Online appendix

Learning and Opinion Change, Not Priming:

Reconsidering the Evidence for the Priming Hypothesis

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1 Replication of Tables 1-4 without controls

No controls version of Table 1: European integration in Britain, 1994 to 1997

	Place Labour more pro-EU than the Conservatives				*European integration coef.*			
	1994	1997	N	%	1994	1997	Diff.	W.Contr.
All	-	-	806	100%	1.23 (0.15)	1.56 (0.15)	0.33 (0.21)	
Knew before	Yes	Yes	355	100%	3.20 (0.29)	2.82 (0.25)	-0.38 (0.38)	-0.17
Learned	No	Yes	176	44%	0.15 (0.29)	2.04 (0.33)	1.89 (0.44)	0.41
Partially learned	No	Better	101	22%	-0.93 (0.40)	0.15 (0.39)	1.08 (0.56)	0.14
Never learned	No	No	95	13%	-0.34 (0.42)	-1.38 (0.49)	-1.04 (0.65)	-0.12
Forgot	Yes	No	79	12%	1.44 (0.46)	0.26 (0.47)	-1.18 (0.66)	-0.12

No controls version of Table 2: Investing Social Security Funds in the stock market and the 2000 Election

	Correctly report candidate positions				*Investing Social Security funds coef.*			
	Pre-debates	Post-election	N	%	Pre-debates	Post-election	Diff.	W. Contr.
All	-	-	937	100%	0.63 (0.09)	1.04 (0.10)	0.41 (0.13)	
Knew before	Yes	Yes	368	39%	1.79 (0.16)	1.88 (0.16)	0.09 (0.23)	0.04
Learned	No	Yes	292	31%	0.16 (0.15)	1.02 (0.16)	0.86 (0.22)	0.27
Partially learned	No	Better	89	9%	-0.58 (0.28)	0.29 (0.29)	0.87 (0.40)	0.08
Never learned	No	No	136	15%	-0.28 (0.23)	-0.28 (0.25)	0.00 (0.34)	0.00
Forgot	Yes	No	52	6%	0.70 (0.37)	0.34 (0.35)	-0.36 (0.51)	-0.02

No controls version of Table 3: **Public works jobs in the 1976 U.S. presidential election**

	Place Carter to the left of Ford				*Public works jobs coef.*			
	Aug.	Oct.	N	%	Aug.	Oct.	Diff.	W.Contr.
All	-	-	393	100%	1.46	2.11	0.65	
					(0.19)	(0.22)	(0.29)	
Knew before	Yes	Yes	163	41%	3.74	3.30	-0.44	-0.18
					(0.50)	(0.42)	(0.65)	
Learned	No	Yes	100	25%	0.78	1.90	1.12	0.28
					(0.35)	(0.40)	(0.53)	
Partially learned	No	Better	51	13%	-0.30	1.32	1.62	0.21
					(0.52)	(0.58)	(0.78)	
Never learned	No	No	54	14%	-0.24	0.53	0.77	0.11
					(0.48)	(0.56)	(0.74)	
Forgot	Yes	No	25	6%	2.94	1.92	-1.02	-0.06
					(0.99)	(0.87)	(1.32)	

No controls version of Table 4: Reagan and defense spending in the 1980 election

	Place Reagan as pro-defense				*Defends spending coef.*			
	Feb.	Sept.	N	%	Feb.	Sept.	Diff.	W.Contr.
All	-	-	533	100%	0.21	0.38	0.17	
					(0.05)	(0.05)	(0.07)	
Knew before	Yes	Yes	125	23%	0.64	0.76	0.12	0.03
					(0.09)	(0.08)	(0.12)	
Learned	No	Yes	167	31%	0.09	0.46	0.37	0.12
					(0.09)	(0.09)	(0.13)	
Partially learned	No	Better	90	17%	-0.06	0.04	0.10	0.02
					(0.11)	(0.11)	(0.16)	
Never learned	No	No	109	20%	-0.03	-0.04	-0.01	0.00
					(0.08)	(0.11)	(0.14)	
Forgot	Yes	No	42	8%	0.45	0.14	-0.31	-0.02
					(0.19)	(0.24)	(0.31)	

2 Replication of Tables 1-3 with continuous dependent variables

Replication of Table 1 with Party favorability instead of Vote as dependent variable: European integration in Britain, 1994 to 1997

