0.40). In addition, the prevalence of age-related childbearing behaviour is negatively correlated with the percentage of respondents who perceived a biological or medical deadline to childbearing for both women and men. At the same time, a considerable amount of variation across and within countries in these deadlines exists. Moreover, the relationship between accessibility to ART and later childbearing, in turn, may help explain some of these differences across and within countries. For instance, the prevalence of ART varies considerably across countries, with some countries allowing later childbearing than others. This suggests that the prevalence of ART may be an important factor in determining the perceived deadline for childbearing, as well as the actual prevalence of late childbearing. In this way, the relationship between accessibility to ART and later childbearing might reflect the development of new technologies and the effect of these technologies on reproductive behaviour.
Beyond biological reasons, social age deadlines for childbearing for both men and women may also be related to concerns about the abilities of older fathers and mothers to raise their children responsibly, though the evidence for these concerns is mainly anecdotal. Finley (1998), however, reported that adolescents born to fathers who were aged 40 or over evaluate the parental quality of their father as being lower than that of fathers who were aged 30–39 at birth. On the other side, older mothers (parents) may have certain socio-economic characteristics which could, at least up to a certain extent, make up for the biological disadvantage of later ages (Stein and Susser, 2000). On average, older mothers tend to be in stable relationships, highly educated and more settled in their careers (Hansen et al., 2005; Kalmijn and Kraykamp, 2005; Benzies et al., 2006; Lamminen et al., 2009); these socio-demographic characteristics could potentially have a positive effect on children’s developmental and cognitive outcomes.

One limitation of the study is that its design does not allow making causal inferences. In addition, multiple indicators for assessing age deadlines would have been preferable, although the survey question used has been extensively tested and used. Another limitation of the study is that country-level correlational analyses were carried out for a restricted sub-sample of countries, because of limited availability of ART measures. Future research should aim at gaining a deeper understanding of social age deadlines, and of their interaction with reproductive behaviour, within a larger data-collection design, including both quantitative and qualitative evidence.

Authors’ roles

F.C.B. has contributed to the conception and design of the life-course module of the ESS (3rd round, 2006), to the interpretation of the data and to drafting the paper. A.G. has carried out the analyses, contributed to the interpretation of the data and to drafting the paper. A.C.L. has contributed to the conception and design of the study, to the interpretation of the data and to drafting of the paper. R.A.S., A.A., G.H. and Z.S. have all contributed to the interpretation of the data and to drafting the paper.

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