

**How Does Age Shape Social Interactions?  
Interviewer-Age Effects, Normative Age Distance, and Gender Attitudes**

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## **How Does Age Shape Social Interactions?**

### **Interviewer-Age Effects, Normative Age Distance, and Gender Attitudes**

#### **Abstract**

Age is one of the most widely used indicators in social research. However, the ways in which age influences the dynamics and outcomes of social interactions have received insufficient attention. The contextual configurations of this influence are particularly under-researched. Analysing data from the European Social Survey, I exploit the case of a survey interview as a microcosm of social interactions to examine the ways in which age influences respondent–interviewer interactions and shapes people’s articulation of gender attitudes. I disentangle whether interviewer’s age influences respondents’ gender-attitude reports directly or via its interaction with respondent’s age. I develop the concept of normative age distance in gender attitudes—the young–old inter-cohort difference in gender attitudes in a given country–year—to examine how it moderates interviewer-age effects. The results suggest that respondents draw on the normative age distance to associate stereotypical gender attitudes with the interviewer’s age and to make sense of their age distance from the interviewer when reporting their gender attitudes. Respondents are more sensitive to the interviewer’s age when the respondent–interviewer age difference is wider and the normative age distance in gender attitudes is greater. Older respondents are more sensitive to normative age distance in gender attitudes when responding to the interviewer’s age. The results provide new insights into how age configures social interactions, underline the importance of understanding survey interviews as contextually embedded symbolic interactions, and reflect critically on methodological challenges to survey design and data analysis.

**Keywords:** Age, Context, Gender Attitudes, Interviewer Effects, Normative Age Distance, Social Interaction, Survey.

## **Introduction**

Age is one of the most salient and ubiquitous identity markers in social research (England and McClintock, 2009; Fan and Marini, 2000; Schuman and Scott, 1989; Shu and Meagher, 2018). Although age has been included in almost all quantitative sociological research to account for its association with individuals' own social attitudes and behaviours, we know relatively little about how one's age may influence the attitudes and behaviours of their counterparts in social interactions, and far less is known about the mechanisms underlying this influence. As a result, the role played by age in shaping the dynamics and outcomes of social interactions presents a major gap in social science research, which I aim to address in this study.

Survey interviews represent a 'microcosm' of social interactions (Krysan and Couper, 2003). Whereas the ways in which age and other individual characteristics shape interpersonal interactions cannot be easily observed and quantified, in part because it requires collecting data on both parties involved in the interaction, the case of survey interview provides a unique opportunity to examine the interaction between respondent and interviewer. Despite an increase in the use of administrative records and digital 'big' data in recent years (Burrows and Savage, 2014), sample surveys remain a major source of data in social science research. Although new modes of survey administration, such as Web and telephone interviewing, have become more prevalent, face-to-face interviews are still seen as the 'queen of data collection' (Leeuw and Berzelak, 2016, p. 142). Survey interviewer effects—i.e. how interviewer characteristics influence respondent's survey reports—have received sustained scholarly attention in the methodological literature (Benstead, 2014a; Beullens and Loosveldt, 2016; Davis and Silver, 2003; West and Blom, 2017). However, the methodological insights are insufficiently used to fertilise our understanding of broader social interactions, and research on interviewer effects has a few important limitations.

First, there is an ‘age gap’ in research on interviewer effects, due not only to the relatively small number of studies on interviewer-age effects, but also to their inconclusive findings (West and Blom, 2017). As I demonstrate in this paper, the mixed findings of these studies are partly due to the varied foci on and often ambiguous distinction between direct and relative interviewer-age effects—namely, whether the effects arise from the interviewer’s age alone or are relationally constructed through the interaction between the respondent’s and the interviewer’s age (West and Blom, 2017). This ambiguity masks distinct natures and potential competing mechanisms underpinning social interactions. Therefore, a key objective of this research is to disentangle and compare these two mechanisms.

Second, age matters to social interactions not only as an individual attribute but also in terms of its role in constructing diffuse social norms. Age is often used to demarcate distinct cohorts and generations to signal social differences and capture social changes at an aggregate level (Schuman and Scott, 1989; Woodman and Bennett, 2005). In this context, diffuse norms pertaining to age play a crucial role in determining the stereotypes that respondents associate with interviewer’s age, leading to direct interviewer-age effects (Krumpal, 2013; Krysan and Couper, 2003). Such norms are also responsible for constructing expectations of respondent–interviewer age distance, which gives rise to relative interviewer-age effects (Brenner and DeLamater, 2016; Liu and Stainback, 2013). Although survey interviews take the form of contextually embedded interactions (Benstead, 2014; Flores-Macias and Lawson, 2008), cross-national variation in interviewer-age effects and the theoretical underpinnings of this variation have received scant scholarly attention (Cernat et al., 2019; Lau, 2018). In existing research (Benstead, 2014a; Flores-Macias and Lawson, 2008; West and Blom, 2017), norms pertaining to age and respondent–interviewer age distance across different country contexts have largely been assumed rather than systematically conceptualised, measured, and analysed. Against this backdrop, it is crucial to

theorise and test how contextual norms of age moderate interviewer-age effects at an individual level.

To fulfil these objectives, I analyse data from the 2010 and 2016 European Social Survey (ESS) to assess direct and relative interviewer-age effects across 46 country–years. I focus on respondents’ gender attitudes, specifically their expressed support for the rights of women to paid jobs, whilst also testing a wider range of outcome measures in supplementary analyses. The findings provide evidence of relative rather than direct interviewer-age effects, as the effects of the interviewer’s age on reported gender attitudes vary with the respondents’ age. Older respondents are more sensitive to interviewer’s age than their younger counterparts. Interviewer-age effects are further moderated by normative age distance<sup>1</sup>—i.e. the extent of inter-cohort difference—in gender attitudes across countries and survey rounds. The findings offer new theoretical insights into how age shapes people’s articulation of social attitudes as well as the contextually embedded nature and dynamics of social interactions, and reflect critically on the methodological design, implementation, and analysis of social surveys.

### **Theoretical Considerations**

Interviewer effects cut across multiple stages of the survey process, ranging from sample coverage, survey and item non-response, and measurement to information recording and processing (West and Blom, 2017). In this research, I focus specifically on interviewer-age effects on respondents’ attitudinal reports. Before theorising interviewer-age effects and their contextual variations, it is worth noting that interviewer effects are also susceptible to the influence of survey questions, which I discuss in the next section.

### *The Illustrative Case: Attitudes towards the Rights of Women to Paid Jobs*

The empirical case focuses on the collection of survey data on attitudes towards the rights of women to paid jobs via face-to-face interviews, and I have also analysed a wider range of measures in supplementary tests. This case is chosen based on its substantive importance, methodological relevance, and empirical feasibility. Substantively, since the middle of the 20<sup>th</sup> century, a long-term increase in women's labour force participation has been a crucial aspect of the gender revolution in particular and social changes in general (England et al., 2020; Scott et al., 2010). Attitudes towards women's equal right to paid jobs are widely considered a salient indicator of people's ideological endorsement of gender egalitarianism (Bolzendahl and Myers, 2004; Cotter et al., 2011; Hu and Scott, 2016; Scarborough et al., 2019b; Shu and Meagher, 2018). However, whilst extensive research has focused on how gender attitudes are shaped by people's socio-demographic traits, life circumstances, and experiences (Brooks and Bolzendahl, 2004; Pepin and Cotter 2018; Schober and Scott, 2012; Scott et al., 1996), the process of data collection and the insights it offers into the nature and dynamics of gender egalitarianism have received less attention (for exceptions, see the comprehensive review by West and Blom [2017]). Questions about attitudes towards women's equal right to paid jobs have been asked in a wide range of flagship surveys other than the ESS examined in this research, such as the European and World Values Surveys and International Social Survey Programme.

Methodologically, as existing literature suggests that the relevance of survey questions to the interviewer's characteristics is key to the triggering of interviewer effects (Krysan and Couper, 2003; West and Blom, 2017), it is important to examine measures that are relevant to the respondent's and interviewer's age. Previous research has shown that attitudinal and gender-related questions are particularly prone to interviewer effects (West and Blom, 2017). Meanwhile, compared with attitudes towards women's domestic roles,

attitudes towards women's role in the public sphere of work have shown greater inter-cohort change, making them particularly relevant to the study of interviewer-age effects (Pepin and Cotter, 2018; Shu and Meagher, 2018). Practically, whilst questions about attitudes towards women's domestic roles have varied across ESS rounds, data on attitudes towards the rights of women to paid jobs have been consistently collected in multiple rounds of the ESS.