	Place Labour more pro-EU than the Conservatives				*European integration coef.*		
	1994	1997	N	%	1994	1997	Diff.
All	-	-	1523	100%	0.10 (0.02)	0.16 (0.02)	0.06 (0.03)
Knew before	Yes	Yes	647	42%	0.24 (0.02)	0.26 (0.02)	0.02 (0.03)
Learned	No	Yes	329	22%	0.01 (0.04)	0.24 (0.03)	0.23 (0.05)
Partially learned	No	Better	214	14%	-0.09 (0.05)	0.07 (0.05)	0.16 (0.07)
Never learned	No	No	184	12%	-0.06 (0.05)	-0.16 (0.06)	-0.10 (0.08)
Forgot	Yes	No	149	10%	0.21 (0.05)	0.01 (0.06)	-0.2 (0.08)

Replication of Table 2 with Comparative thermometer instead of Vote as the dependent variable: Investing Social Security Funds in the stock market and the 2000 Election

	Correctly report candidate positions				*Investing Social Security funds coef.*		
	Pre-debates	Post-election	N	%	Pre-debates	Post-election	Diff.
All	-	-	898	100%	0.07 (0.02)	0.09 (0.02)	0.02 (0.03)
Knew before	Yes	Yes	370	41%	0.20 (0.02)	0.18 (0.02)	-0.02 (0.03)
Learned	No	Yes	285	32%	0.03 (0.03)	0.12 (0.03)	0.09 (0.04)
Partially learned	No	Better	73	8%	-0.10 (0.06)	0.02 (0.05)	0.12 (0.08)
Never learned	No	No	119	13%	-0.10 (0.04)	-0.08 (0.04)	0.02 (0.06)
Forgot	Yes	No	51	6%	0.15 (0.07)	-0.04 (0.05)	-0.19 (0.09)

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Replication of Table 3 with Candidate support instead of Vote: **Public works jobs in the 1976 U.S. presidential election**

Instead of vote choice, this table uses candidate favorability as the dependent variable, measured as favorability towards Carter minus favorability towards Ford (assessed with separate, seven-point scales). Unlike the original findings in the paper (which use vote intent as the dependent variable), the issue weights for Public works jobs increase among those who Already knew, rising from .19 to .33, and thus suggesting a priming effect. Granger causality tests indicate that Public works jobs does indeed become more predictive of candidate preference between the August and October waves. (These tests indicate that issue opinion change is also occurring.) Interestingly, further analyses indicate that the increase among those who Already knew only occurs among those who expressed a vote intent in both August and October, no increase occurs among those who fail to express a vote intent in either or both waves. Thus, Public works jobs becomes more predictive of candidate favorability, but not of what really matters: vote intent.

	Place Carter to the left of Ford				*Public works jobs coef.*		
	Aug.	Oct.	N	%	Aug.	Oct.	Diff.
All	-	-	502	100%	0.05	0.16	0.11
					(0.03)	(0.04)	(0.05)
Knew before	Yes	Yes	214	43%	0.19	0.33	0.14
					(0.05)	(0.05)	(0.07)
Learned	No	Yes	41	8%	0.02	0.16	0.14
					(0.06)	(0.06)	(0.08)
Partially learned	No	Better	112	22%	-0.15	-0.09	0.06
					(0.08)	(0.09)	(0.12)
Never learned	No	No	73	15%	-0.14	0.05	0.19
					(0.09)	(0.10)	(0.13)
Forgot	Yes	No	62	12%	0.20	-0.07	-0.27
					(0.07)	(0.07)	(0.10)

Table 4 already uses a relative measure (Reagan thermometer)

3 Replication of Table 1-4 by High and Low Political Knowledge

In the following tables, I split knowledge as close to the median as possible.

Table 2 by high and low knowledge: European integration in Britain, 1994 to 1997

	Place Labour more pro-EU than the Conservatives				*European integration coef.*			
	Low Knowledge							
	1994	1997	N	%	1994	1997	Diff.	W.Contr.
All	-	-	419	100%	0.88	1.22	0.34	
					(0.20)	(0.21)	(0.29)	
Knew before	*Yes*	*Yes*	*119*	*28%*	*3.02*	*2.63*	*-0.39*	*-0.11*
					(0.47)	(0.39)	(0.61)	
Learned	No	Yes	103	25%	0.21	1.97	1.76	0.43
					(0.38)	(0.46)	(0.60)	
Partially learned	No	Better	79	19%	-0.73	0.16	0.89	0.17
					(0.45)	(0.46)	(0.64)	
Never learned	No	No	71	17%	-0.21	-1.30	-1.09	-0.18
					(0.54)	(0.59)	(0.80)	
Forgot	Yes	No	47	11%	1.60	0.59	-1.01	-0.11
					(0.60)	(0.70)	(0.92)	
	High Knowledge							
	1994	1997	N	%	1994	1997	Diff.	W.Contr.
All	-	-	377	100%	1.67	2.00	0.33	
					(0.22)	(0.22)	(0.31)	
Knew before	Yes	Yes	233	62%	3.29	2.92	-0.37	-0.23
					(0.37)	(0.33)	(0.50)	
Learned	No	Yes	69	18%	0.04	2.46	2.42	0.44
					(0.47)	(0.59)	(0.75)	
Partially learned	No	Better	22	6%	-1.83	0.18	2.01	0.12
					(0.93)	(0.74)	(1.19)	
Never learned	No	No	23	6%	-0.59	-1.60	-1.01	-0.06
					(0.73)	(0.85)	(1.12)	
Forgot	Yes	No	30	8%	1.21	0.01	-1.2	-0.10
					(0.78)	(0.68)	(1.03)	

