

# Internet and the postponement of age deadlines for childbearing

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## **Short abstract**

Age is a salient dimension that structures and regulates individuals' childbearing plans for women and men. Prior life course theory research reveals the existence of age deadlines for both starting and completing childbearing. We argue that the advent of the internet, which has revolutionised access to information on the potential consequences for health of important behavioural choices, might have influenced individuals' perception of age deadlines for childbearing. We hypothesize that this occurred because the internet provided further access to, for example, information on contraception, assisted reproductive technologies and age-related infertility. In this study, we use the 2006-2007 European Social Survey and test for the first time whether using the internet every day is associated with upper, lower and ideal age deadlines for childbearing for men and women. In the unadjusted models, we find that using the internet everyday (which 27% of the respondents declared to do) is significantly associated with later (upper, lower, ideal) age deadlines for both women and men. The effects are stronger for men, which could reflect the health concerns (often discussed in online forums and websites) towards pregnancies at ages 35 or above for women. In models adjusted for individuals' socio-demographic characteristics and health (e.g. education, income, marital status, parenthood, self-rated health), the associations are partially attenuated. Overall, the findings suggest that access to the internet could represent a key driving factor behind individuals' postponement of age deadlines for childbearing.

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<sup>1</sup> This project has received funding from the European Research Council under the European Union's Horizon 2020 research and innovation programme (grant agreement no. 694262 to Francesco Billari and grant agreement no. 803959 to Alice Goisis).

## **Long abstract**

### **Introduction**

Life course research reveals the existence of age deadlines for both starting childbearing and completing childbearing for women and for men (Billari et al. 2011; Mynarska 2010; Settersten 2003). Age deadlines for childbearing are likely to reflect – alongside cultural and societal factors – the perception of biological limits to childbearing as well as of the health risks of parental age on child and maternal outcomes (Bewley, Davies and Braude 2005; Mynarska 2010; Nwandison and Bewley 2006; Schmidt et al. 2012). Age deadlines for childbearing are linked to actual fertility behaviour (Billari et al. 2010; Mills et al. 2011; Mynarska 2010; Van Bavel and Nitsche 2013).

Access to information on the potential consequences of important behavioural choices on health has been revolutionised by the advent of the Internet, which individuals increasingly rely on as a source of information on health and/or to complement more traditional sources of information (Brodie et al. 2000; Goldsmith 2000; Suziedelyte 2012). There is a wealth of evidence showing that individuals often consult the internet for health related behavioural choices (Gray et al. 2005; Pandey, Hart and Tiwary 2003; Sayakhot and Carolan-Olah 2016; Sillence et al. 2007). There is also evidence that the Internet is consulted for and integral to behavioural choices around reproduction, such as sexual health, contraception, pregnancy seeking, health behaviours in pregnancy, infertility and infertility treatments (Bunting and Boivin 2007; Harris et al. 2016; Jones and Biddlecom 2011; Lagan, Sinclair and Kernohan 2011; Sayakhot and Carolan-Olah 2016; Van Hoof, Provoost and Pennings 2013).

Whilst prior work has not examined whether the advent of the Internet has influenced individuals' perceptions of *age* in relation to the timing of childbearing, we argue that there are multiple mechanisms that could link the Internet to individuals' views around the ideal age or when it is too early/late to have children. First, the Internet provides access to a large amount of information on age-related infertility, which individuals might consult because it is not readily available through other sources of information and/or because of the stigmas associated with infertility (Berger, Wagner and Baker 2005; Maeda et al. 2015; Slauson-Blevins, McQuillan and Greil 2013). Second, the Internet provides access to information on the health risks associated with having children at young/advanced parental ages and on the availability of assisted reproductive technologies (Abusief, Hornstein and Jain 2007). Third, the internet provides abundant information on contraception methods (Billari, Giuntella and Stella 2019). Fourth, the Internet, through online forums, might facilitate social interactions and discussions (on health related concerns) about childbearing decisions (Gleeson, Craswell and Jones 2018).

It is difficult to predict a priori whether and how the diffusion of the Internet has influenced the perception of age deadlines for childbearing as the mechanisms we outlined could have opposite and potentially offsetting effects. Moreover, the effect of accessing the Internet on the preferences about the timing of childbearing might vary by educational level as prior research has revealed the existence of a 'second-level digital divide' in the accessibility to and ability to extract information from the Internet by educational level (Brodie et al. 2000; Hargittai 2010). Therefore, investigating whether/how age deadlines are affected by the advent of the Internet can prove useful to understand its effects on an important behavioural choice such as the timing of childbearing as well as, potentially, on the remarkable postponement of childbearing we have witnessed in advanced societies since the 1980s (Sobotka 2004).