### ***Age as an Individual Attribute: Direct and Relative Interviewer-Age Effects***

Interviewer age may affect respondents' gender-attitude reports through at least two channels (Liu and Stainback, 2013)—directly and via its interaction with respondents' age. These channels represent distinct interpretations of the nature of a survey interview. The notion of direct interviewer-age effects posits that irrespective of respondents' characteristics, the interviewer's age has an independent impact on respondents' gender-attitude reports (Johnson and Parsons, 1994). According to social attribution theory (Shaver, 2016), direct interviewer effects occur when respondents actively make sense of the interviewer's observable characteristics (e.g. age) and associate stereotypical symbolic meanings with these characteristics based on various social norms. Informed by attributions of gender attitudes towards age, respondents then succumb to social desirability or conformity bias by 'tailoring their [gender attitude] answers to what they think would satisfy or please the interviewer', based on the interviewer's age (Davis and Silver, 2003, p. 33). To do so, they often defer to the views that they expect the interviewer to hold (Davis and Silver, 2003), due to the inequality of social status and power between the respondent and interviewer (Kryan and Couper, 2003), politeness (Hatchett and Schuman, 1975), and/or the perception that the interviewer controls the agenda and progress of the interview (Rubin and Greene, 1991). If respondents' gender-attitude reports are susceptible to direct interviewer-age effects, the following hypothesis holds:

**Hypothesis 1:** The interviewer's age has a net impact on respondents' gender-attitude reports.

The notion of relative interviewer-age effects contends that direct interviewer-age effects may not affect all respondents equally. Instead, as respondents make sense of their relationship with the interviewer, they do not respond directly to normative stereotypes associated with the interviewer's age (Krysan and Couper, 2003). Rather, such stereotypes form the basis for respondents to make sense of their age distance and attendant attitudinal distance from the interviewer (Davis and Silver, 2003; Lau, 2018). In turn, interviewees' response to the perceived age distance and its associated attitudinal distance produces relative interviewer-age effects (Liu and Stainback, 2013). The conceptualisation of relative interviewer-age effects interprets a survey interview as a relational and interactive process (de Leeuw, 2012; Garbarski et al., 2016). Thus, interviewer effects arise because respondents treat the interview process as a negotiation for closeness and consensus to reduce their social distance from the interviewer (Garbarski et al., 2016). As the age distance between respondents and a given interviewer varies with the respondents' age, a greater respondent–interviewer age difference may mean that respondents need to modify their gender-attitude reports to a greater degree to reduce or eliminate their perceived age distance from the interviewer, as specified in Hypothesis 2A. Furthermore, cognitive theories suggest that older respondents show weaker cognitive functioning, making them more reliant on the interviewer's assistance and guidance; this renders them particularly susceptible to interviewer's age (Beullens et al., 2019), as specified in Hypothesis 2B.

**Hypothesis 2:** The effects of the interviewer's age are stronger when respondent–interviewer age difference is larger than smaller (2A); older respondents are more sensitive to direct interviewer-age effects (2B).



### *Age as a Context: Normative Age Distance in Gender Attitudes*

Respondent–interviewer interactions are embedded in and configured by broader social contexts (de Leeuw, 2012; Lau, 2018). Contextual norms inform the stereotypical gender attitudes that respondents associate with the interviewer’s age and the ways in which respondents make sense of their age distance (and attendant distance in gender attitudes) from the interviewer (Shaver, 2016). However, research focusing on interviewer effects in a single context has not fully considered contextual norms beyond the immediate interview setting (e.g. Brenner and DeLamater, 2016; Davis and Silver, 2003; Krysan and Couper, 2003; Liu and Stainback, 2013). In these studies, contextual norms have been assumed rather than conceptualised and empirically tested. Some recent studies have examined contextual variations in interviewer effects (Benstead, 2014a; Flores-Macias and Lawson, 2008; Lau, 2018), and others have examined survey non-response and the proportion of response variance attributable to interviewer heterogeneity (Beullens and Loosveldt, 2016; Davis et al., 2010; West and Blom, 2017). However, the contextual moderation of interviewer-age effects on substantive survey responses has yet to be systematically theorised, measured, and modelled.

Inter-cohort and life-course changes provide an important context for constructing the normative association between age and gender attitudes. Since the 1950s, there has been a rising tide of support for women’s employment as a result of cohort replacement in many countries (Bolzendahl and Myers, 2004; Brooks and Bolzendahl, 2004; Cotter et al., 2011; Pepin and Cotter, 2018; Scott et al., 1996; Shu and Meagher, 2018). Attitudes towards women’s employment tend to become less egalitarian over the life course, due to the influence of events such as marriage and parenthood (Fan and Marini, 2000; Perales, Lersch, and Baxter, 2019; Schober and Scott, 2012). However, both the direction and degree of inter-cohort difference in gender attitudes vary considerably across countries (Inglehart and Norris

2003; Price, 2008; Scott et al., 2010). For example, there has been a resurgence of traditional gender ideologies among young people in Russia (Ashwin and Isupova, 2018), whilst gender ideologies have become more egalitarian among recent cohorts in countries such as the UK (Scott et al., 2010) and the USA (Shu and Meagher 2018). Meanwhile, the life-course dynamics of attitudes towards women's employment are closely shaped by and thus vary across distinct settings of gender equality legislation and welfare provision for working parents (Davis and Greenstein, 2009).

I develop the concept of normative age distance in gender attitudes to capture contextual norms pertaining to the difference in gender attitudes between younger and older people in a given context. If respondents draw on the normative age distance to construct the stereotypical gender attitudes they expect an interviewer to hold, and if they defer to the stereotypical expectations to appear socially desirable by reducing their perceived social distance from the interviewer (Kryan and Couper, 2003), we expect the distance to moderate the direction of the effect of interviewer age, as specified in Hypotheses 3A and 3B.

Additionally, 'the greater the difference in social group identification between respondent and interviewer, the more likely the respondent will [be to] succumb to social desirability' (Liu and Stainback, 2013, p. 608). Therefore, normative age distance in gender attitudes may also moderate the strength of direct interviewer-age effects, as explicated in Hypothesis 3C:

**Hypothesis 3:** In contexts in which younger people hold more egalitarian gender attitudes than older people, respondents report more egalitarian gender attitudes towards a younger than an older interviewer (H3A); in contexts in which younger people hold less egalitarian gender attitudes than older people, respondents report more egalitarian gender attitudes towards an older than a younger interviewer (H3B); and direct interviewer-age effects are stronger in contexts in which the normative age distance in gender attitudes is larger rather than smaller (H3C).

How, if at all, do respondents of different ages relate differently to the normative age distance in gender attitudes when responding to the interviewer's age? Although a lack of prior research prevents me from offering a systematic theorisation, two considerations may be relevant. First, as older respondents have more fully experienced any inter-cohort and life-course changes in gender attitudes than their younger counterparts (Perales et al., 2019), they may be more sensitive to the normative age distance in gender attitudes when engaging with the interviewer's age. Second, research on generational change in social attitudes and youth culture has shown that young people often cast the values held by their predecessors as obsolete, outdated, and thus undesirable (Schuman and Scott, 1989; Woodman and Bennett, 2015). Compared with older people, therefore, younger people may be less likely to defer to the normative age distance in gender attitudes when responding to an older interviewer.

These considerations lead to the following hypothesis:

**Hypothesis 4:** Compared with their younger counterparts, older respondents are more sensitive to a normative age distance in gender attitudes when responding to interviewer's age.

## **Data and Methods**

### ***Data and Sample***

I use data from the ESS ([www.europeansocialsurvey.org](http://www.europeansocialsurvey.org)). Launched in 2002 and administered across European countries, the ESS is a biennial cross-sectional survey that covers a wide range of social research topics. It collects data from face-to-face computer-assisted personal interviews in all participating countries. Although information on attitudes towards the rights of women to paid jobs is collected in other cross-national surveys, such as the European and World Values Surveys and International Social Survey Programme, only the ESS makes data on interview and interviewer characteristics publicly available.

Following a random probability sampling strategy, the ESS provides a nationally representative sample of all residents aged 15 or over in each participating country. This study uses only the 2010 and 2016 ESS, because consistent data on gender attitudes and interviewer age are only available for these years.<sup>2</sup>

To construct the analytical sample, I first eliminated country–years that did not provide data on all of the measures used in this research. I limited the sample to respondents aged between 16 and 86, ensuring that the respondent age range was the same in all country–years. Next, I deleted 1,320 cases with missing information on gender attitudes and 276 cases with missing information on respondents’ age (Sample 1). I also limited the sample to interviewers aged between 18 and 80 to minimise the influence of outlier cases. I deleted another 500 cases with no valid information on interviewers’ age. Lastly, I eliminated 7,106 cases (< 10% of the original sample) with missing information on the control variables. The final analytical sample contained 77,884 respondents from 30 countries, interviewed by 6,243 interviewers in 46 country–years. This means on average each interviewer handled around 12 respondents in the analytical sample. See Supplementary Appendix 1 for detailed information on the sample selection procedure and Supplementary Appendix 2 for a list of the country–years.

### ***Dependent Variable***

The dependent variable was a single measure capturing respondents’ attitudes towards the rights of women to paid jobs. The survey asked respondents to rate the degree to which they agreed or disagreed that ‘men should have more right to a job than women when jobs are scarce’. Responses were recorded on a 5-point Likert scale ranging from 1 (‘strongly agree’) to 5 (‘strongly disagree’). A higher score indicated more gender-egalitarian attitudes. As the response residuals were within a range sufficient to assume a normal distribution, I treated

the variable as a continuous measure. Although prior research has often relied on a composite score, calculated based on several measures, to capture gender attitudes, the variable used in this research is the only gender-attitude measure that has been consistently included in multiple rounds of the ESS. Examining this single measure is valuable not only due to the substantive importance of understanding attitudes towards women's employment, but also because the measure has been included in a wide range of surveys, such as the European and World Values Surveys and International Social Survey Programme, as well as influential studies on changing gender ideologies (e.g. Bolzendahl and Myers, 2004; Scott et al., 1996; Cotter et al., 2011; Inglehart and Norris, 2003; Scarborough et al., 2019; Shu and Meagher, 2018).