Table 3 by high and low political knowledge: Investing Social Security Funds in the stock market and the 2000 Election

	Correctly report candidate positions				***Investing Social Security funds coef.***			
				Low Knowledge				
	Pre-debates	Post-election	N	%	Pre-debates	Post-election	Diff.	W. Contr.
All	-	-	484	100%	0.10 (0.14)	0.38 (0.15)	0.28 (0.21)	
Knew before	Yes	Yes	134	28%	1.20 (0.29)	0.93 (0.28)	-0.27 (0.40)	-0.07
Learned	No	Yes	147	30%	0.05 (0.23)	0.43 (0.26)	0.38 (0.35)	0.12
Partially learned	No	Better	70	14%	-0.43 (0.35)	0.81 (0.36)	1.24 (0.50)	0.18
Never learned	No	No	103	21%	-0.69 (0.29)	-0.49 (0.31)	0.20 (0.42)	0.04
Forgot	Yes	No	30	6%	0.43 (0.60)	-0.01 (0.48)	-0.44 (0.77)	-0.03
				High Knowledge				
	Pre-debates	Post-election	N	%	Pre-debates	Post-election	Diff.	W. Contr.
All	-	-	427	100%	0.66 (0.17)	0.86 (0.19)	0.20 (0.25)	
Knew before	Yes	Yes	233	55%	1.21 (0.23)	1.21 (0.28)	0.00 (0.36)	0.00
Learned	No	Yes	142	33%	0.32 (0.29)	0.89 (0.32)	0.57 (0.43)	0.19
Partially learned	No	Better	0	0%				
Never learned	No	No	30	7%	0.27 (0.66)	5.37 (0.00)	5.10 (0.66)	0.36
Forgot	Yes	No	22	5%	-0.01 (0.57)	-0.07 (0.81)	-0.06 (0.99)	0.00

4 Replication with alternative measures of correct with relative measures

To measure knowledge and learning about the candidates' or parties' positions, I use correct relative placement when possible. For example, I classify an individual as correctly placing the Conservative and Labour parties on European integration if they place the Labour Party as more Pro integration than the conservative party. I prefer measuring correct placements with relative measures because they appear to be more valid measures of knowledge, probably because they are less sensitive to individual-differences in scale usage. In the two cases where I can use relative measures of learning and knowledge (European integration 1997 British election and Public works jobs in 1976 US election), the relative measures appear to better capture knowledge and learning. To assess the validity of these measures, I examine the extent to which they predict issue weights. For example, among people who do not know the parties' or candidates' positions, we should probably find little relationship between their policy preference on the issue and their vote. For the relative measures of knowledge, we find precisely this pattern: almost no relationship or a negative relationship. However, with the absolute measures, we do find a positive relationship among individuals to are classified as not knowing the positions (especially among those who eventually learn). This suggests that the relative measures are better capturing knowledge. Nevertheless, the paper's findings are generally are robust to these different approaches: the same basic patterns emerge relative and absolute measures, as I show below.

Replication of Table 1 with absolute measures of correct placement (above the midpoint for Conservatives below the midpoint for Labour):
European integration in Britain, 1994 to 1997

A hint of a priming effect emerges here among those who Knew before, but it is far from significant. It is also absent without control variables. When I drop the control variables, the "Diff." among those who knew before drops from 0.82 to 0.14. When I use the continuous party support variable as the dependent variable, the difference is negative (suggesting the depriming).

	Place Labour and the Conservatives on the correct side of the midpoint EU scale				European integration coef.			
	1994	1997	N	%	1994	1997	Diff.	
All	-	-	796	100%	0.74	1.26	0.52	
					(0.20)	(0.20)	(0.28)	
Knew before	Yes	Yes	796	100%	2.08	2.90	0.82	
					(0.61)	(0.67)	(0.91)	
Learned	No	Yes	171	21%	1.20	2.57	1.37	
					(0.41)	(0.50)	(0.65)	
Partially learned	No	Better	163	20%	0.02	1.13	1.11	
					(0.31)	(0.31)	(0.44)	
Never learned	No	No	248	31%	-0.73	-1.46	-0.73	
					(0.60)	(0.69)	(0.91)	
Forgot	Yes	No	109	14%	2.63	1.16	-1.47	
					(0.56)	(0.55)	(0.78)	

Table 2 (the Social Security case) already uses absolute measures to capture knowledge because the Annenberg 2000 survey only asks, yes or no, does the candidate support the investing policy.