In this study, we investigate whether access to the Internet is associated with age deadlines for childbearing by focusing on a period in which Internet use was spreading fast, i.e. the first decade of the 2000s. More specifically, using data from the European Social Survey 2006-2007 (third round), we investigate whether using the internet every day is associated with upper and lower age deadlines for childbearing (Billari et al. 2010) and ideal ages for childbearing (Van Bavel and Nitsche 2013). We analyse the association before and after adjustment for a set of individual socio-demographic characteristics which might confound the association between internet access and the perception of age deadlines for childbearing.

## Data and Methods

### *The European Social Survey*

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. In our study we used the third round of the ESS (ESS-3), collected in 2006–2007, which contained a module on ‘The timing of life: the organization of the life course in Europe’ to collect information on social norms about different behaviours and life transitions. Twenty-five countries participated in ESS-3: Austria, Belgium, Bulgaria, Cyprus, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Latvia, 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 which are thus excluded from the analyses.

### *Age deadlines for childbearing*

To measure individuals’ perception of age deadlines for childbearing we used three survey items. During the interview, 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’). Respondents were asked ‘After what age would you say a woman [man] is generally *too old* to consider having any more children?’, ‘In your opinion, what is the *ideal* age for a girl or woman [man] to become a mother [father]?’ and ‘Before what age would you say a woman [man] is generally *too young* to become a mother [father]?’ 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’. We included in the analyses respondents who provided an answer in integer numbers (ideal age: 10-70; too old: 18-70; too young: 10-40). We excluded from the analyses respondents who answered ‘never too old’ or ‘don’t know’.

### *Internet use*

The key explanatory variable for our analyses is a dummy variable that indicates whether the respondent used the Internet every day. In the survey, respondents were asked ‘How often do you use the Internet, the World Wide Web or e-mail – whether at home or at work – for your personal use (defined as private or recreational use that does not have to do with one’s work or occupation)?’ Responses ranged from ‘no access at home or work’ to ‘every day’. On average, 27% of respondents declared to use the Internet every day. Our study thus focuses on a period of time when using the Internet everyday was not, contrary to nowadays, the norm within most homes.

### *Socio-demographic characteristics*

Using the Internet every day is likely to be correlated with individual characteristics which are also associated with the perception of age deadlines for childbearing. As these characteristics might confound the association between internet use and age deadlines, in the analyses we considered a set of socio-demographic characteristics of the respondents: age in years (continuous), sex (binary), number of years of education (continuous), subjective wealth status (categorical: living well on present income; coping on present income; difficult on present income; very difficult on present income); ever married (binary: even been married or unmarried); parental status (binary: any children vs. childless); self-rated health (binary: very good/good vs. fair/bad/very bad).

### *Statistical Analyses*

For each age deadline, we estimated three linear models: Model 1 (baseline) included adjustment for the age of the respondents (linear and quadratic terms) and for the sex of the respondents; Model 2 – in addition to adjustments made in Model 1 - included adjustment for respondents’ socio-demographic characteristics; Model 3 – in addition to the adjustments made in Model 2 – was adjusted for an interaction term between internet use every day and the number of years of education (to test for the presence of a ‘digital divide’). We

estimated models separately by split ballot such that for each age deadline we estimated a total of six model specification (three for the female and male split ballots, respectively). All the model specifications were adjusted for regional fixed effects (dummies) to account for regional variations in the accessibility to the Internet as well as cultural norms around childbearing.

## Results

Descriptive analyses in Table 1 show that respondents who used the Internet every day, on average, perceived later (ideal, upper, lower) age deadlines for childbearing. In terms of socio-demographic characteristics, respondents who used the Internet every day were more likely to be younger, more educated, and wealthier, to report to be in good health, never married and childless.

The regression model results (Table 2) show that in Model 1 (the baseline model) using the Internet every day was positively and significantly associated with lower, upper and ideal age deadlines for childbearing. For upper/lower deadlines, the associations were stronger for the men split ballot whilst for the perception of ideal age deadlines the results did not vary by gender. Adjustment for individuals' socio-demographic and health characteristics in Model 2 partially attenuated the associations. Yet, the associations remained positive and statistically significant in all model specifications. The results suggest that the magnitude of the association between using the internet every day and age deadlines to childbearing was non-negligible: for example, it was between 2 to 6 times that of an additional year of education. In Model 3, the interaction between the use of the Internet every day and respondent's education was statistically significant only in the female split ballot models for the upper age deadlines to childbearing. The results suggest that the effect of accessing the Internet every day on the perception of females' upper age deadlines to childbearing varied by respondent's education (which hinted at the existence of a 'digital divide'): accessing the Internet every day was negatively associated with upper age deadlines when respondents had fewer years of education and positively associated with age deadlines when respondents had more years of education.