### *Age Measures*

Respondent age was captured using a continuous measure that ranged from 16 to 86 years ( $M = 46.05$ ). Similarly, interviewer age was a continuous measure that ranged between 18 and 80 years ( $M = 49.84$ ). For the descriptive analysis only, I calculated the respondent–interviewer age gap by subtracting the interviewer's age from the corresponding respondent's age, and then coded the value into seven categories: (1) respondent younger than interviewer by 31 or more years ( $[-63, -31]$ ), (2) respondent younger than interviewer by 21 to 30 years ( $[-30, -21]$ ), (3) respondent younger than interviewer by 11 to 20 years ( $[-20, -11]$ ), (4) respondent–interviewer age difference within 10 years ( $[-10, 10]$ ), (5) respondent older than interviewer by 11 to 20 years ( $[11, 20]$ ), (6) respondent older than interviewer by 21 to 30 years ( $[21, 30]$ ), and (7) respondent older than interviewer by 31 or more years ( $[31, 67]$ ).

### *Normative Age Distance in Gender Attitudes*

To measure the normative age distance in gender attitudes, I first calculated the absolute age slope as the coefficient for the respondent's age from a weighted ordinary least squares regression predicting the respondent's gender attitudes for each country–year<sup>3</sup> (Hosseinpoor et al., 2016; Regidor, 2004). As absolute age slopes are sensitive to changes in the mean level of gender attitudes and the age distribution of the population (Pamuk, 1985), I then calculated the relative age slope by dividing the absolute slope by the country–year mean level of gender attitudes (Hosseinpoor et al., 2016; Regidor, 2004). I reversed the relative slope measure such that a positive and larger value indicated that younger respondents held more egalitarian gender attitudes than their older counterparts, and a negative value indicated that younger respondents held less egalitarian gender attitudes than their older counterparts.

Notably, to use as much information from the dataset as possible, the measure was calculated based on Sample 1 before the listwise deletion of missing cases for all of the variables except gender attitudes and respondent's age. Descriptive statistics of the measure by country–year are presented in Supplementary Appendix 2 and further information on the measure can be found in Supplementary Appendix 3.

[TABLE 1 ABOUT HERE]

### *Control Variables*

I controlled for a wide range of variables that may influence gender attitudes and interviewer–age effects, as shown in Table 1. At the respondent level, I controlled for gender and years of schooling, which are known to affect individuals' gender attitudes (Pepin and Cotter, 2018). Individuals' gender attitudes also vary with their family circumstances (Schober and Scott, 2012). I thus controlled for the respondent's marital status, distinguishing between never married, currently married, and previously married (i.e. widowed, divorced, and separated,

respectively). I also included two dummy variables to capture whether the respondent had one or more children and whether the respondent lived with at least one child (Schober and Scott, 2012). People's economic participation and status are salient predictors of their gender attitudes (Bolzendahl and Myers, 2004). I distinguished between respondents who were currently working, unemployed, retired, and inactive or other. I also controlled for respondents' occupational status using the International Socio-Economic Index (ISEI; Ganzeboom, Graaf, and Treiman, 1992). A score of zero was assigned to non-working respondents. As maternal employment helps to foster gender egalitarianism among children (Scott et al., 1996), I used a dummy variable to capture whether the respondent's mother had participated in paid work when the respondent was aged 14.<sup>4</sup>

Gender attitudes vary with migration status (Röder and Mühlau, 2014), which I distinguished using three categories—native (with no foreign-born parent), second-generation migrant (with one foreign-born parent), and first-generation migrant (not born in the country of residence). To account for ethnic differences in gender attitudes (Röder and Mühlau, 2014), I controlled for whether a respondent self-identified as belonging to an ethnic minority group. Religiosity, which plays an important role in shaping gender attitudes (Abdelhadi and England, 2018), was captured using the standardised principal-component score of three Likert-type scales measuring the respondent's self-reported religiousness, frequency of religious service attendance, and frequency of praying. Higher scores indicated that the respondent was more religious. As expressed gender attitudes reflect deep-rooted value orientations, I controlled for two of Schwartz's human value domains, self-transcendence and conservatism, which have been shown to correlate with gender attitudes, using Schwartz's 21-item Portrait Values Questionnaire (Schwartz and Rubel-Lifschitz, 2009). A higher score denoted a greater propensity for self-transcendence or conservatism. The wording of the

religiosity and human value measures and calculations of the composite indices are detailed in Supplementary Appendix 4.

Interview and interviewer characteristics play a crucial role in shaping respondents' attitudinal reports. I controlled for interviewer gender using a dummy variable (Liu and Stainback, 2013). Interviewer experience is associated with respondents' acquiescence (Olson and Bilgen, 2011). I thus calculated the number of interviews conducted by an interviewer prior to the current interview to account for interviewer experience within an ESS round. Unfortunately, information on interviewers' overall experience is not recorded in the ESS. I also controlled for whether a respondent was reallocated to a new refusal conversion interviewer and the number of visits paid to a respondent in order to complete an interview, to capture the level of difficulty of engaging with a respondent (West and Blom, 2017). I used interviewer-rated measures of the respondents' understanding of the survey questions, effort, and reluctance to answer the questions (Beullens et al., 2019), which may correlate with respondents' acquiescence (Olson and Bilgen, 2011). A 5-point Likert scale was used for each of the three measures, with higher scores indicating that the respondent showed a better understanding of the questions, made greater effort, and was more reluctant to answer the questions, respectively. Survey responses are susceptible to third-party interruption (Diop et al., 2015). Therefore, I created a dummy variable and coded as 'yes' cases in which the interview was interrupted by the respondent's spouse, parent(s), child(ren), other relative(s), or any other person. Interview duration was not included in the analysis as it had no statistically significant association with the dependent variable, contributed little to the overall model fit, and its inclusion did not affect the other independent variables.

At the country-year level, I controlled for the female labour force participation rate to account for the overall level of gender egalitarianism in women's employment. These data



were obtained from the World Bank (2020), and the descriptive statistics by country–year are presented in Supplementary Appendix 2.

### *Analytic Strategy*

To account for the hierarchical structure of the data and unobserved heterogeneity between interviewers and across country–years, I fitted mixed-effects regression models with three levels (Snijders and Bosker, 2012): respondent (level 1), interviewer (level 2), and country–year (level 3). Given the non-random distribution of the respondent’s and interviewer’s age profiles across country–years, I adopted the Mundlak (1978) specification by including the country–year mean values of the respondent’s and interviewer’s age (and their interaction term) in the models, alongside the original variables. This specification introduced a country–year fixed-effects property to the models, allowing for the reliable estimation of interviewer–age effects within country–years (Allison, 2009). When fitting the cross-level interactions, I also included random slopes for the lower-level main effects and interaction terms at the higher interviewer and country–year levels (Heisig and Schaeffer, 2019). I estimated robust standard errors to account for the clustering of country–years within countries (Maas and Hox, 2004). All continuous variables were grand mean centred to enhance model efficiency and the interpretability of the intercept (Snijders and Bosker, 2012). Weights were applied in all analyses.<sup>5</sup> Variance inflation factor tests confirmed that there was no considerable multicollinearity between the predictors (O’Brien, 2007).

I further conducted a counterfactual analysis to illustrate the substantive impact of the uneven respondent–interviewer age matching across the survey countries. First, I employed the technique of entropy reweighting, using the *ebalance* package in Stata, to create a counterfactual sample in which all respondents were interviewed by an interviewer within 10 years of age difference, whilst keeping the post-stratification weighted mean, variance and

skewness of all respondent characteristics included in Table 1 to be the same as those in the original sample of a given country (Hainmueller and Xu, 2013). Then, after combining the original and the counterfactual samples, I created a dummy treatment variable to distinguish the two samples (counterfactual = 1). Third, I fitted a weighted ordinary least squares (OLS) regression model, using the post-stratification weight for the original sample and the weight obtained from entropy reweighting for the counterfactual sample. In the model, the gender attitude measure was the dependent variable, and the interaction between the treatment dummy and country identifiers, along with all respondent, interviewer and interview characteristics listed in Table 1 and a dummy variable distinguishing ESS5 and ESS8, were included as the independent variables. Although I used respondent characteristics for entropy reweighting, their inclusion in the OLS model helped balance out any remaining differences between the original and counterfactual samples (Hainmueller and Xu, 2013). To account for the uncertainty associated with entropy reweighting, standard errors were bootstrapped 2,000 times in the OLS model. Scholars use ESS gender-attitude measures in many different ways. For illustrative purposes, I calculated the average marginal effects of the treatment variable for each country, which indicate the extent to which the country mean levels of gender attitudes would differ from observations based on existing ESS data, if all respondents were interviewed by a similarly-aged interviewer. All analyses were conducted using Stata version 16.0 (StataCorp, 2019).

## **Results**

### ***Descriptive Results***

Figure 1 illustrates the mean interviewer age and respondent–interviewer age difference across the 46 country–years. The upper panel reveals considerable variation in mean interviewer age across the countries and survey rounds, ranging from 27.0 years in Croatia in

2010 to 64.3 years in Denmark in 2010. On balance, 35.8% of the respondents were interviewed by a similarly aged interviewer (within 10 years older or younger). Whilst 11.9%, 12.3%, and 14.2% of the respondents were interviewed by an interviewer 31 or more years, 21–30 years, and 11–20 years older than them, respectively, 11.5%, 7.8%, and 6.4% of the respondents were interviewed by someone younger than them by 11–20 years, 21–30 years, and 31 or more years, respectively. As shown in the lower panel, there was notable variation in respondent–interviewer age difference across countries and over time. In 2010, for example, only 0.2% of the respondents in Denmark, compared with 30.1% in Croatia, were interviewed by someone younger by 31 or more years; and in Israel, 11.1% of the respondents in 2010, compared with 5.6% in 2016, were interviewed by someone younger by 31 or more years.