Replication of Table 3 with absolute measures of correct placement (above the midpoint for Carter below the midpoint for Labour): **Public works jobs in the 1976 U.S. presidential election**

	Place Carter and Ford on the correct side of the midpoint on the Public works jobs scale				Public works jobs coef.			
	Aug.	Oct.	N	%	Aug.	Oct.	Diff.	
All	-	-	379	100%	3.56	2.64	0.69	
					(1.04)	(0.77)	(0.38)	
Knew before	Yes	Yes	113	30%	1.08	1.50	-0.92	
					(0.55)	(0.68)	(1.29)	
Learned	No	Yes	81	21%	-0.23	1.04	0.42	
					(0.47)	(0.47)	(0.87)	
Partially learned	No	Better	98	26%	-0.12	0.40	1.27	
					(0.54)	(0.52)	(0.66)	
Never learned	No	No	64	17%	-0.42	2.04	0.52	
					(0.85)	(1.01)	(0.75)	
Forgot	Yes	No	23	6%	3.56	2.64	2.46	
					(1.04)	(0.77)	(1.32)	

Replication of Table 4 with relative correct placements: Reagan and defense spending in the 1980 election

In the paper, I do not use a relative measure for Reagan; instead I code a correct placement of Reagan as a six or a seven on the seven-point defense-spending scale. I chose this coding because the dependent variable is Reagan thermometer. As I mention in the text, we see no increase in a relationship between defense spending attitudes and Carter feeling thermometer (or approval). (Beginning in July, Carter worked feverishly to appear as strongly prodefense.) So, I only examine priming with the Reagan thermometer, because we only find an apparent priming effect for the Reagan thermometer. (We probably fail to find an apparent priming effect for Carter because he did his best to appear hawkish.). Nevertheless, the same pattern holds if we use relative judgments instead. Among the learners, the coefficient increases by .20 instead of .23, with similar standard errors.

	Place Reagan as pro-defense				Defends spending coef.		
	Jan./Feb.	Sept.	N	%	Jan./Feb.	Sept.	Diff.
Knew before	Yes	Yes	169	34%	0.52	0.68	0.16
					(0.08)	(0.08)	(0.11)
Learned	No	Yes	19	4%	0.10	0.30	0.20
					(0.07)	(0.07)	(0.10)
Never learned	No	No	189	38%	-0.07	0.04	0.11
					(0.08)	(0.09)	(0.12)
Forgot	Yes	No	114	23%	0.37	-0.57	-0.94
					(0.27)	(0.21)	(0.34)

4.1 Defense Spending and Carter versus Reagan, January to June

By June, Reagan's nomination was all but official. Although standard vote choice questions are not available until the September way, after the nomination, we can look at the effect of defense spending attitudes on the comparative thermometer, which I code as Carter minus Reagan thermometer scores. The results look somewhat similar to those presented for Carter, except that we failed to find evidence of Learned.

This table shows the Granger causality tests of learning and priming effects.

COEFFICIENT	(1) therm_cr_2	(2) therm_cr_2	(3) therm_cr_2
therm_cr_1	0.75	0.74	0.65
	(0.03)	(0.03)	(0.04)
k_0_1	-0.02	0.06	0.04
	(0.02)	(0.10)	(0.10)
k_1_1	-0.02	0.17	0.15
	(0.02)	(0.10)	(0.10)
k_0_0	0.03	0.14	0.15
	(0.02)	(0.10)	(0.10)
def_1_k_0_1 (learners)		0.01	0.02
		(0.07)	(0.07)
def_1_k_1_1 (knowers)		-0.14	-0.12
		(0.06)	(0.06)
def_1_k_0_0		-0.03	-0.05
		(0.06)	(0.06)
def_1_k_1_0		0.11	0.08
		(0.11)	(0.11)
iPID_1			0.10
			(0.02)
ieco_1			0.02
			(0.03)
ispserv_1			0.04
			(0.02)
iinf_1			-0.02
			(0.03)
def_1	-0.04		
	(0.03)		
Constant	0.08	-0.03	-0.03
	(0.04)	(0.09)	(0.09)
Observations	536	536	536
R-squared	0.534	0.538	0.566
rmse	0.136	0.136	0.132

Standard errors in parentheses

4.2 Defense Spending and Carter versus Reagan, January to September

defense spending attitudes Carter compared to Reagan, as measured by the difference in feeling thermometer scores, between January and June. Although almost 40% of individuals learn that Carter was to the left of Reagan (and only, we see no evidence that this learning resulted in a learning effects, that is, lead them to shift their support to the candidate that, they now now, shares their position.

