Retirement, Consumption of Political Information, and Political Knowledge

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Abstract

Democratic societies depend on citizens being informed about candidates and representatives, to allow for optimal voting and political accountability. As the Fourth Estate, news media have a crucial role in this context. However, due to selective exposure, media bias, and endogeneity it is not a priori clear if news consumption increases voter information. Focusing on the increase in leisure time that is associated with retirement, this study investigates whether changes in the consumption of political information affect campaign-related knowledge. For that purpose, I use survey data pertaining to the 2000, 2004, and 2008 US presidential elections. Instrumenting with eligibility for old age benefits, the results show that retirement improves respondents' performance in answering knowledge questions. The effect is mostly driven by additional exposure to newscasts and newspapers. There is also evidence of increasing polarization due to retirement.

1. Introduction

Retirement from work is a major life-changing event for most people. After decades of work-centered activities, retirees encounter completely different daily routines. The social environment changes, as contact to former co-workers declines or ceases. In the economics literature, the sudden increase in leisure time that comes with retirement has been investigated from different perspectives. For example, consumption-related studies have been addressing the finding that people often reduce their expenditures after retirement (e.g., Aguiar and Hurst, 2005, 2007; Battistin et al., 2009; Luengo-Prado and Sevilla, 2013). Time diary data suggest that retirees spend more time shopping, which allows them to buy cheaper goods, especially groceries. The health literature discusses the effects on physical and mental conditions, since retirees are able to sleep longer, to exercise more, and to allocate more time to recreational activities, such as cooking, gardening, knitting, or taking care of pets (e.g., Stancanelli and Van Soest, 2012; Eibich, 2015).

This study investigates another byproduct of the increase in leisure time, the effect of retirement on news consumption. Retirees can spend more time reading the newspaper or watching television, for instance, compared to people who are still working. In addition, retirees might pay more attention to news and current affairs to compensate for the loss of mentally stimulating activities associated with work. Many retirees also depend to a larger degree on public goods and subsidies than employees – such as state health insurance, pension, or discounts in government-sponsored facilities – which might increase their news consumption due to an added interest in politics.

There are convincing reasons to expect retirees to exhibit higher levels of news exposure, and empirical evidence of this phenomenon would be certainly of some value. However, it is even more important to evaluate the consequences of the shift in the demand for news. For that purpose, this study also evaluates whether retirement affects political knowledge, as larger degrees of exposure to (political) news could improve voters' information.

I use the 2000, 2004, and 2008 editions of the National Annenberg Election Survey (NAES) to verify the hypothesized effects. The national rolling cross sections of this survey each consist of more than 50,000 interviews, which provide ideal data on this matter. On the one hand, respondents are asked a comprehensive set of questions about political issues that are particularly

relevant to US presidential campaigns, such as candidates' agenda and background. On the other hand, the surveys provide information on people's exposure to political information, for instance, by the means of television, newspapers, and online news outlets.

The decision to retire might be endogenous to news consumption, political knowledge, or both. When using observational data, one approach to address the endogeneity is to look at changes in knowledge over time within individuals (e.g., Barabas and Jerit, 2009; Dimitrova et al., 2011; Munger et al., 2016). Panel data would allow to deal with the kind of endogeneity that is caused by unobserved individual characteristics, simultaneously influencing knowledge, news exposure, and the status of retirement. To address a potentially more severe source of endogeneity – reverse causality – it is useful to exploit an exogenous source of variation in retirement status. Therefore, I use the eligibility for Social Security retirement benefits to construct two binary instruments, capturing respondents aged 62 to 64 (early retirement) and 65 years or older (normal retirement). These instruments allow to estimate the causal effect of retirement on respondents' exposure to political information and their performance in answering subsets of 167 campaign-related question items.

After controlling for the age-related decline in cognitive abilities and other covariates, instrumental variable (IV) estimates indicate that retirement leads to an increase in the respondents' share of correctly answered questions by approximately 4.6 percentage points. The magnitude of the effect is meaningful, considering that the respondents' average of providing correct answers is 46%. The effect is larger for questions about issues that are particularly relevant to retirees (e.g., health policy), and current rather than general knowledge. The findings are robust to changes in specifying the instruments, applying different age polynomials, interacting the age function with the eligibility thresholds, including question fixed effects, weighting the respondents by the number of questions asked, and varying the age window around the time of retirement.

To learn about the mechanism behind the effect, I consider various media and non-media sources of political information. Respondents' usage of the different information sources is found to strongly correlate with the level of political knowledge; and the data show that retirement affects the respondents' information exposure, especially through newscasts and newspapers. Compared to working people, retirees are estimated to read a newspaper on 0.8 additional days per week, for

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instance. Although a similarly large and robust effect can be found on the frequency of participation in private political discussions, the data suggest that the knowledge effect is mostly driven by media consumption.

In addition, I test whether the change in information exposure and knowledge affects further outcomes. The lack of consistent data prevents the evaluation of actual turnout, but I do not find robust evidence of effects on intentions of respondents to vote. However, the data suggest that the strength of party identification and partisan affect increase after retirement. This result likely implies that retirees use the additional spare time to expand their consumption of congenial partisan news, which strengthens existing beliefs and increases polarization. In general, greater knowledge is socially beneficial but affective polarization is likely harmful. Thus the welfare effects of the increase in media consumption due to retirement remain unclear. In addition, the findings help to understand the demographic differences in polarization discussed by Boxell, Gentzkow, and Shapiro (2017). That is, increased exposure to traditional media – in combination with a changing media landscape – likely explain why older people have been becoming more polarized than other age groups over the last decades.

As the Fourth Estate, the media is supposed to provide information that helps reduce asymmetries between voters and representatives. However, it is not always clear whether media actually educate voters, due to media bias, selective exposure, and other obstacles to an undistorted transmission of information. There might also be reverse causality, as politically sophisticated individuals usually consume more political news than less informed people. The findings of this study therefore contribute to the sparse evidence of causal effects of media on political knowledge outside the laboratory: Gentzkow (2006) uses random, spatial variation in the introduction of television in the 1950s to show that the new technology decreased consumption of newspapers and radio, which in turn led to a drop in US voters' political knowledge. Gerber, Karlan, and Bergan (2009) conduct a field experiment, in which individuals are randomly assigned to a newspaper subscription; their results do not indicate effects of the subscription on knowledge though. Investigating how random differences in the availability of Fox News during its introduction affected knowledge, Schroeder and Stone (2015) find that the outlet shifted political knowledge in a partisan way. While these studies investigate effects of media from a supply-side perspective, I provide evidence that is based on a demand-side mechanism.

The findings also contribute to research on the effects of retirement, which has not addressed media consumption and political knowledge aspects so far. Specifically, the findings relate to studies investigating retirement and cognitive abilities. According to this strand of research, cognitive abilities decline progressively with age, and possibly due the life changes associated with retirement (e.g., Rohwedder and Willis, 2010; Bonsang, Adam, and Perelman, 2012; Mazzonna and Peracchi, 2012; 2017). A central subject of discussion in these studies is the "use it or lose it" effect, according to which the absence of mentally stimulating tasks accelerates the decline in cognitive abilities. By considering the consumption of political information, the current study investigates an example of a mentally stimulating activity. This activity improves cognition, thus contributing to human resources in the form of political knowledge.

The next section describes the data and motivates the identification strategy. Afterwards, I provide details on the estimation approach and present the main results. I illustrate the mechanism and evaluate other outcome variables before concluding in the last section.

2. Data and identification

2.1 Political knowledge

Data come from the 2000, 2004, and 2008 editions of the NAES, which are the waves that are currently available for secondary research. The cross-section components used in this study consist of 58,373, 81,422, and 57,967 30-minute phone interviews of adult US residents, respectively. Among other things, the surveys provide information about respondents' demographic characteristics, media use, as well as political beliefs, behavior, and knowledge. The interviews were conducted in the months before the respective presidential election.[1]

Each edition contains a battery of questions that can be used to measure political knowledge. I only include questions for which a factually correct answer exists, and only those that relate to the campaign at the time, because of the short-run nature of potential effects of information

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[1] Although the respondents are randomly selected, the NAES samples are not exactly representative of the adult US population, because the response rates vary across demographic groups. For example, the NAES over-samples female and white respondents. I refrain from using survey weights, because the analyses are only based on a subsample of the respondents. However, it is advisable to consider the composition of the sample – as shown in Table A2 – when interpreting the results.

exposure. Based on these criteria, there are 167 questions – and question variants using a different wording – in the pooled data. Table A1 in the Online Appendix lists these questions and their correct answers. I use respondent i's share of correct answers $\bar{c}_i$:

$$\bar{c}_i = \frac{1}{\bar{q}_i} \sum_{j=1}^{J} c_{ij} \tag{1}$$

Here, the sum of correct answers is divided by the number of questions j asked (with $\bar{q}_i = \sum_{j=1}^{J} q_{ij}$), since individual respondents are only asked a subset of the questions. I exclude respondents that were not asked any knowledge questions. Due to the focus on retirement, I restrict the sample to people aged 50 to 80 years, which results in a total of 71,180 interviews. Robustness checks confirm that different age windows do not affect the results in substantial ways. On average, the respondents were asked 11.2 knowledge questions (SD = 5.4), which they answered correctly in 46.2% of time (SD = 26.8%).