[FIGURES 1, 2 AND 3 ABOUT HERE]

Figure 2 depicts a curvilinear relationship between mean interviewer age and country–year age distance in gender attitudes: older interviewers were more likely than their younger counterparts to be deployed in country–years with a medium level, as opposed to a high or a low level, of inter-cohort difference in gender attitudes. Similarly, Figure 3 depicts a curvilinear relationship between respondent–interviewer age difference and country–year age distance in gender attitudes. Respondents were more likely to have been interviewed by a younger than an older interviewer in country–years at the two ends of the spectrum of normative age distance in gender attitudes, compared with country–years falling in the middle range of inter-cohort difference in gender attitudes.

Together, Figures 1, 2, and 3 confirm the uneven distributions of interviewer age profiles and respondent–interviewer age difference across countries and over time, as well as their non-random sorting by normative age distance in gender attitudes. These results underline the need for an analytical strategy that incorporates country–year fixed effects and

isolates the between country–year effects of interviewer’s age and respondent–interviewer age difference—i.e. the Mundlak (1978) specification used for the multilevel models.<sup>6</sup>

### ***Multilevel Modelling Results***

Table 2 presents the results for the key predictors of people’s attitudes towards the rights of women to paid jobs in the three-level mixed-effects models. As the results for the control variables changed little across the models, they are presented in Appendix Table A1 based on the full Model 2.

[TABLE 2 ABOUT HERE]

In the null model, which included only fixed and random intercepts, the intra-class correlations show that interviewer heterogeneity accounted for as much as 37.1% of the variation in the gender-attitude reports, while heterogeneity between country–years accounted for 21.9% of the variation. In Model 1, the inclusion of respondent’s age, country–year normative age distance in gender attitudes, and all of the control variables explained 14.0% of the variation attributed to interviewers and 33.3% of the variation attributed to country–years. In Model 2, I further included interviewer’s age to test the direct interviewer-age effect. The results did not support Hypothesis 1, as there was no statistically significant association between interviewer’s age and gender-attitude reports, net of respondents’ age and control variables, and the effect size of interviewer’s age was small.

[FIGURE 4 ABOUT HERE]

In Model 3, I included the cross-level interaction between respondent’s and interviewer’s age to assess relative interviewer-age effects. To aid interpretation of the interaction effect, I calculated the predictive margins and discrete marginal effects, which are displayed in Figure 4. The result for the interaction, which was statistically significant at the 5% level, supported Hypothesis 2A that the effect of the interviewer’s age on gender-attitude

reports varies with the respondent's age, and the effect tends to be stronger when the respondent-interviewer age difference is larger rather than smaller. The results also supported Hypothesis 2B, that older respondents are more sensitive to direct interviewer-age effects. As depicted in the right panel of Figure 4, the interviewer's age had little impact on how young respondents (e.g. 16- and 33-year-olds) reported their gender attitudes; yet by contrast, the interviewer's age made a statistically significant difference to the gender-attitude reports of their older counterparts (e.g. those aged 50 or over).

[FIGURE 5 ABOUT HERE]

In Model 4, to examine how, if at all, direct interviewer-age effects were moderated by country-year age distance in gender attitudes, I included the cross-level interaction between interviewer's age and country-year normative age distance in gender attitudes. The results supported Hypothesis 3, as the interaction effect was sizeable and statistically significant at the 5% level, as illustrated in Figure 5. For country-years in which older people held more egalitarian gender attitudes than their younger counterparts, respondents were found to report more egalitarian gender attitudes towards an older than a younger interviewer, as specified in Hypothesis 3A. Conversely, in line with Hypothesis 3B, for country-years in which younger people were more supportive of the rights of women to paid jobs, respondents tended to report more egalitarian gender attitudes towards a younger than an older interviewer. Supporting Hypothesis 3C, country-year age distance in gender attitudes was found to moderate the strength of direct interviewer-age effects, as these effects were stronger in the presence of a larger than a smaller normative age distance in gender attitudes.

[FIGURE 6 ABOUT HERE]

In Model 5, to examine the contextual moderation of relative interviewer-age effects, I included the three-way interaction between respondent's age, interviewer's age, and country-year age distance in gender attitudes, as well as the lower-order interaction terms

between each two of the three variables. The results supported Hypothesis 4, as the way in which respondents drew on normative age distance in gender attitudes to respond to the interviewer's age varied with the respondents' age. As the left panels of Figure 6 show, the gender-attitude reports of the young respondents do not seem to have been affected by their interviewers' age, and country-year age distance in gender attitudes made hardly any difference to the effect of interviewer's age. Moving across to older respondents in the right-hand panels, the results show a gradient increase in the respondents' sensitivity to the normative age distance in gender attitudes as they responded to the interviewer's age in reporting their gender attitudes. For country-years in which older people held more egalitarian gender attitudes than their younger counterparts, middle-aged and old respondents reported more egalitarian attitudes towards an older than a younger interviewer. Conversely, for country-years in which younger people held more egalitarian gender attitudes than their older counterparts, middle-aged and old respondents reported more egalitarian gender attitudes towards a younger than an older interviewer. For country-years in which there was only a small inter-cohort difference in gender attitudes, interviewer age had hardly any impact on the respondents' gender-attitude reports.

### ***Counterfactual Analysis and A Comment on Effect Size***

Figure 7 presents the impact of the counterfactual scenario in which all respondents were interviewed by someone within 10 years of age difference on the country mean levels of gender attitudes. Compared with the original ESS data, the counterfactual scenario would produce a statistically different country mean level of gender attitudes in as many as nine of the 30 countries (at the 5% level). Compared with the counterfactual scenario, the ESS data recorded statistically significantly more egalitarian mean gender attitudes in four countries and less egalitarian mean attitudes in 5 countries (at the 5% level). Therefore, it is clear that

the uneven age matching between interviewer and respondent across the survey countries had a notable impact on the substantive inference we can draw from the data. The results have important implications for data comparability across the countries: for example, the difference in the mean levels of gender attitudes between Croatia and the Netherlands would be underestimated using existing ESS data, compared with the counterfactual scenario.

[FIGURE 7 ABOUT HERE]

Comparison of the discrete marginal effects of interviewer age (presented in Figure 6) and the standardised coefficients for the control variables (presented in Appendix Table A1) further indicates the importance of age in shaping social interactions and the articulation of gender attitudes. For example, for country–years in which younger people held considerably less egalitarian gender attitudes than their older counterparts (i.e. normative age distance = –0.17 in the far right panel of Figure 6), the discrete marginal effect of a one standard deviation change in the interviewer’s age on the gender-attitude reports of 86-year-olds was –0.101 (95% CI: 0.086, 0.115). The effect size is comparable to that of Schwartz’s human values (e.g. conservatism  $\beta = -0.094$ ), religiosity ( $\beta = -0.094$ ), and maternal employment ( $\beta = 0.076$ ), and larger than those of occupational status ( $\beta = 0.044$ ) and parenthood status ( $\beta = -0.003$ ), which are known to play crucial roles in shaping people’s gender attitudes (Bolzendahl and Myers, 2004; Schwartz and Rubel-Lifschitz, 2009; Shu and Meagher, 2018). In addition, the effect size is larger than those of other interview and interviewer characteristics, such as interviewer’s gender ( $\beta = 0.036$ ), interview interruption ( $\beta = 0.068$ ), respondents’ understanding of the survey questions ( $\beta = 0.050$ ), and respondents’ reluctance to answer the questions ( $\beta = -0.020$ ), which represent some of the key concerns in survey methodology (West and Blom, 2017).

### ***Robustness Checks***

I conducted a series of additional analyses to ensure that the results were not driven by model specification or measurement choice. The results of these analyses are presented in the online supplementary appendices. Some previous studies coded gender-attitude measures as binomial categorical variable to capture people's endorsement of traditional gender values (Braun et al., 1994; Scott et al., 1996). Coding the dependent variable as a binomial measure and modelling it using logit and probit models yielded substantively consistent results. The findings were substantively consistent with analyses using alternative dependent measures of public attitudes towards homosexuality and women's work-family roles, respectively. The results were also robust to alternative country-year measures of normative age distance in gender attitudes and gender equality in women's economic participation.

Although it was beyond the scope of this research to systematically theorise and test gender differences in interviewer-age effects, I explored the possibility that direct and relative interviewer-age effects, as well as their contextual variations, may differ with respondents' and interviewers' gender. The findings held up for both male and female respondents and male and female interviewers, although female respondents were more sensitive than male respondents to the interaction between interviewer's age and country-year age distance in gender attitudes, and the interaction between relative interviewer-age effects and normative age distance seemed to be stronger in the presence of a female than a male interviewer .

To rule out the possibility that the results were driven by outlier country-years, I used a bootstrap procedure in which I repeatedly re-estimated the models but sequentially removed one country-year from each model. In each case, the bootstrap procedure yielded results consistent with those reported in the article. Finally, the boundary of normative contexts was drawn at the country-year level to ensure a sufficient sample size in each contextual unit for the reliable calculation of the normative age distance measure. The results were robust to



modelling contextual moderation at the region–year level, with each country being disaggregated into smaller regions (Nomenclature of Territorial Units for Statistics).