COEFFICIENT	(1) Carter minus Reagan Feeling thermometer September	(2) therm_cr_3	(3) therm_cr_3
therm_cr_1	0.75	0.75	0.61
	(0.04)	(0.04)	(0.04)
k_0_1	0.03	0.29	0.35
	(0.03)	(0.14)	(0.14)
	(0.03)	(0.15)	(0.14)
k_0_0	0.10	0.43	0.48
	(0.03)	(0.15)	(0.14)
def_1_k_0_1 (learners)		0.06	0.05
		(0.06)	(0.06)
def_1_k_1_1 (knowers)		-0.10	-0.11
		(0.07)	(0.07)
def_1_k_0_0		-0.02	-0.05
		(0.08)	(0.08)
def_1_k_1_0		0.45	0.51
		(0.19)	(0.18)
iPID_1			0.15
			(0.02)
ieco_1			0.04
			(0.04)
ispserv_1			0.01
			(0.02)
iinf_1			-0.02
			(0.03)
def_1	-0.01		
	(0.04)		
Constant	0.03	-0.28	-0.34
	(0.05)	(0.14)	(0.13)
Observations	522	491	491
R-squared	0.500	0.505	0.554
rmse	0.148	0.148	0.141

OLS with standard errors in parentheses. Individuals with defense spending attitudes below the midpoint, 4, are excluded.

5 Does learning the parties' positions change votes or opinions?

5.1 Instrumental variables approach

Given that some of these panels have multiple waves, another approach to causation is to use variables from earlier waves as instruments (Finkel 1995). Using this technique, I test for issue-driven learning effects by estimating the effect of issue attitudes on vote choice among the learners before and after the treatments. If issue attitudes better explain vote choice after the treatment, then the data support an issue-driven explanation. I test for vote-driven learning effects by estimating the effect of vote choice on issue attitudes before and after the treatments. If vote choice better explains issue attitudes after the treatment, then the data support an issue-driven explanation. Unfortunately, the 2000 and 1980 cases lacked sufficient waves before the increases in campaign and media messages, and thus I cannot estimate the pre-treatment baseline with this approach. The post-treatment estimates, however, do provide useful information because finding that issue attitudes fail to affect vote choice is inconsistent with issue-driven learning effects, and, similarly, finding that vote choice fails to influence issue attitudes is inconsistent with vote-driven learning effects.

IV approaches estimate causal effects, that is, eliminate concerns about the direction of causation as well as other potential endogeneity problems, such as measurement error, when certain assumptions are met. In particular, the instrument or instruments can only influence the DV indirectly through the variables being instrumented, an untestable assumption called the exclusion restriction. To minimize violations of this assumption, I use this method only when I can include an instrumented lagged DV. This requires three or more waves of panel data, two or more of which must occur before the increase in messages on the relevant issue. This strategy should minimize violations because the instruments (e.g., wave 1) most likely influence the DV (wave 3) only through the explanatory variables (wave 3) or the lagged DV (wave 2). Nevertheless, I conduct simulations to determine the sensitivity of the findings to violations (Wand 2002). To avoid other sources of bias, I also instrument all the variables in the model with variables from an earlier wave.

To conduct this analysis, I adopt different variables in a few cases and a different data set in one case. For the British and the 1976 election cases, I switch from using the binary vote choice to (more) continuous measures: approval of Labour minus approval of the Conservatives

(*Labour vs. Tory approval*) and approval of Carter minus approval of Ford (*Carter vs. Ford approval*). By making this switch, I increase the number of cases and can use the same estimator, two-stage least squares, for issue-driven and vote-driven learning effects, resulting in coefficients that are more comparable. The results look similar though with much less precision using two-stage probit with vote choice DVs. I also persist in using the index of feelings for Reagan and PID in the 1980 case. Since the primary instrument for September attitudes about Reagan are January attitudes about Reagan, the public's lack of familiarity with him in January results in this being a very poor instrument. I use the same control variables as before, with one exception in the British case (see the appendix). Finally, instead of using the two-wave NAES pre- and post-election panel for the 2000 cases, I use the NAES Multi-Reinterview Panel A (see the appendix for details).