2.2 Eligibility for Social Security retirement benefits

The earliest age to claim (reduced) old age benefits is 62 years. For people born before 1938, the normal retirement age at which full benefits are payable is 65 years. With each year born after that, the age threshold increases by two months. For instance, the normal retirement age for those born in 1942 is 65 years and 10 months. People born between 1943 and 1954 are eligible for normal retirement at the age of 66. The NAES only provide ages in years but not months, so that it is unclear whether respondents aged 66 and interviewed in 2008 were born in 1942 or 1943. Because there were no interviews after Election Day in 2008 – and interviews started at the end of 2007 – most respondents in the 2008 edition and all of them in 2000 and 2004 were still able to claim normal retirement benefits at the age of 65 years and x months. Thus, I construct two binary variables to capture eligibility for Social Security benefits. The first refers to respondents aged 62 to 64 years, and the second to respondents 65 years or older. I conduct robustness checks to ensure that the second age threshold does not result in misleading estimates.

Figure 1 shows the share of retirees by age. At the age of 50, approximately 3.5% of the respondents are retired. This share increases gradually until the first eligibility threshold at 62

years, at which point the share increases by more than ten percentage points, from 31.3% to 41.6%. At the threshold for normal retirement, the share rises by more than seven percentage points, from 53.4% to 60.8%.

Figure 1: Share of retired respondents, by age
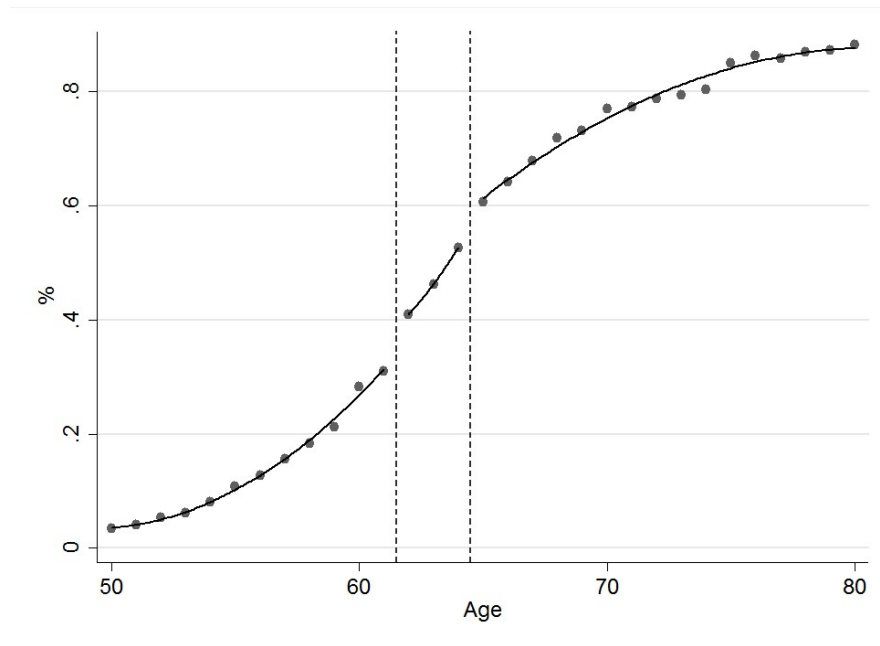
2.3 Instrument validity

While the relevance of the instruments can be verified empirically, it is necessary to discuss whether their excludability can be plausibly assumed. Initial support for this assumption comes from the retirement literature, in which eligibility ages have been widely used for causal inference; see Bonsang, Adam, and Perelman (2012), Insler (2014), and Kämpfen and Maurer (2016) for examples with US data.

In the context of this study, an important element of the exclusion restriction is the absence of any effects of political knowledge or retirement status on eligibility ages. This possibility can be ruled out, because eligibility for old age benefits is part of the institutional setting; the age thresholds are set in an arbitrary way and legislated independent of individuals' knowledge or

retirement status. In addition, eligibility must not have any direct effects on knowledge. For example, it could be argued that reaching the age threshold entails psychological effects, such that people change their exposure to political news only because they know they could claim old age benefits, without actually retiring from work. However, direct effects on knowledge are implausible, because without actual retirement, there is no increase in spare time large enough to allow for a measurable impact on news exposure and knowledge. The argument can be tested empirically. For that purpose, I split the sample into retired and non-retired respondents – to hold the respondents' retirement status fixed – and regress the share of correctly answered knowledge questions on the instruments. If eligibility for old age benefits affected knowledge directly, the effect would be present regardless of the retirement status. Table 1 summarizes the results of this test, which does not indicate direct effects. Given the set of covariates, neither the dummy indicating respondents aged 62 to 64 years, nor the dummy capturing respondents aged 65 years or older have a statistically significant impact.

Table 1: Direct effects of eligibility for old age benefits on knowledge

	(1) Knowledge (only retired respondents)	(2) Knowledge (only non-retired respondents)
Aged 62 to 64	-0.000977	0.00840
	(0.00737)	(0.00519)
Aged 65 or older	-0.000503	0.00874
	(0.00875)	(0.00688)
R-square	0.131	0.140
Observations	28206	42974

Notes: OLS estimates. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Another concern could be that a third variable simultaneously correlates with eligibility and knowledge. In particular, the exclusion restriction would be violated if other institutional changes coincide with the eligibility ages, and if these changes affect people's political knowledge independent of the effects through retirement. Such changes have been discussed in the retirement literature (e.g., Card, Dobkin, and Maestas, 2009; Eibich, 2015), including discounts offered to people above a certain age (e.g., for museums, libraries, or transportation); changes in

recommendations for dietary and medical practices (e.g., different vaccination schemes for people below and above 65 years); or changes in medical insurance. It is conceivable that these changes affect other outcomes (e.g., health, demand for doctor's appointments, or life satisfaction). However, there is no reason why they should influence political knowledge, especially because many of these changes are tied to the actual retirement status but not eligibility for old age benefits.

Figure 2: Share of correct answers, by age
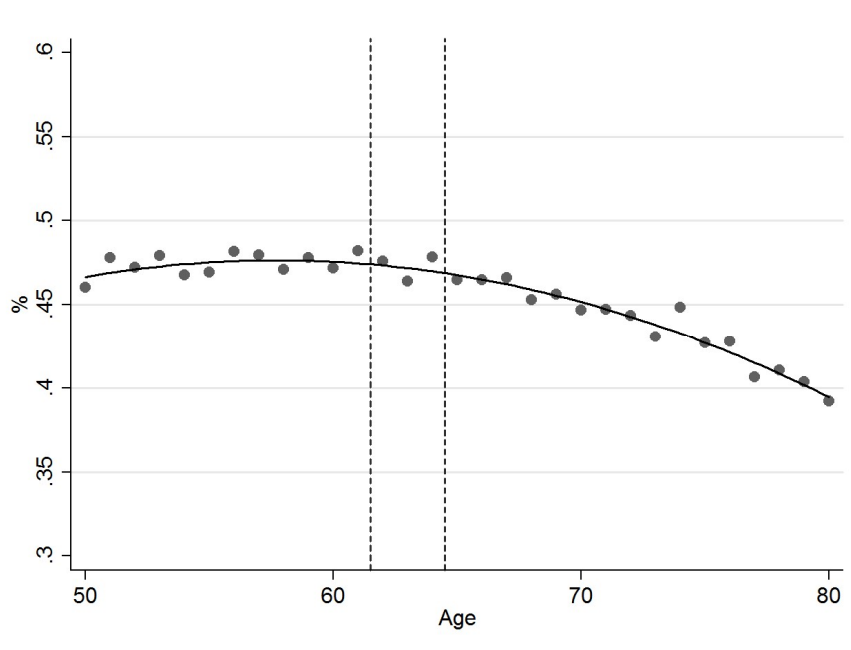
Finally, it is necessary to briefly discuss people's cognitive abilities here. After a certain point of life, these abilities are known to decline, which likely affects political knowledge. However, the decline occurs continuously. Even if there are discrete changes in cognitive abilities – which is a controversial issue in the literature – they would result from retirement but not eligibility (Rohwedder and Willis, 2010; Bonsang, Adam, and Perelman, 2012; Mazzonna and Peracchi, 2012). Figure 2 supports this view. Accordingly, the average share of correct answers seems to slightly increase until a few years before the age of early retirement. Afterwards, knowledge declines steadily. The cognitive decline thus runs in the opposite direction to the increase in the

probability of retirement; it can be controlled for by using an appropriate age function, such as a quadratic polynomial.