### ***Limitations***

Despite the reassuring results of the robustness checks, the limitations of this research suggest a few important directions for future research. First, whilst characteristics such as race and ethnicity are known to affect respondents' attitudinal reports and interpersonal interactions (Krysan and Couper, 2003), the ESS data lack information on the interviewer's race and ethnicity, which should be included in future data collection and analysis. Second, despite my efforts to verify the robustness of the results by using alternative dependent variables, the scope of the dependent variables was necessarily limited. It would be profitable to assess a wider range of measures in terms of their susceptibility to interviewer effects as well as potential contextual variations in the susceptibility using the approach developed in this study. Third, although I used the Mundlak (1978) specification, which includes a fixed-effects property for the key variables at the country–year level, to mitigate the non-random distribution of respondent and interviewer age across the countries and survey rounds, future research could usefully adopt randomised experiments to verify the findings of this research. Finally, to tease out the causal mechanisms underpinning interviewer-age effects, longitudinal data can be collected and analysed to examine the effect of interviewer change on the attitudinal reports provided by the same respondents.

### **Conclusions and Discussion**

Age is one of the most widely used indicators in social research (Bolzendahl and Myers, 2004; England and McClintock, 2009; Fan and Marini, 2000; Pepin and Cotter, 2018; Scott et al., 2010; Shu and Meagher, 2018). However, the influence of age on the dynamics and

outcomes of social interactions, and particularly the contextual configurations of this influence, have received insufficient attention. Against this backdrop, I have exploited the case of survey interview as a microcosm of social interactions to illustrate the ways in which age shapes people's articulation of (gender) attitudes in respondent–interviewer interactions. Whilst a limited body of survey methodology research has examined interviewer-age effects—yielding mixed findings (West and Blom, 2017), this study is one of the first to have systematically assessed how age shapes survey reports in a cross-national context. It has helped to clarify that the mixed findings of previous research are due partly to the inconsistent ways in which interviewer-age effects have been conceptualised and operationalised, and partly to researchers' focus on a single context, with insufficient attention to the contextual moderation of the effects. This research provides new, important theoretical insights into how age operates at cross-cutting contextual and individual levels to configure interpersonal interactions. In doing so, it extends our understanding of survey interviews as contextually embedded symbolic interactions. The illustrative case underscores the role of inter-cohort change in providing a crucial context for the relational articulation of gender and social attitudes. The findings also have pertinent methodological implications for the design and implementation of social surveys and the analysis of survey data.

### ***The Role of Age in Shaping Social Interactions***

This research reflects critically on the understanding and use of age in social research. In most quantitative sociological research, age is included as a control variable in the background. When researchers do focus on age, for example, in the study of life course, cohort, and generational issues, age is often conceptualised and operationalised as a characteristic that shapes one's own attitudes and behaviours. This research goes beyond an individual-centred focus to have systematically investigated the way in which age shapes the

attitudes and behaviours of one's counterparts in social interactions. The findings show that age operates at both individual and contextual levels, as well as the interaction between the two, to shape social interactions. In the collective, age is imbued with social meanings. As people draw on diffuse norms and stereotypes to make sense of their interlocutor's age in relation to that of their own, the social meanings of age are invoked in and animated and reproduced through individual interactions.

In the case of survey interviewers, the findings underline the theoretical imperative to understand interviewer-age effects as a product of contextually embedded interactions. Core to interviewer effects are contextual norms based on which respondents devise responses that they perceive to be socially desirable (Davis et al., 2010; Davis and Silver, 2003; Leeuw and Berzelak, 2016). However, such norms have largely been assumed in existing scholarship (e.g. Benstead, 2014; Krysan and Couper, 2003; Liu and Stainback, 2013). This research is the first to have directly conceptualised, measured, and modelled the contextual norms underlying interviewer-age effects. The findings clearly demonstrate that contextual norms play a pivotal role in informing respondents' understanding of the interviewer's observable traits, such as age, which in turn encourages them to act on their perceived (age) distance from the interviewer. Specifically, the normative age distance in gender attitudes not only informs the direction in which respondents defer to the interviewer, but also bolsters the strength of the interviewer-age effects. Therefore, the findings suggest that a survey interview is not an isolated social situation. Rather, the diffuse norms pertaining to the link between gender attitudes and age validate and legitimise the stereotypical (gender) attitudes that respondents associate with their own and the interviewer's age.

The findings also clarify that the impacts of age on social interactions are generated by the interaction between the respondent's and interviewer's age, rather than by the interviewer's age alone. Extending prior research on interviewer effects that has focused on

discrete categories such as gender and race (e.g. Benstead, 2014; Kryan and Couper, 2003; Liu and Stainback, 2013), my focus on the continuous indicator of age has shown that the greater the respondent–interviewer age difference, the stronger the relative interviewer-age effects. Compared with gender and race, which are ostensibly visible (West and Blom, 2017), the visibility of age difference is a matter of degree, closely associated with the magnitude of the difference. Furthermore, compared with young respondents, older respondents were found to be more sensitive to the normative age distance when responding to interviewers' age. This may be the combined result of older respondents' greater reliance on the interviewer in the survey process due to their weaker cognitive functioning (Beullens et al. 2019) and their fuller experience of and thus closer identification with inter-cohort changes in gender attitudes (Schuman and Scott, 1989; Woodman and Bennett, 2005). As differently aged respondents relate differently to the normative age distance when responding to the interviewer's age, the findings emphasise the need to understand the role not just of contextual norms, but also of respondents' position in relation to these norms in understanding how age shapes social interactions.

### ***Inter-Cohort Changes and Attitudinal Reports***

A substantial body of literature has shown that over the last few decades, inter-cohort change has been a key mechanism underpinning changing social attitudes towards a wide range of issues, such as homosexuality, women's employment and work-family roles (Bolzendahl and Myers, 2004; Brooks and Bolzendahl, 2004; Hart-Brinson, 2018; Hu and Scott, 2016; Pepin and Cotter, 2018; Scarborough, Sin, and Risman, 2019; Scott et al., 2010; Shu and Meagher, 2018; Treas, 2002). Whilst previous research has often considered inter-cohort change in social attitudes as a social outcome (Bolzendahl and Myers, 2004; Brooks and Bolzendahl, 2004; Pepin and Cotter, 2018; Scarborough, Sin, and Risman, 2019; Scott et al., 2010; Shu

and Meagher, 2018), I have extended this perspective to show that inter-cohort change in attitudes provides a crucial (antecedent) context that shapes how people articulate their attitudes in the first place.

In sum, I have found that in contexts where gender attitudes have become considerably more egalitarian over distinct cohorts, respondents report more egalitarian gender attitudes towards a younger than an older interviewer. Conversely, in contexts where young people have regressed to less egalitarian gender attitudes, respondents report less egalitarian gender attitudes towards a younger than an older interviewer. In the absence of inter-cohort change in gender attitudes, there is hardly any interviewer-age effect on gender-attitude reports. These findings suggest that inter-cohort change, as a normative context, configures how respondents make sense of intersecting age and gender identities in relating to the interviewer. Furthermore, as respondents' perception of and reaction to their own and the interviewer's age are inextricably intertwined with their understanding of gender ideology, the articulation of gender (or any given) ideology should not be taken as univocal; rather, it should be considered in conjunction with other salient and cross-cutting identities.

### ***Methodological Implications***

The findings have several important implications for the methodological design, implementation, and analysis of social surveys. The presence of interviewer-age effects and their contextual variations mean that uneven interviewer–respondent age matching across countries and survey rounds—as observed in many initiatives, such as the ESS and International Social Survey Programme (Leeuw and Berzelak, 2016)—may undermine data comparability across the survey countries and rounds. These repeated cross-national, cross-sectional surveys have often been used to profile changes in gender attitudes over time (Bolzendahl and Myers, 2004; Davis and Greenstein, 2009; Scott et al., 1996). However, as a

large normative age distance in gender attitudes bolsters interviewer-age effects, the greater inter-cohort difference in gender attitudes in more recent rounds of data, as reported in numerous studies (Brooks and Bolzendahl, 2004; Pepin and Cotter, 2018; Shu and Meagher, 2018), means that interviewer-age effects are likely to be stronger in more recent rounds of data. This is particularly problematic if the distribution of interviewer age is non-random across the survey countries and over time, as is widely the case.

The findings suggest a few practical actions for survey methodologists and practitioners. Whilst it is difficult to achieve consistent age matching in the design and implementation of survey fieldwork, it is worth reflecting on the extent to which face-to-face interviews are still the ‘queen of [survey] data collection’ (de Leeuw and Berzelak, 2016, p. 142). This requires a comprehensive and systematic assessment of which measurement domains have been subject to inter-cohort change and which survey questions are particularly likely to be inflected by interviewers’ age, in addition to their gender, race, verbal expressions, and behaviours (West and Blom, 2017). This study provides a template for such assessment, based on which evidence-informed mixed-mode designs can be developed and deployed when consistent matching in respondent–interviewer characteristics is infeasible. In this context, an open empirical question remains as to whether the ways in which age shapes survey interactions identified in this research similarly apply to survey domains that have undergone less inter-cohort change than gender and sexual attitudes. Particular attention should be paid to surveying old respondents, as they appear to be especially susceptible to interviewer-age effects and may not be sufficiently technology-savvy to adapt to new forms of Web and mobile surveys (Beullens, Loosveldt, and Vandenplas, 2019). Finally, this research urges data collectors to publicly release information on interview and interviewer characteristics where possible, and recommends that analysts consider and account for these characteristics where appropriate.