With a clarity that is surprising for IV estimates, especially in such small samples, the results also support the explanation that the increases among the learners arise because of vote-driven opinion change. The table below presents the estimates. When people learn the parties' positions, the coefficients indicate that they fail to become more supportive of the party that shares their position on the issue (issue-driven learning effect). Instead, learning these positions causes individuals to adopt the position of their preferred candidate or party (vote-driven learning effects). The left-hand side of the table presents estimates of issue-driven learning effects, and the right-hand side presents estimates of vote-driven learning effects.

To ensure that the method I am using is clear, I explain it in detail for the British case. The first column on the left uses two-stage least squares to estimate the effect of attitudes about European integration on Labour versus Tory approval in 1996. (I use 1996 instead of 1994 to provide a baseline estimate so that I have sufficient prior waves for the IV estimation.) In this column, the explanatory variables include European integration and the control variables, which are measured in 1996, as well as the lagged DV from the 1995 wave. The next column repeats these estimates except that all variables are measured in 1997 except the lagged DV, now from the 1996 wave. I instrument the explanatory variables in both models with 1994 variables. I only present the coefficient for European integration and for the lagged DV. The 1996 coefficient suggests that attitudes about European integration had little effect on evaluations of the parties in 1996, ceteris paribus, and, as these individuals learned the positions of the parties, the coefficients increased slightly but remained relatively small in 1997.

Using the same setup but reversing the positions of European integration and Labour versus Tory approval so that the former is now the DV, the next two columns present the estimates of vote-driven learning effects. The coefficients suggest that attitudes about the parties

became much more important in explaining attitudes about integration after the campaign, rising from -.12 in 1996 to .49 in 1997. The latter coefficient represents a substantial effect. An individual that voted for Labour in 1997 will increase on average their support for European integration by about half a point on a one-point scale compared to someone who voted for the Conservatives but was otherwise identical. Thus, as these individuals learned the parties' positions, they appear to adopt the position of their preferred party. Although lacking the same level of precision, the results for the other three cases suggest similar conclusions.

Taken together, these IV estimates provide reasonably strong evidence that learning the positions of the parties causes people to adopt the position of their preferred party. Moreover, the pattern of coefficients in this table appears to rule out potential problems. To claim that these findings arise because of bias from endogenous instruments (or other assumptions), one would have to argue that the bias only occurs in the estimates of vote-driven learning effects and then only after the treatments, not in the baseline estimates. Moreover, simulations suggest that the findings are robust to moderate levels of instrument endogeneity.

I conducted the simulations by adopting code from Wand (2002), which is available from http://wand.stanford.edu/counterfactuals/. In the post-treatment models of issue attitudes, the conditional efficiency of the party or candidate support instruments (the correlation between the predicted values from the first stage estimates and that part of candidate or party support that is uncorrelated with the other variables in the models) are quite high for each of the four cases: .77, .51, .45, and .72, respectively. Assuming the true coefficient is zero in each of these four cases (e.g., .45(.08) is zero in the first case), the simulations indicate that the correlations between the error terms and the instruments (the endogeneity of the instruments) would have to be of moderate size to produce the observed coefficients: .43, .38, .25, and .33, respectively. For the Social Security investing case, I conducted the simulations with two-stage least squares instead of two-stage probit. The two-stage least squares estimate of the effect of vote choice on investing is .70(.33) (instead of the 2.10(.85) from two-stage probit).

Table 1: Does learning lead to issue-driven or vote-driven effects? IV estimates

Estimates of issue-driven learning effects				*Estimates of vote-driven learning effects*			
European integration and vote choice in the UK							
DV:	Labour vs. Tory approval				European integration		
	1996	1997	Diff.		1996	1997	Diff.
European integr.	.02	.12	.10	Labour vs. Tory	-.11	.45	.56
(1996, 1997)	(.07)	(.07)	(.10)	*(1996, 1997)*	(.11)	(.08)	(.14)
Lagged DV	.96	.91			.89	1.01	
(1995, 1996)	(.04)	(.05)			(.16)	(.18)	
Two-stage least squares. N = 267 for each of the four models. Instruments from the 1994 wave.							
Investing Social Security (S.S.) funds in the stock market and the 2000 U.S. presidential election							
DV:	Bush vs. Gore vote				Investing S.S. funds		
	Pre-debate	Post-debate			Pre-debate	Post-debate	
Invest S.S. funds	-	-13.11	-	Bush vs. Gore	-	2.10	-
(-, Post)	-	(9.63)	-	(-, Post)	-	(.85)	-
Lagged DV	-	6.11			-	2.54	
(-, Pre)	-	(1.95)			-	(.50)	
Two-stage probit. N = 71 for both models. Instruments from the pre-convention wave.							
Public Works and the 1976 U.S. presidential election							
DV:	Carter vs. Ford approval				Public works jobs		
	Aug.	Sep.	Diff.		Aug.	Sep.	Diff.
Public Works	.01	.01	.00	Carter vs. Ford	.03	.52	.49
(Aug., Sep.)	(.16)	(.18)	(.24)	(Aug., Sep.)	(.31)	(.32)	(.45)
Lagged DV	.83	.64			1.02	.70	
(Jun., Sep.)	(.38)	(.22)			(.22)	(.19)	
Two-stage least squares. N = 86 for each of the four models. Instruments from the April wave.							
Defense spending and support for Reagan in the 1980 U.S. presidential election							
DV:	Reagan support				Defense spending		
	Jan./Feb.	Sep.			Jan./Feb.	Sep.	
Defense spending	-	-.07	-	Reagan / PID	-	.21	-
(-, Sep.)	-	(.17)	-	(-, Sep.)	-	(.09)	-
Lagged DV	-	1.09			-	.49	
(-, Jan./Feb.)	-	(.19)			-	(.11)	
Two-stage least squares. N = 138 for both models. Instruments from the Jan./Feb. wave.							