It would be optimal to directly estimate the effect of information exposure on knowledge. Unfortunately, the age thresholds would not fulfil the exclusion restriction in this case. It is not clear, which of the individual information sources have causal links to the instruments and which not, because exposure to these channels is observed simultaneously.

3. Estimation and results

To evaluate the effect of retirement on knowledge, I estimate a system of equations using two-stage least squares (2SLS):

$$r_i = a_1 + a_2 D_i^{62\text{-}64} + a_3 D_i^{65} + a_4 X_i + u_i \tag{2}$$

$$\bar{c}_i = b_1 + b_2 \hat{r}_i + b_3 X_i + e_i \tag{3a}$$

where $D_i^{62\text{-}64}$ and D_i^{65} are dummy variables indicating respondents aged 62 to 64, and 65 or older, respectively. Equation (2) is used to determine the retirement status r_i. Equation (3a), from which the eligibility instruments are excluded, contains the predicted values $\hat{r}_i$ of the retirement status, so that b_2 measures the treatment effect of retirement on the respondents share of correct answers $\bar{c}_i$. Specifically, b_2 can be interpreted as the local average treatment effect (LATE). Both equations contain a set of control variables X_i, including a flexible function of age. In the baseline specification, I use a quadratic age polynomial to account for continuous changes in cognitive abilities. Robustness checks involve further functional forms and interactions between the age function and the age thresholds. The control variables also include gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and NAES edition fixed effects.

Table 2 shows the causal effect of retirement on political knowledge, as well as corresponding OLS estimates. Column (1) confirms the existence of a reduced form; eligibility for early and normal retirement has significant effects on the share of correctly answered questions, conditional on the control variables. Column (2) shows a positive and statistically significant relationship

between knowledge and retirement status, as estimated by OLS. This coefficient could be biased due to simultaneity. Considering the complexity of the model, it is not straightforward to determine the direction of the bias. However, if retirement has a positive influence on knowledge and vice versa, and assuming that the product of the effects is less than unity, the bias should be positive by rule of thumb. The first stage of the IV estimates confirms the relevance of the instruments; the coefficients for early and normal eligibility have large and highly significant effects on the probability of retirement (14.7 and 27.1 percentage points, respectively; see Column 3). The first-stage F-statistic and Hansen's test on overidentifying restrictions support the relevance and the validity of the instruments. As the second stage in Column (4) indicates, the causal effect of retirement on knowledge is positive and significant at the 1% level. Given cognitive abilities and other covariates, retirement increases the respondents' share of correct answers by 4.6 percentage points.[2] The coefficient is more than three times as large as its OLS counterpart in Column (2). The IV coefficient only refers to those respondents who retire when they are eligible for Social Security benefits, whereas the OLS estimate captures the average effect over all respondents. The larger size of the IV coefficient therefore implies that the effect on knowledge is smaller when people decide to retire before the age of 62. This is plausible, because respondents might have to take a side job if they are not yet eligible for benefits, which reduces the chances of additional news exposure.

I evaluate the robustness of these results in several ways. To begin with, I use a linear age polynomial instead of a quadratic one.[3] As Column (1) in Table A4 suggests, the effect remains highly significant and increases slightly, to a value of 6.6 percentage points. However, Hansen's test on overidentifying restrictions casts doubts on the validity of the instruments in this specification. In Column (2), I interact the age polynomial with the instruments, which allows the age function to differ before and after the eligibility thresholds. This change results in a less precise coefficient estimate, suggesting an increase in knowledge of 11.1 percentage points. Column (3) shows the effect when using eligibility for early retirement as the only instrument.

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[2] Estimating the models separately for each NAES edition indicates that the effect is largest in 2000, non-existent in 2004, and moderate in 2008 (cp. Table A3 in the Online Appendix). However, it is unclear whether these differences reflect varying degrees of learning, unequal difficulties of the knowledge questions, or a different salience of campaign topics.

[3] I do not use polynomials of a higher order, because those lead to severe problems with multicollinearity. See also Gelman and Imbens (2014), who show that using a higher-order polynomial than a quadratic one often results in misleading estimates in the context of regression discontinuity designs.

Before the age of 62, people cannot claim Social Security benefits. After that age, it is possible to retire at any point with reduced benefits before reaching the normal retirement age. The age threshold of 65 years, when retirement without reductions becomes possible, is therefore a rather soft threshold. In addition, the normal retirement age switches from 65 + x months for people born in 1942 to 66 years for those born in 1943, which leads to an imprecise identification of people eligible for normal retirement in the 2008 NAES edition. It is therefore advisable to replicate the baseline estimation, but using a dummy variable that merely indicates if respondents are 62 years or older. Using only one age threshold barely affects the estimates though. Next, I evaluate the robustness in terms of the varying difficulty of the knowledge questions. Similar to Schroeder and Stone (2015), Column (4) shows estimates when including question fixed effects. In addition, Column (5) summarizes the results when weighting the respondents by the number of questions they were asked, whereas Column (6) shows estimates when controlling for the number of questions. Again, the results are almost identical to those of the baseline estimates.

Table 2: Effect of retirement on knowledge

	(1) Knowledge (OLS, reduced form)	(2) Knowledge (OLS)	(3) Retired (OLS, first stage)	(4) Knowledge (IV, second stage)
Retired		0.0146***		0.0461***
		(0.00245)		(0.0168)
Aged 62 to 64	0.00901**		0.147***	
	(0.00401)		(0.00733)	
Aged 65 or older	0.0122***		0.271***	
	(0.00455)		(0.00776)	
Kleibergen-Paap Wald F-Statistic				614.6
Hansen J, p-value				0.482
R-square	0.135	0.135	0.405	
Observations	71180	71180	71180	71180

Notes: Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* $p<0.10$, ** $p<0.05$, *** $p<0.01$

In another modification, I compare estimates for subsets of the knowledge questions, to account for different dimensions of political knowledge (Barabas et al., 2014). Respondents likely learn more about political proposals that affect their lives than about issues with little personal

consequences; for instance, due to rational inattention and selective exposure. I assemble a subset of 20 questions particularly relevant to retirees, including all items dealing with health-related issues – such as health care, drug regulations, or patients' rights – and one question addressing tax cuts for seniors. Table A5 compares the effect on the performance in answering these questions (Column 1) to the effect on the share of correct answers for the other 147 question items (Column 2). The estimates suggest that the increase in knowledge is about twice as large in the case of the more relevant topics, which supports the connection between learning and personal relevance. A second split compares questions about general political knowledge (e.g., the number of troops in Iraq or the level of the minimum wage) with those addressing current, candidate-specific topics (e.g., the candidates' position on school vouchers).[4] Effects on knowledge caused by a sudden shift in information exposure should be larger for current than more permanent issues. Table A5 confirms this intuition: Retirement does not lead to a statistically significant increase in knowledge when only considering questions about general topics (Column 3). As Column (4) indicates, the effects are driven by current issues that focus on candidates.

Finally, I test how the retirement coefficient changes when extending or narrowing the width of observations around the age thresholds. I estimate the baseline knowledge models several times to obtain a series of retirement coefficients for varying ranges of the age window. Figure A1 plots these coefficients including the 95% confidence bands. The plot starts at a window of 32 years of age before and after the thresholds (i.e., using respondents aged 30 to 97) and ends at a six-year window (i.e., using respondents aged 56 to 71). As the figure shows, the estimated effect is fairly stable and precise for wider windows. Due to the diminishing sample size, estimation uncertainty increases when narrowing the window. The estimates become too imprecise to be statistically significant for windows smaller than 11 years.