## Notes

1. I use the term ‘normative age distance’ to capture diffuse expectations pertaining to age difference in (gender) attitudes in a given context. The term ‘normative’ is used because such expectations function as social norms, drawing on which people construct age stereotypes; and it distinguishes the concept from respondent–interviewer age difference at an individual level.
2. A continuous measure of interviewer age is not available for the 2002, 2004, 2006, or 2008 ESS. Data on attitudes towards the rights of women to paid jobs were not collected in the 2012, 2014, or 2018 ESS.
3. The normative age distance in gender attitudes was calculated based on the same age range (16–86) across all country–years.
4. I coded as zero a small number of cases in which the mother was absent or deceased (i.e. less than 2% of the sample), because the influence of maternal employment was non-existent in these cases.
5. Following the ESS weighting guide (Kaminska, 2020) and Carle’s (2009) recommendations, the ESS post-stratification weights were rescaled to sum up to the actual sample size of each country-year at level 1. The ESS did not provide interviewer-level weights and the distribution of interviewers is non-random and not supposed to be representative. Thus, a weight of 1 was assigned to each interviewer at level 2. At level 3 (country–year), the population size weights provided by the ESS were used.
6. Although the hybrid within-between model specification similarly isolates within and between effects (Allison, 2009), predictive margins cannot be obtained for hybrid models that include interaction terms using the *margins* function in Stata (Schunck, 2013).

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**Table 1.** Sample characteristics

Variable	Minimum	Maximum	Mean / proportion	Standard deviation
<b>Respondent characteristics</b>				
Attitudes towards the rights of women to paid jobs	1	5	3.675	1.210
Respondent age	16	86	46.053	18.061
Female respondent (ref. = male)	0	1	0.525	
Years of schooling	0	22	12.609	3.842
Marital status				
Never married	0	1	0.303	
Married	0	1	0.526	
Previously married	0	1	0.171	
Has child (ref. = no)	0	1	0.672	
Living with child (ref. = no)	0	1	0.403	
ISEI score	0	89	36.381	20.105
Work status				
Currently working	0	1	0.516	
Unemployed	0	1	0.063	
Inactive	0	1	0.220	
Retired	0	1	0.201	
Mother worked at 14 (ref. = no)	0	1	0.623	
Migration status				
Native	0	1	0.841	
Second-generation migrant	0	1	0.070	
First-generation migrant	0	1	0.089	
Ethnic minority (ref. = no)	1	2	0.084	
Religiosity (high = more religious)	-1.240	2.010	-0.051	0.892
Self-transcendence	-4.484	1.346	-0.007	0.837
Conservatism	-3.525	1.596	-0.002	0.842
<b>Interview and interviewer characteristics</b>				
Interviewer age	18	80	49.835	13.464
Female interviewer (ref. = male)	0	1	0.707	
Interviewer experience within current survey round (high = more experienced)	1	52	9.509	10.316
Reissued interview	0	1	0.057	
Number of visits for interview	0	10	2.738	1.902
Respondent's understanding	1	5	4.462	0.723
Respondent's efforts	1	5	4.152	0.940
Respondent's reluctance	1	5	1.682	0.942
Interview interrupted by third party (ref. = no)	0	1	0.120	
<b>Country-year characteristics</b>				
Normative age distance in gender attitudes ( $\times 100$ ) <sup>a</sup>	-0.166	0.556	0.243	0.146
Female labour force participation rate <sup>a</sup>	0.396	0.732	0.539	0.059

Notes: <sup>a</sup> Calculated based on 46 country-year units.  $N = 77,884$  respondents, 6,243 interviewers, and 46 country-years. Ref. = reference group. ISEI = International Socio-Economic Index. Dummy variables have a range of 0–1, and the standard deviations for which are not reported. Column proportions may not add up to 1 due to rounding. Detailed information on variables and sample sizes at country-year level is presented in Supplementary Appendix 2. Weighted statistics with unweighted sample sizes.

**Table 2.** Three-level mixed-effects linear regression models predicting attitudes towards the rights of women to paid jobs (results for key predictors)

Key predictor	Model 1	Model 2	Model 3	Model 4	Model 5
	<i>B (SE)</i>	<i>B (SE)</i>	<i>B (SE)</i>	<i>B (SE)</i>	<i>B (SE)</i>
<b>Fixed part</b>					
Country–year age distance in gender attitudes ( $\div 100$ )	0.935** (0.322)	0.625 (0.451)	0.380 (0.606)	0.581 (0.445)	0.335 (0.596)
R age ( $\times 10$ )	–0.031 (0.020)	–0.031 (0.019)	–0.031 (0.020)	–0.031 (0.019)	–0.042*** (0.006)
R age (country–year mean)	0.741* (0.356)	0.456 (0.358)	0.325 (0.397)	0.449 (0.357)	0.324 (0.397)
I age ( $\times 10$ )		0.011 (0.009)	0.012 (0.009)	0.004 (0.007)	0.004 (0.007)
I age (country–year mean)		0.263** (0.100)	0.256** (0.097)	0.272** (0.102)	0.267** (0.099)
R age $\times$ I age			0.005* (0.002)		0.001 (0.003)
R age $\times$ I age (country–year mean)			–0.370 (0.313)		–0.359 (0.309)
I age $\times$ country–year age distance in gender attitudes				–0.061*** (0.018)	–0.070*** (0.017)
R age $\times$ country–year age distance in gender attitudes					–0.276*** (0.026)
R age $\times$ I age $\times$ country–year age distance in gender attitudes					–0.026*** (0.008)
Respondent-level intercept	3.613*** (0.099)	3.611*** (0.100)	3.672*** (0.084)	3.612*** (0.099)	3.673*** (0.084)
<b>Random part</b> (standard deviations)					
Interviewer level					
ICC (%; null = 37.1)	31.9	30.1	29.9	30.0	29.8
Intercept (null = 0.492)	0.466	0.465	0.466	0.465	0.465
Slope: R age	0.102	0.102	0.102	0.102	0.102
Country–year level					
ICC (%; null = 21.9)	14.6	12.3	12.1	12.2	12.0
Intercept (null = 0.590)	0.427	0.387	0.383	0.385	0.379
Slope: R age	0.051	0.051	0.053	0.051	0.015
Slope: I age		0.000	0.000	0.000	0.000
Slope: R age $\times$ I age			0.004		0.004
<b>Model fit indices</b>					
LL (null = –117,476)	–112,274	–112,268	–112,265	–112,265	–112,224
AIC (null = 234,961)	224,608	224,596	224,589	224,591	224,507
BIC (null = 234,998)	224,885	224,874	224,867	224,869	224,785

Notes:  $N = 77,884$  respondents, 6,243 interviewers, and 46 country–years. SE = Robust standard errors clustered at country level. R = Respondent. I = Interviewer. ICC = Intra-class correlation; and the interviewer-level ICC was computed as the ratio of the sum of the interviewer and country–year variance components to the sum of all variance components. LL = Log-pseudolikelihood. AIC = Akaike-information-criterion. BIC = Bayesian-information-criterion. All models included control variables listed in Appendix Table A1. Weighted statistics with unweighted sample sizes.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  (two-tailed tests).



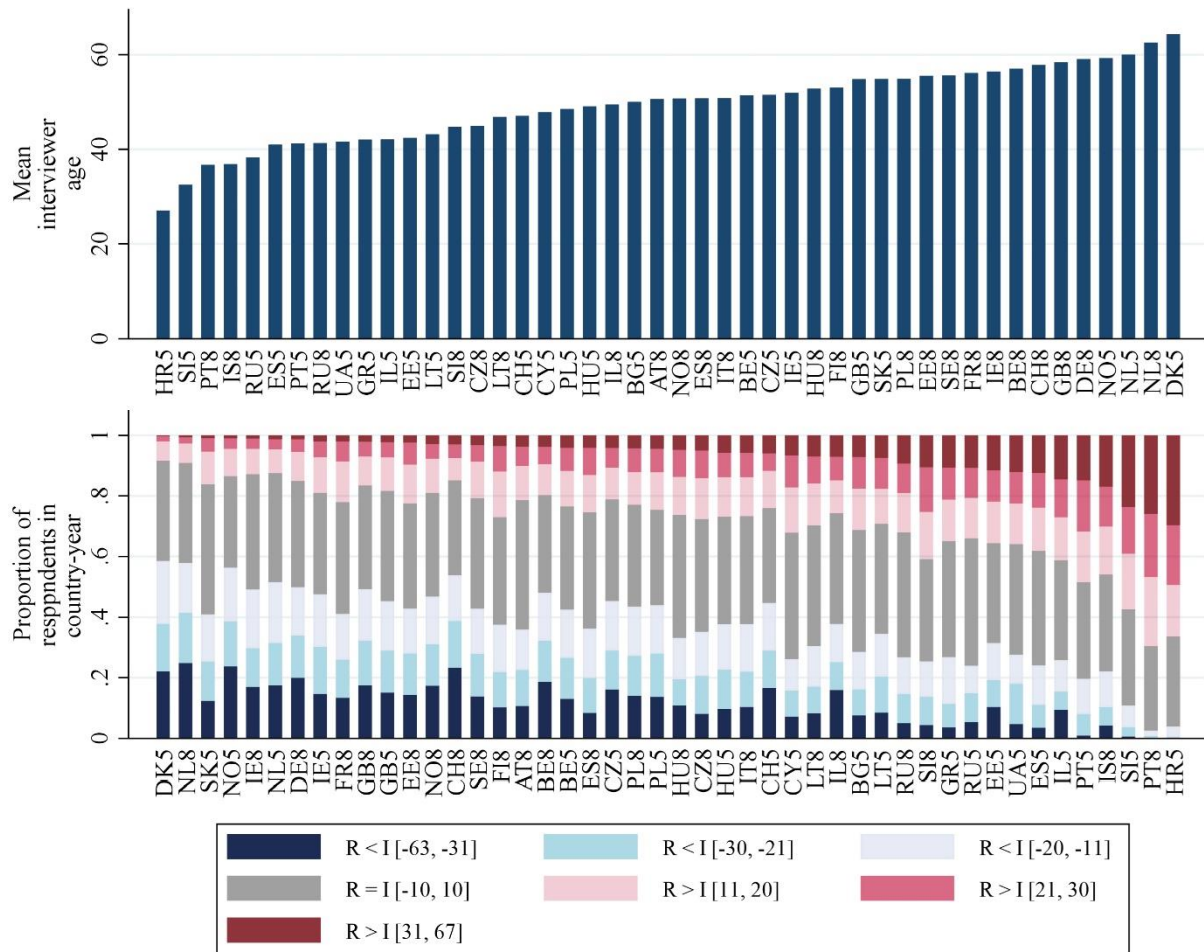
**Appendix Table A1.** Results for control variables from three-level mixed-effects linear regression models predicting attitudes towards the rights of women to paid jobs