Note: This table presents instrumental variables estimates for the learners. It suggests that vote-driven in issue-vote consistency among the learners. Increases on the left-hand side reflect issue-driven learning effects and increases on the right-hand side reflect vote-driven learning effects. Number of respondents in parentheses. See appendix for control variables and sources.

5.2 An issue opinion stability approach

I present one other approach to further confirm these findings. Since a primary danger to inference about priming is that the treatments in these studies may cause people to change their issue opinions, adopting those of their party, one could estimate priming only among those individuals who maintain the same opinion. For instance, I could test for these effects in the British case by examining whether attitudes about integration became more predictive of vote choice between 1994 and 1997 among those who had maintained the same attitude throughout the panel. If so, we know that these individuals must have changed their vote choice to match their attitude about integration. To my knowledge, no prior research has used this method, its statistical properties are unknown, and there are potential problems with it. For instance, because of measurement error, we may classify individuals as having held the same opinion even though they changed their opinion. By requiring respondents to consistently hold a similar opinion over many waves, I may somewhat reduce such concerns.

Table 5 presents the results of this approach. It reestimates the first four rows of Tables 1-4, separating the estimates for those who maintained stable issue opinions (left side) and those who changed their issue opinions (right side). In all cases, I adopt a lenient definition of holding a consistent opinion, coding respondents as stable if they merely consistently support or consistently oppose a policy, regardless of whether they vary in the extent of their support or opposition (see appendix for details). The results in this table further confirm the cross-lagged analyses, finding little evidence of learning effects, but strong evidence of issue opinion change. In three of the four cases, the issue weight increases occur only among individuals who both changed their issue opinions and learned (or Partially learned) the parties' or candidates' positions. Only in the Defense spending case do we also find some evidence of learning effects. Among those who both maintained a stable opinion on defense spending and learned Reagan's position, the issue weight rises by .20, though this rise is not statistically distinguishable from zero.

Besides providing further evidence against learning effects and instead finding that the learners are adopting their party's or candidate's positions, Table 5 also provides further evidence against priming. In the first three cases, it finds no evidence of issue-weight increases among those who both maintained stable issue opinions and already knew the parties' or candidates' positions. In the last case, there is a hint of priming among this group, with the coefficient rising .23.

In sum, the normatively appealing interpretation of these results turns out to be false. Both methods point to this conclusion. When individuals learn the parties' or candidates' positions, they generally fail to switch their vote to the party or candidate that they now know shares their position (a learning effect). Instead, campaign and media attention to these issues primarily causes people to change their issue opinions, adopting their party's or candidate's issue position as their own, and creating the appearance of priming effects. Finally, these findings also rule out the possibility that individuals who learn the parties' or candidates' positions are, at the same time, being primed.

Issue opinion stability coding. For the Investing Social Security funds case, responses to the Investing Social Security funds question were binary, so I code respondents as stable if they consistently supported or opposed this policy across the pre-election and post-election waves. For the Public Works case, I code respondents as stable if they consistently supported the government directly providing jobs (4 or above on the 7-point scale), were consistently neutral (3), or consistently opposed (1 through 3) across the August and October waves. I explored testing stability of opinion over more waves, but the sample was too small. For the Defense spending case, I code respondents as stable if they consistently supported increased defense spending (4 or above on the 7-point scale), were consistently neutral (3), or consistently supported decreased spending (1 through 3) across all three waves that asked this question: January and February, June and July, and September. Since the analysis spans additional waves in the European integration and the Defense spending cases, the number of respondents in the analysis drops slightly because of the resulting increased panel attrition.