4. Mechanisms

In general, there are three possibilities of how voters can learn about politics: from the media, from direct contact with politicians, and from interpersonal communication with other social

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[4] In low-information elections, voters tend to be particularly attentive to candidate-specific issues (Mechtel, 2014).

contacts. The most obvious explanation for the effect of retirement on knowledge are retirees' increased levels of news consumption, induced by the sudden abundance of leisure time. In democratic societies, it is the media's task to inform voters about representatives and candidates, because individuals barely have any other means to learn about politics. However, the possibility that voters obtain first-hand knowledge through direct contact with politicians cannot be disregarded. Although the vast majority of voters never come into direct contact with candidates, information can be transmitted by campaign aides (e.g., phone calls or home visits) and campaign advertising outside the news media (e.g., billboards or leaflets). Finally, voters may learn about politics from interpersonal communication, e.g., by talking to family, friends, or colleagues. These peers, again, might have obtained their political knowledge from the news media, non-media campaign contacts, or both.

The NAES allow to explicitly test these information channels. Regarding news consumption, respondents are asked how many days in the past week they got information about the presidential campaign from television, talk radio, newspapers, and the Internet. For some of the news categories, questions were not or not consistently asked through the NAES editions. In the 2000 and 2004 editions, people were asked separately about their news exposure to national network, cable, and local television news, whereas the 2008 edition asks about television news in general. The 2004 edition did not ask about radio news exposure. Data on consumption of newspapers and online news are consistently available in all three editions, although not necessarily for all respondents. Three variables are available to test non-media exposure to political information. Respondents are asked whether somebody from a campaign talked to them personally or on the phone; whether they received a campaign brochure; and on how many days in the past week they participated in a private discussion about politics.

Table 3 provides summary statistics of these variables. On average, respondents indicate to have watched television for campaign-related news on 5.7 days per week (NAES 08). This value amounts to 3.8 days for national network news, 3.3 days for cable news, and 4.7 days for local television news (all NAES 00/04). Radio amounts to 1.6, newspapers to 4.1, and online news to 1.9 days. About 14% of the respondents report that they have been personally contacted by the campaign, 28% received a brochure. The average number of days of participation in a private political discussion is 3.4 days per week.

Table 3: Exposure to political information (summary statistics)

	Mean	SD	Min	Max	N
Media exposure					
TV news (NAES 08)	5.74	2.32	0	7	30,807
National network news (NAES 00/04)	3.77	2.74	0	7	39,724
Cable news (NAES 00/04)	3.26	2.93	0	7	39,764
Local television news (NAES 00/04)	4.69	2.67	0	7	39,768
Radio news (NAES 00/08)	1.63	2.52	0	7	51,222
Newspaper	4.07	3.04	0	7	70,946
Online news	1.93	2.77	0	7	45,363
Non-media exposure					
Contacted by campaign	0.14	0.35	0	1	30,716
Received campaign brochure (NAES 00/04)	0.28	0.45	0	1	10,117
Discussions	3.36	2.68	0	7	67,838

Table 4: Correlations between news consumption and political knowledge

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TV news	0.0162***						
	(28.79)						
Nat. network news		0.00727***					
		(14.11)					
Cable news			0.0103***				
			(21.48)				
Local news				0.00308***			
				(5.92)			
Radio news					0.0102***		
					(23.81)		
Newspaper						0.00735***	
						(21.79)	
Online news							0.0113***
							(27.00)
R-square	0.171	0.133	0.140	0.130	0.139	0.141	0.108
Observations	30,807	39,724	39,764	39,768	51,222	70,946	45,363

Notes: Dependent variable: Share of correct answers. OLS estimates; t-statistics in parentheses, based on robust standard errors. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), retirement status, gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* $p<0.10$, ** $p<0.05$, *** $p<0.01$

A necessary condition for the hypothesized effect of retirement on political knowledge through information exposure is a positive relationship between the two latter variables. Tables 4 and 5 summarize the results of regressing the respondents' share of correct answers on the individual media and non-media exposure variables. Accordingly, each individual information source

correlates significantly with the respondents' performance in answering the knowledge questions. The t-statistics suggest that private discussions (t = 62.0), television news (t = 28.8), and online news (t = 27.0) have the strongest correlations with knowledge.

Table 5: Correlations between exposure to other information channels and political knowledge

	(1)	(2)	(3)
Contacted by campaign	0.0467***		
	(13.04)		
Received campaign brochure		0.0456***	
		(7.84)	
Discussions			0.0237***
			(62.05)
R-square	0.160	0.145	0.182
Observations	30,716	10,117	67,838

Notes: Dependent variable: Share of correct answers. OLS estimates; t-statistics in parentheses, based on robust standard errors. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), retirement status, gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* p<0.10, ** p<0.05, *** p<0.01

A second necessary condition is that retirement increases people's exposure to political information in a causal way. To estimate this effect, the outcome variable in Equation (3a) is replaced by the different media and non-media measures of exposure y_i:

$$y_i = c_1 + c_2 \hat{r}_i + c_3 X_i + \varepsilon_i \tag{3b}$$

Table 6 shows the estimation results for the news consumption variables, according to which retirement does not have significant effects on general television (as asked in the 2008 NAES), radio, and online news exposure. In the case of the two latter channels, this finding is not surprising. Radio is usually consumed passively. Compared to reading the newspaper, for example, listening to the radio often does not require additional (leisure) time; people most commonly use the radio while driving, showering, or cooking, and in many cases at work. Thus it seems plausible for retirement not to cause an increase in the consumption of radio news. The effect on exposure to online news is likely insignificant because of cohort effects. The generation that retired at the beginning of the new millennial has been used to traditional media for decades, so that the increase in spare time does not result in an additional use of (unfamiliar) online outlets. In contrast, retirement has significant effects on the consumption of television news, at

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least according to the more detailed question items in Columns (2) to (4). The effect on newspaper consumption is statistically significant at 1% level as well (Column 6). The coefficient in the newspaper equation, for instance, suggests that retirement causes respondents to increase their reading frequency by 0.76 days per week.

Table 6: Effect of retirement on news consumption

	(1) TV news (NAES 08)	(2) Nat. network news (NAES 00/04)	(3) Cable news (NAES 00/04)	(4) Local news (NAES 00/04)	(5) Radio news (NAES 00/08)	(6) Newspaper	(7) Online news
Retired	0.248	0.661***	0.896***	0.692***	-0.198	0.758***	0.0502
	(0.234)	(0.236)	(0.257)	(0.235)	(0.193)	(0.189)	(0.244)
Kleibergen-Paap Wald F-Statistic	259.5	355.3	348.5	350.5	454.7	613.7	310.6
Hansen J, p-value	0.0868	0.990	0.141	0.604	0.334	0.0850	0.502
Observations	30807	39724	39764	39768	51222	70946	45363

Notes: 2SLS estimates, using $D_i^{62\text{-}64}$ and D_i^{65} as instruments. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* p<0.10, ** p<0.05, *** p<0.01

Table 7: Effect of retirement on exposure to other information channels

	(1) Contacted by campaign	(2) Received campaign brochure	(3) Discussions
Retired	0.00749	0.000502	0.660***
	(0.0339)	(0.0696)	(0.171)
Kleibergen-Paap Wald F-Statistic	297.0	112.3	592.5
Hansen J, p-value	0.206	0.0432	0.414
Observations	30716	10117	67838

Notes: 2SLS estimates, using $D_i^{62\text{-}64}$ and D_i^{65} as instruments. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* p<0.10, ** p<0.05, *** p<0.01

Table 7 provides equivalent results for the non-media information channels. As Column (3) shows, retirement significantly affects the frequency of private political discussions. The size of the effect is comparable to that on newspaper consumption. There are no indications of effects on the measures of direct contact to the campaign (Columns 1 and 2).

I evaluate the robustness of the findings based on the same tests that I used for the effects of retirement on knowledge, if applicable. Tables A6 and A7 in the Online Appendix provide estimation results using a linear age polynomial instead of a quadratic one. The results now indicate marginally significant effects on exposure to general television news, as asked in the 2008 NAES edition (Table A6, Column 1). The remaining coefficients do not change in a substantial way. The same applies to non-media channels of information. Tables A8 and A9 show the results when using the age threshold at 62 years as the only instrument. Here, the effects of retirement on news consumption and non-media exposure are again very similar to the baseline specification, both in terms of statistical significance and magnitude.

In summary, the estimates suggest that retirees could learn about politics from TV news, reading the newspaper, and participation in private discussions – the channels for which the evidence is sufficiently robust. However, thus far, it remains unclear whether the findings can be labeled as media effects. To rule out the possibility that the entire effect is driven by interpersonal communication, I estimate the knowledge models for a subsample of respondents who state to never participate in political discussions. According to Table A10, the effect of retirement on knowledge survives when using this subsample. The coefficient of interest always has the correct sign and tends to be slightly larger than in the case of the full sample, suggesting effects between 6.7 and 9.9 percentage points. In addition to these estimates, the varying popularity of the information channels gives reason to attribute the aggregate effect of retirement on knowledge to people's media exposure: Consumption of relevant news media (i.e., newscasts and newspapers) is far more common than participation in political discussions. The share of media deniers amounts to only 2.3%, whereas about 27.8% of the respondents never participate in discussions on politics.