Control variables	<i>B</i>	( <i>SE</i> )	$\beta$
<b>Respondent characteristics</b>			
Female respondent (ref. = male)	0.362***	(0.081)	–
Years of schooling	0.037***	(0.003)	0.144***
Marital status (ref. = never married)			
Married	–0.044	(0.042)	–
Previously married	–0.000	(0.035)	–
Has child (ref. = no)	–0.003	(0.013)	–
Living with child (ref. = no)	–0.007	(0.012)	–
ISEI score	0.002**	(0.001)	0.044**
Work status (ref. = currently working)			
Unemployed	–0.143***	(0.024)	–
Retired	–0.089***	(0.023)	–
Inactive and other	–0.054*	(0.024)	–
Mother worked at 14 (ref. = no)	0.076***	(0.017)	–
Migration status (ref. = native)			
Second-generation migrant	0.015	(0.034)	–
First-generation migrant	–0.178***	(0.034)	–
Ethnic minority (ref. = no)	–0.167**	(0.056)	–
Religiosity (high = more religious)	–0.109***	(0.011)	–0.097***
Self-transcendence	0.110***	(0.028)	0.092***
Conservatism	–0.111***	(0.010)	–0.094***
<b>Interview and interviewer characteristics</b>			
Female interviewer (ref. = male)	0.036*	(0.018)	–
Interviewer experience in current survey round (high = more experienced)	0.001	(0.001)	0.008
Reissued interview (ref. = no)	–0.005	(0.024)	–
Number of visits for interview	0.008**	(0.003)	0.015**
Respondent understanding	0.070**	(0.026)	0.050**
Respondent efforts	0.028***	(0.008)	0.026***
Respondent reluctance	–0.021***	(0.005)	–0.020***
Interview interrupted by third party (ref. = no)	–0.050*	(0.022)	–
<b>Country–year characteristics</b>			
Country–year female labour force participation rate	1.634	(1.661)	0.090

Notes:  $N = 77,884$  respondents, 6,243 interviewers, and 46 country–years. SE = Robust standard errors clustered at country level. Ref. = Reference group. ISEI = International Socio-Economic Index. Model continuing from Model 2 (full model) in Table 2. Standardised coefficients estimated using the Mundlak specification controlling for the country–year mean values for all control variables, the results for which are omitted from the table.

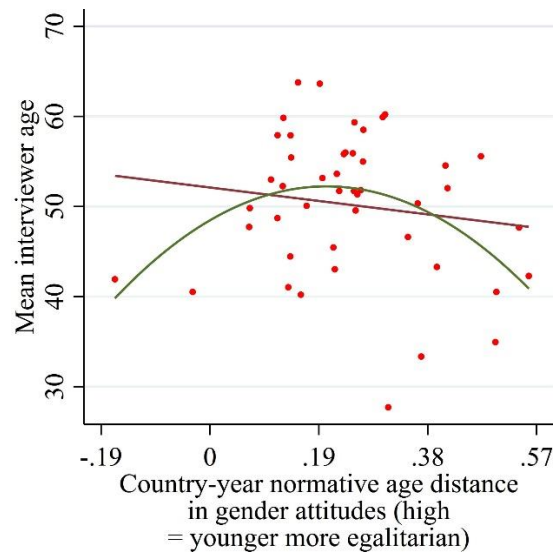
Weighted statistics with unweighted sample sizes.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  (two-tailed tests).



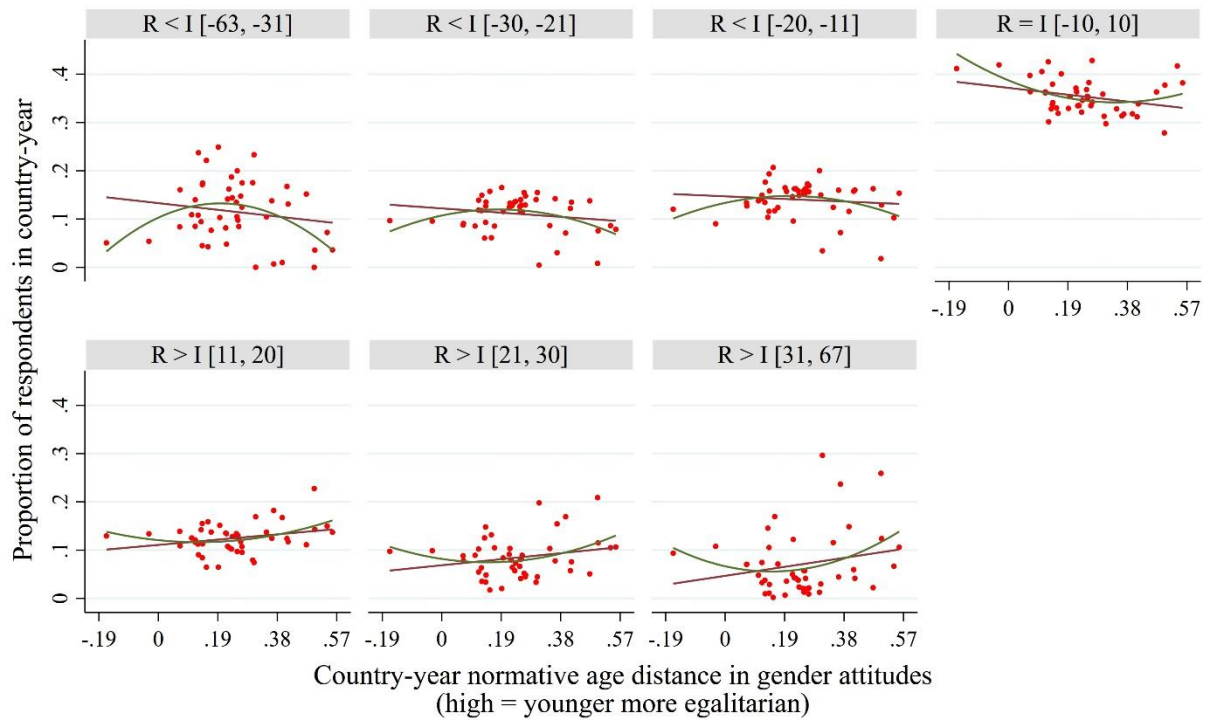
**Figure 1.** Mean interviewer age and respondent–interviewer age difference across 46 country–years.

*Notes:*  $N = 6,243$  interviewers for upper panel; 77,884 respondents and 6,243 interviewers for lower panel.  $R =$  Respondent age.  $I =$  Interviewer age. The numbers after country acronyms indicate the round of the European Social Survey (5 = 2010 and 8 = 2016). See Supplementary Appendix 5 for the bivariate matching between respondent’s age and interviewer’s age. Weighed statistics with unweighted sample sizes.



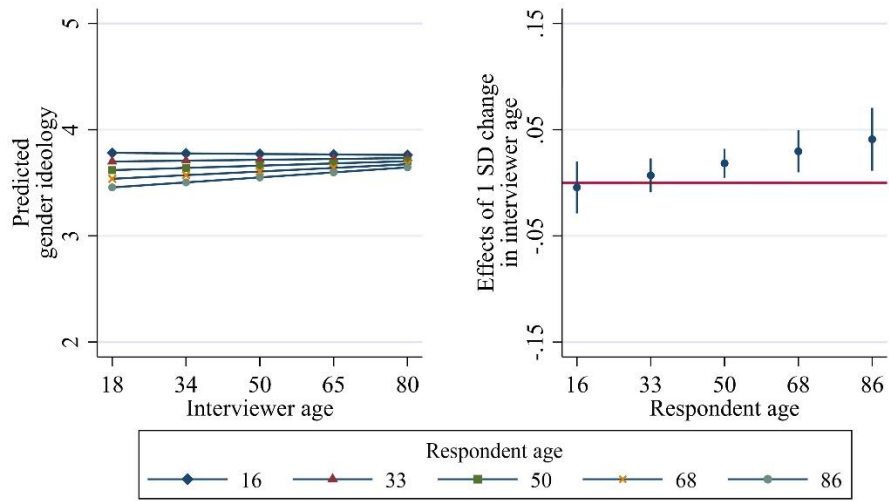
**Figure 2.** Mean interviewer age over the distribution of country-year normative age distance in gender attitudes.

*Notes:*  $N = 6,243$  interviewers and 46 country-years. Straight line indicates linear fit and curve indicates quadratic fit. Weighed statistics with unweighted sample sizes.