## Preliminary Conclusions

This is the first study investigating whether and how using the Internet every day is associated with the perception of age deadline to childbearing. Using data from the European Social Survey, the results show that accessing the internet every day was associated with higher (upper, lower, ideal) age deadlines to childbearing, even in models which included adjustment for individuals' characteristics. Overall, the findings suggest that access to the internet could represent a key driving factor behind individuals' postponement of age deadlines for childbearing.

**Table 1: Descriptive characteristics of the analytical sample, by internet use**

	Internet use everyday	
	Yes	No
<b>Age deadlines for childbearing, female ballot: mean (SD)</b>		
<i>Age too young to have a child (n=19,742)</i>	19.5 (3.1)	19.1 (2.9)
<i>Age too old to have a child (n= 18,835)</i>	42.3 (4.9)	41.6 (5.2)
<i>Ideal age to have a child (n=18,505)</i>	26.0 (3.3)	24.5 (3.3)
<b>Age deadlines for childbearing, male ballot (mean values)</b>		
<i>Age too young to have a child (n=19,227)</i>	21.0 (3.6)	20.7 (3.4)
<i>Age too old to have a child (n=17,285)</i>	47.7 (7.2)	47.2 (7.5)
<i>Ideal age to have a child (n=17,894)</i>	27.7 (3.4)	26.6 (3.5)
<b>Individual characteristics</b>		
Age (mean)	38.0	51.5
Female (%)	45.5	58.0
Years of education (mean)	14.3	11.3
Parent (%)	54.2	76.1
Married (%)	54.2	77.1
Income:		
<i>Living well on present income (%)</i>	42.1	57.9
<i>Coping on present income (%)</i>	27.0	73.1

<i>Difficult on present income (%)</i>	13.9	86.2
<i>Very difficult on present income (%)</i>	8.3	91.7
Good/very good self-rated health (%)	55.5	80.9
%		27.34
N		41,391

**Table 2: Coefficients showing the association between age deadlines for childbearing and internet use every day, by female/male split ballot**

	Model 1: Baseline		Model 2: Model 1 + socio-demographic characteristics		Model 3: Model 2 + internet use every day * education	
	$\beta$ (95% CI)	<i>p</i>	$\beta$ (95% CI)	<i>P</i>	$\beta$ (95% CI)	<i>p</i>
<b>Age too young</b>			<b>Female split ballot (n=19,742)</b>			
Internet everyday	0.34 (0.23 - 0.45)	<0.00	0.24 (0.13 - 0.36)	<0.00	0.48 (0.09 - 0.86)	0.016
Internet everyday * Years of education					0.02 (-0.04-0.01)	0.212
<b>Age too young</b>			<b>Male split ballot (n=19,227)</b>			
Internet everyday	0.50 (0.37-0.63)	<0.00	0.34 (0.20-0.47)	<0.00	0.25 (-0.20-0.70)	0.273
Internet everyday * Years of education					0.01 (-0.02 - 0.04)	0.685
<b>Age too old</b>			<b>Female split ballot (n=18,835)</b>			
Internet everyday	0.33 (0.14 - 0.52)	<0.00	0.20 (0.01 - 0.39)	0.044	-0.82 (-1.47 - -0.17)	0.014
Internet everyday * Years of education					0.07 (0.03 - 0.12)	0.001
<b>Age too old</b>			<b>Male split ballot (n=17,285)</b>			
Internet everyday	0.72 (0.45 - 1.00)	<0.00	0.34 (0.05 - 0.62)		-0.02 (-1.02 - 0.97)	0.963
Internet everyday * Years of education					0.03 (-0.04 - 0.10)	0.461
<b>Ideal age</b>			<b>Female split ballot (n=18,505)</b>			
Internet everyday	0.72 (0.60 - 0.84)	<0.00	0.47 (0.34 - 0.59)	<0.00	0.68 (0.25 - 1.10)	<0.00
Internet everyday * Years of education					-0.02 (-0.04 - 0.01)	0.306
<b>Ideal age</b>			<b>Male split ballot (n=17,894)</b>			
Internet everyday	0.75 (0.62 - 0.88)	<0.00	0.47 (0.34 - 0.60)	<0.00	0.48 (0.04 - 0.91)	0.031
Internet everyday * Years of education					0.00 (-0.03 - 0.03)	0.976

Note: Results obtained by regressing age deadlines on internet use before and after adjustment for respondents' characteristics. Model 1-3 are adjusted for respondents' age (linear and quadratic terms) and sex. Model 2 and 3 are adjusted for respondents' education, perceived wealth, marital status, parental status and self-rated health. All models include adjustment for regional fixed effects.

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