To further explore the effect of different types of media, I use the eligibility instruments to estimate the effect of retirement on news consumption – as shown in Table 6 – and then regress knowledge on the predicted values of news consumption $\hat{y}_i$. Table A11 summarizes the results of these regressions, according to which all media channels significantly affect knowledge. The signs of the coefficients are positive, except for the one on radio. In addition, the coefficient on online news is comparatively large (26.3 percentage points). Considering the use it or lose it effect, a possible explanation for these two anomalies could be the different levels of mental

activity the consumption of both types of media requires. Exposure to radio news is usually passive and in the background, such that there is relatively little mental stimulation, which in turn might be detrimental for knowledge. In contrast, due to their novelty for the age cohort, the consumption of online media is mentally very stimulating, and exposure could result in particularly large effects on learning. However, caution is necessary when interpreting the coefficients in Table A11. Strictly speaking, they cannot be interpreted in a causal way, since the exclusion restriction is likely violated when estimating direct effects of news consumption on knowledge (cp. Section 2.3).

5. Other outcomes

Does the exogenous shift in leisure time have other consequences than increases in information exposure and political knowledge? It is conceivable that this shift also raises people's interest in politics, a factor that is often considered as a prerequisite for political participation. The NAES allow to evaluate effects on self-assessments of interest in the presidential campaign. To ensure consistent measurement across the survey editions, I construct a binary variable that takes the value 1 if respondents are very interested in the campaign, and 0 otherwise (mean = 0.46, SD = 0.50). Column (1) in Table 8 shows the resulting estimate. Accordingly, retirement increases the likelihood that respondents state to be strongly interested, an effect that is significant at the 5% level. Conducting the same series of robustness checks as in the previous section confirms this finding. Column 1 in Tables A12 and A13 shows estimates that are significant at the 1% and 10% level, respectively. The size of the effect ranges from increases of about 8.6 to 11.8 percentage points in the likelihood of being strongly interested in the campaign.

Next, I consider the share of "do not know" answers and the share of false answers to evaluate if the increased news exposure causes respondents to over-estimate their knowledge (Stone, 2017). An indication of overconfidence would be an increase in the share of false answers, in which case the additional news exposure could be socially harmful. However, the estimates in Columns (2) and (3), Table 8, do not suggest that this is the case. Retirement reduces the share of "do not know" answers but does not affect the share of false responses, which implies that the additional news exposure does not alter respondents' assessment of their knowledge.

In addition, I check whether better information and the increased interest could translate into higher turnout, as suggested by the literature (e.g., Sobbrio and Navarra, 2010; Houser, Morton, and Stratmann, 2011). The NAES do not provide consistent data on actual voting. However, the surveys ask about the intention to vote, based on which I construct a binary variable (mean = 0.94, SD = 0.23). It seems very plausible that retirement would increase the likelihood of voting, due to larger amounts of spare time, better political knowledge, and an increased interest in politics. The estimated coefficient in Column (4), Table 8, has the expected sign but lacks statistical significance though. The same applies when looking at the robustness checks in Column (4), Tables A12 and A13. However, the lack of statistical significance might be due the unreliability of voting intentions. A 94% share of respondents with the intention to vote suggests that many people are too optimistic about their participation, considering that actual turnout in US presidential elections is usually just above 50%.

Table 8: Effect of retirement on other outcomes

	(1) Strong interest in the campaign	(2) Share of "do not know" answers	(3) Share of false answers	(4) Intention to vote	(5) Strong party identification	(6) Strong political views	(7) In-candidate - out-candidate favorability
Retired	0.0885**	-0.0561***	0.00531	0.0294	0.0474*	0.00613	1.103***
	(0.0390)	(0.0168)	(0.0151)	(0.0234)	(0.0282)	(0.0251)	(0.365)
Kleibergen-Paap Wald F-Statistic	432.2	614.6	614.6	233.7	537.7	590.1	380.2
Hansen J, p-value	0.918	0.944	0.228	0.0725	0.320	0.142	0.0717
Observations	50142	71180	71180	28519	63398	68676	43190

Notes: 2SLS estimates, using D_i^{62-64} and D_i^{65} as instruments. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* p<0.10, ** p<0.05, *** p<0.01

Finally, an important question is whether an exogenous shift in exposure to political information has implications for political polarization. People might be exposed to more diverse opinions, which could cause their political views to be more nuanced. However, the respondents might also use their additional spare time to increase the consumption of congenial news. Selective exposure can involve filter bubble effects, in which case people experience a reinforcement of existing

views, and possibly form extreme opinions. I test whether the increase in leisure time associated with retirement affects political views in three ways. First, based on the NAES questions about party identification and strength, I construct a variable that takes the value 1 if the respondents indicate that they consider themselves either a strong Republican or Democrat, and 0 otherwise (mean = 0.45, SD = 0.50). A second binary variable indicates respondents with strong conservative or strong liberal political views (mean = 0.17, SD = 0.37). Third, I create a measure of affect polarization (e.g., Iyengar, Sood, and Lelkes, 2012). This measure refers to the distance between partisans' feelings about their preferred candidate and their feelings about the opposing nominee, based on thermometer scores provided by the NAES. That is, respondents rate the candidates on a scale from 0 to 10, with 0 implying "very cold" feelings and 10 "very warm" ones. In the case of respondents identifying themselves as Republicans, for example, the distance is their rating of the Republican nominee (i.e., the in-candidate) minus their rating of the Democratic nominee (i.e., the out-candidate). The variable ranges from -10 to 10 (mean = 3.99, SD = 4.32), with larger values implying a greater distance in feelings about the candidates. The resulting estimates indicate that the likelihood of a strong party identification increases, as well as the difference between in-candidate and out-candidate ratings (Columns 5 and 7 in Table 8, respectively). There is no effect on the political views variable though (Column 6). These findings are confirmed by the robustness checks in Tables A12 and A13. The increase in party identification and partisan affect could imply that respondents use their additional spare time to expand their consumption of known partisan outlets, which increases the exposure to congenial news and strengthens existing beliefs. The results are also compatible with the findings of Boxell, Gentzkow, and Shapiro (2017), according to which the growth in polarization over the last decades has been consistently higher among older age groups. These age groups have the lowest levels of Internet and social media use, but the emergence of new media might have caused traditional outlets to provide more extreme coverage.

6. Conclusion

This study investigates the causal effects of retirement on the consumption of political information and survey takers' performance in answering questions about campaign-related issues. Instrumenting with eligibility for Social Security benefits, 2SLS estimates indicate that

retirement increases the exposure to political news, and the additional time spent watching newscasts and reading the newspaper improves political knowledge.

These findings are subject to some limitations though. The variables used in this study are self-reported measures; the usual caveats for survey data apply. An exception are the knowledge data, which are not based on self-assessments, but on the actual presence of campaign-related information. Here, the chances of biased responses are small, because there are hardly any effects of social desirability, and the incentives for knowingly providing a wrong answer are small. Another limitation relates to local average treatment effects. These effects only pertain to people affected by the instruments, i.e., those who actually retire when they are eligible for Social Security benefits. Thus it is unclear whether increases in leisure time always have positive effects on news consumption and knowledge. If a credible instrument was available, it would be interesting to study whether sudden unemployment has a similar impact, for instance.

Despite these limitations, the idea that time availability affects the level of voter information has important implications. Societies that acknowledge the importance of informed voters – as the basis for democratic participation and political accountability – need to allow their citizens to have the time to deal with politics. If, for instance, people are forced to work multiple simultaneous jobs to make a living, only a certain degree of knowledge and engagement can be expected. The findings also pose the question whether groups with large levels of exposure to political information can be easier influenced. In general, people with large amounts of news consumption are known to be political sophisticates with strong own opinions. However, if there are exogenous increases in exposure, as in the context of this study, it would be worth investigating whether biased information is more persuasive than usually.