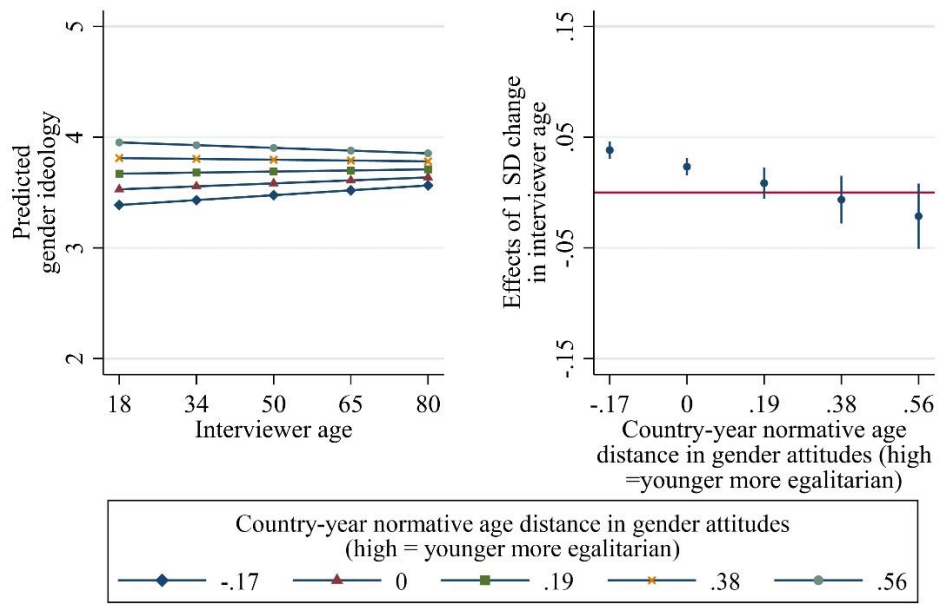
**Figure 3.** Respondent–interviewer age difference over the distribution of country–year age distance in gender attitudes.

*Notes:*  $N = 77,884$  respondents, 6,243 interviewers, and 46 country–years.  $R =$  Respondent age.  $I =$  Interviewer age. Straight lines indicate linear fit and curves indicate quadratic fit. See Supplementary Appendix 6 for the correlation between respondent–interviewer age difference and country–year normative age distance in gender attitudes. Weighed statistics with unweighted sample sizes.



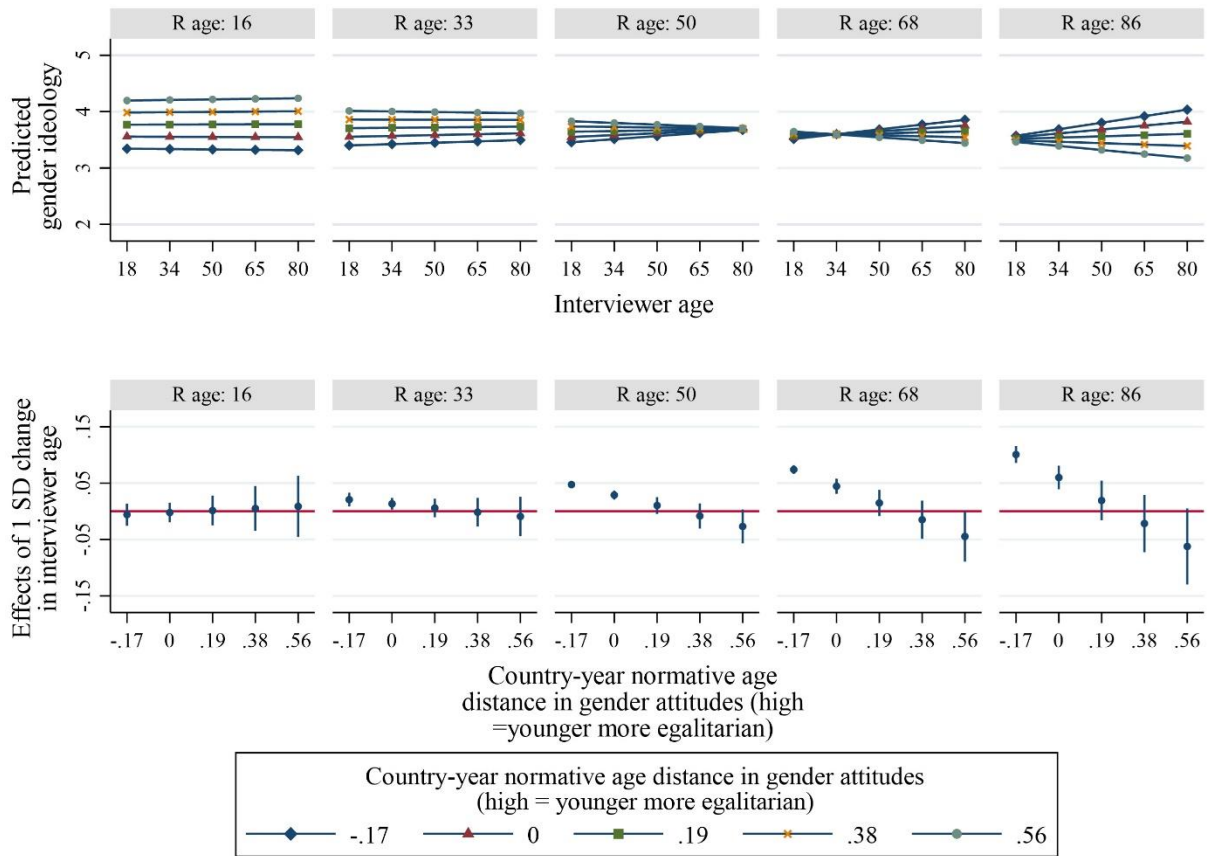
**Figure 4.** Interaction effect of respondent’s age and interviewer’s age on gender-attitude reports—predictive margins and discrete marginal effects.

*Notes:* *SD* = standard deviation. Calculated based on Model 3 in Table 2, holding all control variables at their observed values. Error bars indicate 95% confidence intervals. Weighed statistics.



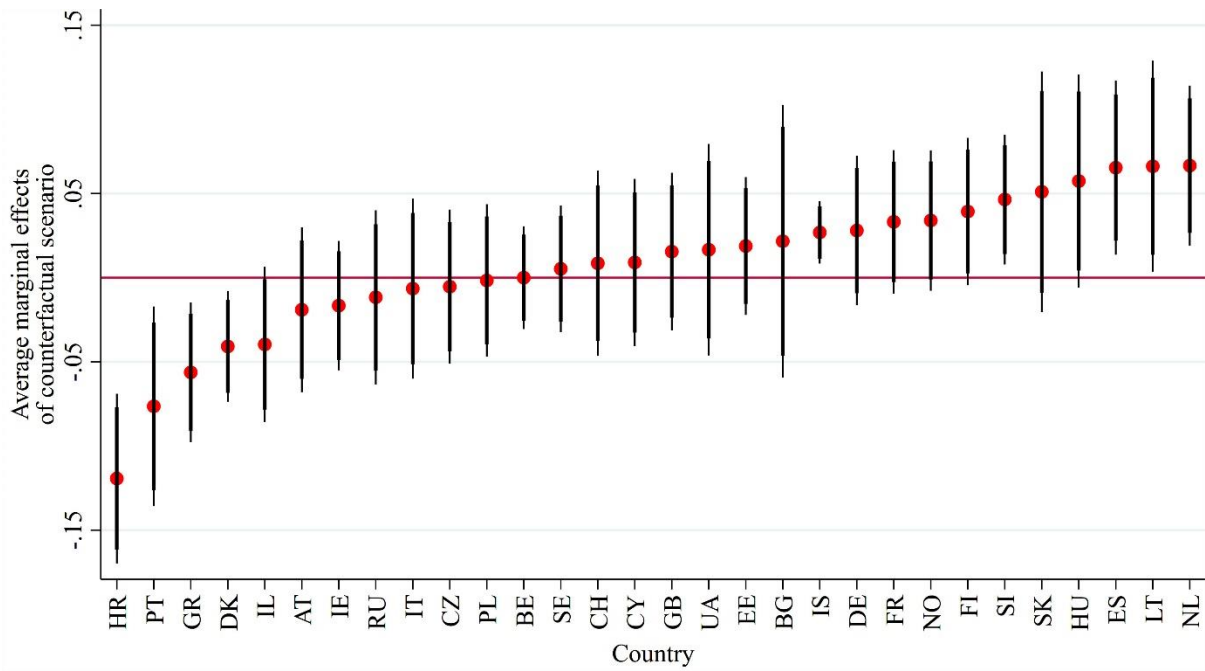
**Figure 5.** Interaction effect of interviewer's age and country-year normative age distance in gender attitudes on gender-attitude reports—predictive margins and discrete marginal effects.

*Notes:* *SD* = standard deviation. Calculated based on Model 4 in Table 2, holding all control variables at their observed values. Error bars indicate 95% confidence intervals. Weighed statistics.



**Figure 6.** Variations in interaction effects of respondent's age and interviewer's age on gender-attitude reports with country-year normative age distance in gender attitudes—predictive margins and discrete marginal effects.

*Notes:* *SD* = standard deviation. Calculated based on Model 5 in Table 2, holding all control variables at their observed values. Error bars indicate 95% confidence intervals. Weighed statistics.



**Figure 7.** Average marginal effects of counterfactual scenario (all respondents interviewed by an interviewer within 10 years younger or older) on country mean levels of gender attitudes.

*Note:* Reference category for the average marginal effects = original ESS interviewer–respondent matching. Treatment category = counterfactual entropy reweighted sample in which all respondents were interviewed by an interviewer within 10 years of age difference. The analysis was conducted at country level rather than country–year level to ensure that the sample size of respondents interviewed by someone within 10 years of age difference is sufficiently large for each analytical unit. Thick error bars indicate 90% confidence intervals and thin error bars indicate 95% confidence intervals, which were calculated based on 2,000 bootstrap replications.