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Online Appendix

Marcel Garz: Retirement, Consumption of Political Information, and Political Knowledge

Table A1: NAES political knowledge questions

Question	Correct answer
NAES 2000	
Is the minimum wage per hour $4.50, $5.15, $6.35 or $7.10?	$5.15
Over the first eight months of 1999, was the inflation rate 1.6%, 2%, 2.6% or 3.2%?	2.6%
Is the US trade deficit in the first half of 1999 higher, lower or about the same as last year's?	Higher
Who favors the biggest tax cut, George W. Bush or Al Gore?	Bush
Who favors using some of the Medicare surplus to cut taxes, George W. Bush or Al Gore?	Bush
Who favors paying down the national debt the most, George W. Bush or Al Gore?	Gore
Do you think that tax breaks for ethanol, a cornbased fuel additive, cost $100 million a year, $275 million, $425 million or $600 million a year?	$600 million
Who favors doubling the amount families can deduct from their income tax for each child they have, George W. Bush or Al Gore?	Bush
Thinking about federal income taxes, what federal tax rate do most people pay? 15%, 28%, 32% or 39.6%?	28%
Who favors the biggest increase in spending for Social Security, George W. Bush or Al Gore?	Gore
Who favors allowing workers to invest some of their Social Security contributions in the stock market? George W. Bush, Al Gore, both or neither?	Both
Who favors using government money to help some parents send their children to private schools? George W. Bush, Al Gore, both or neither?	Bush
How many Americans do not have health insurance? About one American in 50, one in 20, one in 10 or more than one in 10?	More than one in 10
On the issue of prescription drugs for senior citizens, what does George W. Bush think? Does George W. Bush think the federal government should not pay for senior citizens' prescription drugs; the government should offer senior citizens a voucher to cover some of the cost of prescription drugs; or the federal government should cover prescription drugs through Medicare?	Offer senior citizens a voucher
Who favors using government funds to make sure that every child in the US is covered by health insurance? George W. Bush, Al Gore, both or neither?	Gore
Who favors giving a $3000 income tax credit for long-term health care expenses, George W. Bush or Al Gore?	Gore
Who favors giving patients the right to sue their health maintenance organization or HMO? George W. Bush, Al Gore, both or neither?	Gore
Who favors making it harder for a woman to get an abortion? George W. Bush, Al Gore, both or neither?	Bush

Do you happen to know how many pregnancies end in abortion each year in the US? Do fewer than 10%, between 10% and 25% or more than 25% end in abortion each year?	Fewer than 10
Who opposes the sale of RU-486? George W. Bush, Al Gore, both or neither?	Bush
Who favors the death penalty for some crimes? George W. Bush, Al Gore, both or neither?	Both
Who favors requiring a license for a person to buy a handgun? George W. Gore, both or neither?	Gore
Who supported legislation allowing people to carry concealed handguns? George W. Bush, Al Gore, both or neither?	Bush
Who favors a ban on all soft money campaign contributions? George W. Bush, Al Gore, both or neither?	Gore
Each year, how many legal immigrants come to the US? Fewer than 200,000, 400,000, 600,000 or more than 1 million?	600,000
Who favors allowing homosexuals to serve openly in the United States military? George W. Bush, Al Gore, both or neither?	Gore
Does George W. Bush favor or oppose selling some of the oil reserve to increase the winter heating oil supply?	Oppose

NAES 2004

Who is the Republican vice presidential candidate?	Cheney
Who is the Democratic vice presidential candidate?	Edwards
Who favors making the recent tax cuts permanent—George W. Bush, John Kerry, both, or neither?	Bush
John Kerry says that he would eliminate George W. Bush's tax cuts on those making how much money—over $50,000 a year; over $100,000 a year; over $200,000 a year; or over $500,000 a year?	$200,000
Which candidate or candidates would repeal George W. Bush's tax cuts for the wealthiest Americans, that is, for those making over $200,000 a year, but keep the tax cuts for those Americans who are making less?	Kerry
Who favors completely eliminating the estate tax, that is, the tax on property left by people who die—George W. Bush, John Kerry, both, or neither?	Bush
Who favors eliminating tax breaks for overseas profits of American corporations and using the money to cut corporate income taxes—George W. Bush, John Kerry, both, or neither?	Kerry
Who favors cutting the federal budget deficit, which is now over $500 billion a year, by more than half in four years—George W. Bush, John Kerry, both, or neither?	Both
Which candidate favors increasing the $5.15 minimum wage employers must pay their workers—George W. Bush, John Kerry, both, or neither?	Kerry
Who wants to make it easier for unions to organize—George W. Bush, John Kerry, both, or neither?	Kerry
Which candidate or candidates opposes the North American Free Trade Agreement, also known as NAFTA?	John Edwards
Who favors the federal government helping to pay for health insurance for all children and helping employers pay the cost of the workers' health insurance— George W. Bush, John Kerry, both, or neither?	Kerry

Which candidate or candidates supports a single-payer health care plan?	Kucinich
Who favors the Medicare prescription drug law that was recently enacted—George W. Bush, John Kerry, both, or neither?	Bush
Who favors changing the recently passed Medicare prescription drug law to allow reimporting drugs from Canada—George W. Bush, John Kerry, both, or neither?	Kerry
Which candidate favors allowing the federal government to negotiate with drug companies for lower prescription drug prices for senior citizens—George W. Bush, John Kerry, both, or neither?	Kerry
Who favors allowing workers to invest some of their Social Security contributions in the stock market—George W. Bush, John Kerry, both, or neither?	Bush
Which candidate proposes moving 60,000 to 70,000 troops stationed in Europe and South Korea to other locations, including the United States, in the next decade—George W. Bush, John Kerry, both, or neither?	Bush
Who favors reinstating the military draft—George W. Bush, John Kerry, both, or neither?	Neither
Who favored spending $87 billion on Iraq and Afghanistan last fall—George W. Bush, John Kerry, both, or neither?	Bush
Just your best guess, roughly, how many American troops are in Iraq—40,000; 80,000; 115,000; or 200,000?	115,000
Who wants to extend all provisions of the USA Patriot Act in order to fight terrorism—George W. Bush, John Kerry, both, or neither?	Bush
Who favors laws making it more difficult for a woman to get an abortion—George W. Bush, John Kerry, both, or neither?	Bush
Who favors federal funding of research on diseases like Alzheimer's using stem cells taken from human embryos—George W. Bush, John Kerry, both, or neither?	Kerry
Who favors extending the federal law banning assault weapons—George W. Bush, John Kerry, both, or neither?	Both
Who wants to cut back punitive damages in lawsuits—George W. Bush, John Kerry, both, or neither?	Bush
Which candidate favors placing limits on how much people can collect when a jury finds that a doctor has committed medical malpractice—George W. Bush, John Kerry, both, or neither?	Bush
Can you tell me the yearly salary of a U.S. Supreme Court Justice?	$193,000
Can you tell me the yearly salary of the President of the United States?	$400,000
Who is a former prosecutor—George W. Bush, John Kerry, both, or neither?	Kerry
Which candidate or candidates was majority leader in the U.S. House of Representatives?	Gephardt
Which candidate or candidates is the son of a mill worker?	John Edwards
Which candidate or candidates was a general?	Clark
Which candidate or candidates was governor of Vermont?	Dean
Which candidate or candidates was a trial lawyer?	Edwards
Which candidate or candidates has won the most primaries this year?	Kerry
Do you happen to know who Al Gore endorsed for the Democratic nomination for president?	Dean

Do you happen to know who Bill Bradley endorsed for the Democratic nomination for president?	Dean
Do you happen to know who Madonna endorsed for the Democratic nomination for president?	Clark
Do you happen to know which candidate has more public support from retired generals and admirals—George W. Bush, John Kerry, both, or neither?	Bush

NAES 2008

Which Republican candidate or candidates running for president opposed some of the Bush tax cuts: Rudy Giuliani, Mike Huckabee, John McCain, or Mitt Romney?	McCain
Which Democratic candidate or candidates running for president would eliminate the Bush tax cuts for people above a certain income level: Hillary Clinton, John Edwards, or Barack Obama?	All
Which Democratic candidate or candidates running for president promises to provide a $1,000 tax cut for working families and no federal income tax for seniors earning under $50,000 per year: Hillary Clinton, Barack Obama, both, or neither?	Obama
Which candidate or candidates running for president would provide more tax cuts to the middle class: John McCain, Barack Obama, both, or neither?	Obama
Which candidate or candidates running for president proposes a tax cut plan that would provide a government check to millions of people who pay no federal income taxes: John McCain, Barack Obama, both, or neither?	Obama
Which candidate or candidates running for president favors completely eliminating the estate tax, that is the tax on property left by people who die: John McCain, Barack Obama, both, or neither?	McCain
Which Republican candidate or candidates running for president supports abolishing the Internal Revenue Service, getting rid of the income tax and payroll tax, and putting in place a flat national sales tax that he calls the Fair Tax: Rudy Giuliani, Mike Huckabee, John McCain, or Mitt Romney?	Huckabee
Which Democratic candidate or candidates running for president would freeze foreclosures on homes and mortgage interest rates: Hillary Clinton, Barack Obama, both, or neither?	Clinton
Which Democratic candidate or candidates running for president is proposing a health care reform plan that mandates that everyone have health insurance: Hillary Clinton, Barack Obama, both, or neither?	Clinton
Which candidate or candidates running for president is proposing a health care reform plan that mandates that children have health insurance: John McCain, Barack Obama, both, or neither?	Obama
Which candidate or candidates would provide individuals $2,500 and families $5,000 to help them buy their own health insurance: John McCain, Hillary Clinton, or Barack Obama?	McCain
Which candidate or candidates running for president proposes taxing the health benefits an employee receives from an employer: John McCain, Barack Obama, both, or neither?	McCain
Which candidate running for president favors vouchers that would help parents pay the cost of charter or private elementary or secondary schools for their children: John McCain, Barack Obama, both, or neither?	McCain

Which Democratic candidate or candidates running for president was opposed to giving President Bush authorization to wage war in Iraq: Hillary Clinton, John Edwards, or Barack Obama?	Obama
Which Republican candidate running for president was the first to criticize former Secretary of Defense Donald Rumsfeld for conduct of the Iraq War and the first to advocate the increase in troops known as the surge: Rudy Giuliani, Mike Huckabee, John McCain, or Mitt Romney?	McCain
Which Democratic presidential candidates, if any, voted for a resolution in Congress which called on the Bush administration to designate a special Iranian military unit called the Revolutionary Guard, a foreign terrorist organization?	Clinton
Which candidate or candidates running for president favors closing the base at which alleged enemy fighters are held at Guantanamo Bay: John McCain, Barack Obama, both, or neither?	Obama
Which Republican candidate or candidates running for president has an immigration plan that would, as a first step, secure the nation's borders, then, once that is done, allow people who entered the country illegally to have the opportunity to become citizens under certain conditions, but deport those who have committed crimes while in the United States: John McCain, Mitt Romney, both, or neither?	McCain
Which Democratic candidate or candidates running for president favors allowing driver's licenses for undocumented or illegal immigrants: Hillary Clinton, Barack Obama, both, or neither?	Obama
Which candidate or candidates running for president favors overturning Roe v. Wade, the Supreme Court decision legalizing abortion: John McCain, Barack Obama, both, or neither?	McCain
Which candidate or candidates running for president supports federal funding for embryonic stem cell research: John McCain, Barack Obama, both, or neither?	Both
Which Republican candidate or candidates running for president supports both a constitutional amendment prohibiting same sex marriages and a constitutional amendment outlawing abortion: Rudy Giuliani, Mike Huckabee, John McCain, or Mitt Romney?	Huckabee
Does John McCain support suspending the gas tax throughout the summer months this year, or not?	Yes
Does Hillary Clinton support suspending the gas tax throughout the summer months this year, or not?	Yes
Does Barack Obama support suspending the gas tax throughout the summer months this year, or not?	No
Which candidate or candidates running for president favors lifting the federal ban on oil drilling off the coast of the United States: John McCain, Barack Obama, both, or neither?	McCain
Which candidate or candidates favors reducing pollution through a process called cap and trade: John McCain, Barack Obama, both, or neither?	Both
Which Democratic candidate running for president did the most in the United States Senate to pass ethics reform: Hillary Clinton, John Edwards, or Barack Obama?	Obama
Do you happen to know which one candidate the major papers in Iowa, New Hampshire, and Massachusetts endorsed for the Republican nomination for president?	McCain

Do you happen to know which one candidate Joe Lieberman endorsed for the Republican nomination for president?	McCain
Do you happen to know who National Right to Life endorsed for the Republican nomination for president?	Thompson
Do you happen to know who The New York Times endorsed for the Republican nomination for president?	McCain
Do you happen to know who Dr. James Dobson, president of Focus on the Family, endorsed for the Republican nomination for president?	Huckabee
Do you happen to know who Oprah Winfrey endorsed for the Democratic nomination for president?	Obama
Do you happen to know who The New York Times endorsed for the Democratic nomination for president?	Clinton
Do you happen to know who Senator Edward Kennedy endorsed for the Democratic nomination for president?	Obama
Do you happen to know who the United Farm Workers endorsed for the Democratic nomination for president?	Clinton
Do you happen to know who MoveOn.Org endorsed for the Democratic nomination for president?	Obama
Do you happen to know who New Mexico Governor Bill Richardson endorsed for the Democratic nomination for president?	Obama
Do you happen to know which Republican candidate won the Iowa caucus?	Huckabee
Do you happen to know which Democratic candidate won the Iowa caucus?	Obama
Do you happen to know which Republican candidate won the New Hampshire primary?	McCain
Do you happen to know which Democratic candidate won the New Hampshire primary?	Clinton
Do you happen to know which Republican candidate won the Michigan primary?	Romney
Do you happen to know which Democratic candidate won the Nevada caucuses?	Clinton
Do you happen to know which Republican candidate won the South Carolina primary?	McCain
Do you happen to know which Democratic candidate won the South Carolina primary?	Obama
Do you happen to know which Republican candidate won the Florida primary?	McCain
Do you happen to know which Democratic candidate won the Florida primary?	Obama
Which Republican candidate running for president won more of the Republican primaries and state conventions on Super Tuesday, February 5?	McCain
Do you happen to know who Colin Powell endorsed for president?	Obama

Table A2: Description of the sample

	Share
Gender	
female	0.559
male	0.441
Age	
18-27	0.111
28-37	0.167
38-47	0.209
48-57	0.209
58-67	0.151
68-77	0.100
78-87	0.048
88-97	0.005
Education	
grade 8 or lower	0.022
some high school, no diploma	0.053
high school diploma or equivalent	0.260
technical or vocational school	0.025
some college, no degree	0.172
associate's or two-year college degree	0.084
four-year college degree	0.194
graduate or professional school, no degree	0.033
graduate or professional degree	0.144
Ethnicity	
white	0.829
black	0.082
Asian	0.015
other	0.053
Party identification	
republican	0.292
democrat	0.327
independent	0.281
something else	0.060

Notes: Based on 197,762 interviews from the 2000, 2004, and 2008 NAES. Due to missing responses, the shares do not necessarily sum up to 100% within the categories.

Table A3: Effect of retirement on knowledge, by NAES edition

	(1) 2000	(2) 2004	(3) 2008
Retired	0.108***	-0.00362	0.0377*
	(0.0333)	(0.0352)	(0.0227)
Kleibergen-Paap Wald F-Statistic	195.5	158.2	261.0
Hansen J, p-value	0.446	0.786	0.0789
Observations	20391	19573	31216

Notes: 2SLS estimates, using $D_i^{62\text{-}64}$ and D_i^{65} as instruments. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, and Internet access.
* p<0.10, ** p<0.05, *** p<0.01

Table A4: Effect of retirement on knowledge (robustness)

	(1) Linear age polynomial	(2) Age × eligibility interactions	(3) Only early retirement as an instrument	(4) Including question fixed effects	(5) Weighting by number of questions	(6) Controlling for number of questions
Retired	0.0660***	0.111**	0.0530***	0.0534***	0.0591***	0.0465***
	(0.0161)	(0.0546)	(0.0195)	(0.0157)	(0.0152)	(0.0168)
Kleibergen-Paap Wald F-Statistic	647.3	74.48	865.1	614.5	510.8	614.6
Hansen J, p-value	0.00125	0.0427		0.720	0.951	0.528
Observations	71180	71180	71180	71180	71180	71180

Notes: 2SLS estimates, using $D_i^{62\text{-}64}$ (and D_i^{65}) as instruments. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age, gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* p<0.10, ** p<0.05, *** p<0.01

Table A5: Effect of retirement on knowledge (subsets of questions)

	(1) Particularly relevant to retirees	(2)	(3) General knowledge	(4)
	yes	no	yes	no
Retired	0.0806***	0.0440**	0.133	0.0358**
	(0.0309)	(0.0173)	(0.109)	(0.0162)
Kleibergen-Paap Wald F-Statistic	416.3	614.6	49.61	581.0
Hansen J, p-value	0.862	0.490	0.309	0.765
Observations	48157	71180	5975	67336

Notes: 2SLS estimates, using $D_i^{62\text{-}64}$ and D_i^{65} as instruments. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* p<0.10, ** p<0.05, *** p<0.01

Table A6: Effect of retirement on news consumption (linear age polynomial)

	(1) TV news (NAES 08)	(2) Nat. network news (NAES 00/04)	(3) Cable news (NAES 00/04)	(4) Local news (NAES 00/04)	(5) Radio news (NAES 00/08)	(6) Newspaper	(7) Online news
Retired	0.383[*] (0.223)	0.677[***] (0.228)	0.928[***] (0.249)	0.709[***] (0.226)	-0.184 (0.185)	0.686[***] (0.182)	0.00487 (0.246)
Kleibergen-Paap Wald F-Statistic	274.8	371.0	364.1	366.3	478.5	646.3	311.7
Hansen J, p-value	0.00965	0.869	0.447	0.567	0.361	0.0276	0.749
Observations	30807	39724	39764	39768	51222	70946	45363

Notes: 2SLS estimates, using D_i^{62-64} and D_i^{65} as instruments. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age, gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* p<0.10, ** p<0.05, *** p<0.01

Table A7: Effect of retirement on exposure to other information channels (linear age polynomial)

	(1) Contacted by campaign	(2) Received campaign brochure	(3) Discussions
Retired	0.0117 (0.0327)	0.0206 (0.0678)	0.827[***] (0.165)
Kleibergen-Paap Wald F-Statistic	310.4	116.6	623.8
Hansen J, p-value	0.428	0.338	0.115
Observations	30716	10117	67838

Notes: 2SLS estimates, using D_i^{62-64} and D_i^{65} as instruments. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age, gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* p<0.10, ** p<0.05, *** p<0.01

Table A8: Effect of retirement on news consumption (only one age threshold)

	(1) TV news (NAES 08)	(2) Nat. network news (NAES 00/04)	(3) Cable news (NAES 00/04)	(4) Local news (NAES 00/04)	(5) Radio news (NAES 00/08)	(6) Newspaper	(7) Online news
Retired	0.450[*] (0.264)	0.659[**] (0.282)	0.656[**] (0.302)	0.770[***] (0.280)	-0.0921 (0.224)	0.567[***] (0.219)	-0.0483 (0.286)
Kleibergen-Paap Wald F-Statistic	385.6	476.4	469.7	469.9	648.0	862.0	440.5
Observations	30807	39724	39764	39768	51222	70946	45363

Notes: 2SLS estimates, using D_i^{62-64} as an instrument. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* p<0.10, ** p<0.05, *** p<0.01

Table A9: Effect of retirement on exposure to other information channels (only one age threshold)

	(1) Contacted by campaign	(2) Received campaign brochure	(3) Discussions
Retired	-0.0151	-0.0840	0.581***
	(0.0382)	(0.0812)	(0.195)
Kleibergen-Paap Wald F-Statistic	437.3	153.0	843.0
Observations	30716	10117	67838

Notes: 2SLS estimates, using $D_i^{62\text{-}64}$ as an instrument. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* p<0.10, ** p<0.05, *** p<0.01

Table A10: Effect of retirement on knowledge (only including respondents not participating in private discussions on politics)

	(1)	(2)	(3)	(4)	(5)
Retired	0.0774**	0.0991***	0.0669*	0.0803**	0.0798***
	(0.0331)	(0.0312)	(0.0377)	(0.0318)	(0.0304)
Age polynomial	quadratic	linear	quadratic	quadratic	quadratic
Threshold(s)	62/65	62/65	62	62/65	62/65
Question fixed effects	no	no	no	yes	no
Weighting by number of questions	no	no	no	no	yes
Kleibergen-Paap Wald F-Statistic	168.3	181.8	243.0	167.3	128.9
Hansen J, p-value	0.564	0.702		0.565	0.924
Observations	15498	15498	15498	15498	15498

Notes: 2SLS estimates. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* p<0.10, ** p<0.05, *** p<0.01

Table A11: Political knowledge and predicted values of news consumption

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TV news	0.0304**						
	(0.0132)						
Nat. network news		0.0294***					
		(0.00543)					
Cable news			0.0225***				
			(0.00400)				
Local news				0.0281***			
				(0.00518)			
Radio news					-0.0718***		
					(0.0142)		
Newspaper						0.0191***	
						(0.00324)	
Online news							0.263***
							(0.0607)
R-square	0.148	0.129	0.130	0.129	0.130	0.135	0.0949
Observations	30807	39724	39764	39768	51222	70946	45363

Notes: The table shows OLS regressions of political knowledge on predicted values of news consumption. The predicted values are obtained from the second stage shown in Table 6, when estimating the effect of retirement on news consumption. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Table A12: Effect of retirement on other outcomes (linear age polynomial)

	(1) Strong interest in the campaign	(2) Share of "do not know" answers	(3) Share of false answers	(4) Intention to vote	(5) Strong party identification	(6) Strong political views	(7) In-candidate - out-candidate favorability
Retired	0.118***	-0.0677***	-0.000475	0.0301	0.0564**	0.0183	1.210***
	(0.0375)	(0.0162)	(0.0145)	(0.0226)	(0.0270)	(0.0242)	(0.349)
Kleibergen-Paap Wald F-Statistic	456.4	647.3	647.3	242.5	569.0	620.0	406.1
Hansen J, p-value	0.113	0.136	0.0713	0.207	0.140	0.0253	0.0431
Observations	50142	71180	71180	28519	63398	68676	43190

Notes: 2SLS estimates, using $D_i^{62\text{-}64}$ and D_i^{65} as instruments. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age, gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Table A13: Effect of retirement on other outcomes (only one age threshold)

	(1) Strong interest in the campaign	(2) Share of "do not know" answers	(3) Share of false answers	(4) Intention to vote	(5) Strong party identification	(6) Strong political views	(7) In-candidate - out-candidate favorability
Retired	0.0862*	-0.0554***	-0.00530	0.00171	0.0643*	0.0282	1.493***
	(0.0450)	(0.0195)	(0.0175)	(0.0284)	(0.0329)	(0.0294)	(0.425)
Kleibergen-Paap Wald F-Statistic	613.9	865.1	865.1	313.5	744.6	831.4	524.8
Observations	50142	71180	71180	28519	63398	68676	43190

Notes: 2SLS estimates, using $D_i^{62\text{-}64}$ and D_i^{65} as instruments. Robust standard errors in parentheses. The sample includes respondents aged 50 to 80 years. All models contain controls for age (quadratic polynomial), gender, education, household size and income, marital status, ethnicity, state and urbanity of residence, party identification, Internet access, and the NAES editions.
* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Figure A1: Effect of retirement on political knowledge (varying age windows)

(a) quadratic age polynomial   (a) linear age polynomial
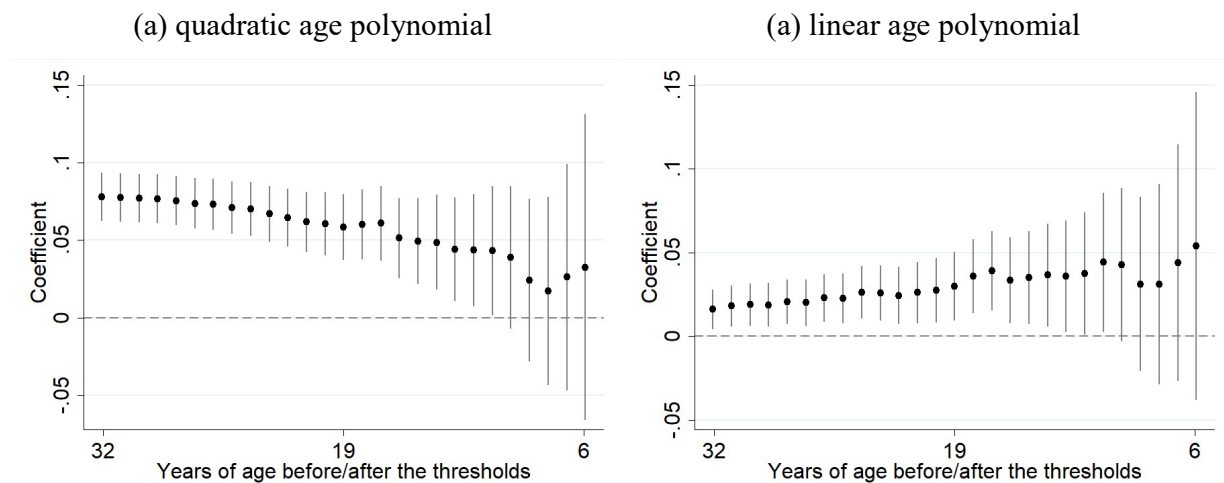
Note: 2SLS estimates based on Equations (2) and (3a). The grey spikes represent the 95% confidence interval.