Learning effects or issue opinion change? Comparing those with stable and those with changing issue opinions

European integration and the 1997 British election								
	Stable opinion on EU				Changed opinion on EU			
	N	1994	1997	Diff.	N	1994	1997	Diff.
All	288	1.98	1.83	-0.15	174	-0.36	0.98	1.34
		(0.37)	(0.34)	(0.50)		(0.37)	(0.41)	(0.55)
Knew before	173	3.64	3.29	-0.35	52	1.18	1.49	0.31
		(0.70)	(0.65)	(0.96)		(0.60)	(0.76)	(0.97)
Learned from	41	1.58	1.81	0.23	51	-0.88	2.75	3.63
		(0.76)	(0.55)	(0.94)		(0.65)	(0.97)	(1.17)
Partially learned	26	-1.37	-1.04	0.33	26	-1.47	0.21	1.68
		(1.19)	(0.72)	(1.39)		(1.19)	(0.75)	(1.41)
Investing Social Security funds and the 2000 U.S. presidential election								
	Stable opinion on Inv. S.S. funds				Changed opinion on Inv. S.S. funds			
	N	Pre	Post	Diff.	N	Pre	Post	Diff.
All	723	0.63	0.56	-0.07	218	-0.64	0.99	1.63
		(0.13)	(0.13)	(0.18)		(0.21)	(0.26)	(0.33)
Knew before	323	1.76	1.48	-0.28	52	-0.65	0.62	1.27
		(0.23)	(0.23)	(0.33)		(0.39)	(0.51)	(0.64)
Learned from	201	0.58	0.37	-0.21	91	-0.79	1.56	2.35
		(0.22)	(0.22)	(0.31)		(0.34)	(0.45)	(0.56)
Partially learned	63	-0.39	0.60	0.99	23	-1.36	0.75	2.11
		(0.35)	(0.36)	(0.50)		(0.81)	(0.92)	(1.23)
Public Works and the 1976 U.S. presidential election								
	Stable opinion on Public Works				Changed opinion on Public Works			
	N	Aug.	Sep.	Diff.	N	Aug.	Sep.	Diff.
All	258	0.89	1.33	0.44	121	-0.39	1.55	1.94
		(0.31)	(0.31)	(0.44)		(0.69)	(0.84)	(1.09)
Knew before	123	2.85	2.57	-0.28	39	2.39	1.11	-1.28
		(0.81)	(0.64)	(1.03)		(1.18)	(1.70)	(2.07)
Learned from	62	0.71	1.09	0.38	34	-0.73	4.07	4.80
		(0.51)	(0.53)	(0.74)		(1.30)	(2.03)	(2.41)
Partially learned	28	-0.76	0.82	1.58	20	-1.06	-0.19	0.87
		(0.72)	(0.86)	(1.12)		(1.23)	(1.32)	(1.80)
Defense spending and Reagan in the 1980 U.S. presidential election								
	Stable opinion on Defense				Changed opinion on Defense			
	N	Jan.	Sep.	Diff.	N	Jan.	Sep.	Diff.
All	311	0.26	0.34	0.08	180	0.09	0.16	0.07
		(0.08)	(0.07)	(0.11)		(0.09)	(0.10)	(0.13)
Knew before	81	0.50	0.73	0.23	36	0.50	0.34	-0.16
		(0.10)	(0.09)	(0.13)		(0.19)	(0.16)	(0.25)
Learned from	95	0.17	0.37	0.2u	60	-0.02	0.25	0.27
		(0.13)	(0.12)	(0.18)		(0.17)	(0.15)	(0.23)
Partially learned	54	-0.18	-0.02	0.16	30	-0.06	0.12	0.18
		(0.13)	(0.11)	(0.17)		(0.17)	(0.30)	(0.34)

6 Panel Attrition

Addressing panel attrition is difficult because the paper's key variable -- whether individuals learn the parties' or candidates' positions -- is only measurable across panel waves. Standard techniques for addressing panel attrition do not apply to such a variable. To gain a sense for the potential bias introduced by panel attrition, I model an individual's probability of surviving the panel based on demographics, political participation, and political interests (measured in the first wave). Based on these models, I calculate a predicted probability of surviving the panel. Using this predicted probability, I replicate the paper's main findings (Tables 1-4) separately for those with a high and low probability of panel attrition, using a median split among those who survive the panel. Across the four cases, the results remain substantively similar with no consistently different patterns emerging. These results are somewhat reassuring, suggesting that panel attrition is not significantly biasing the results.

6.1 European integration

Histogram of predicted probability of panel attrition among those who survive the panel

This figure shows the predicted probability of attrition in the British panel between waves 1994 and 1997.

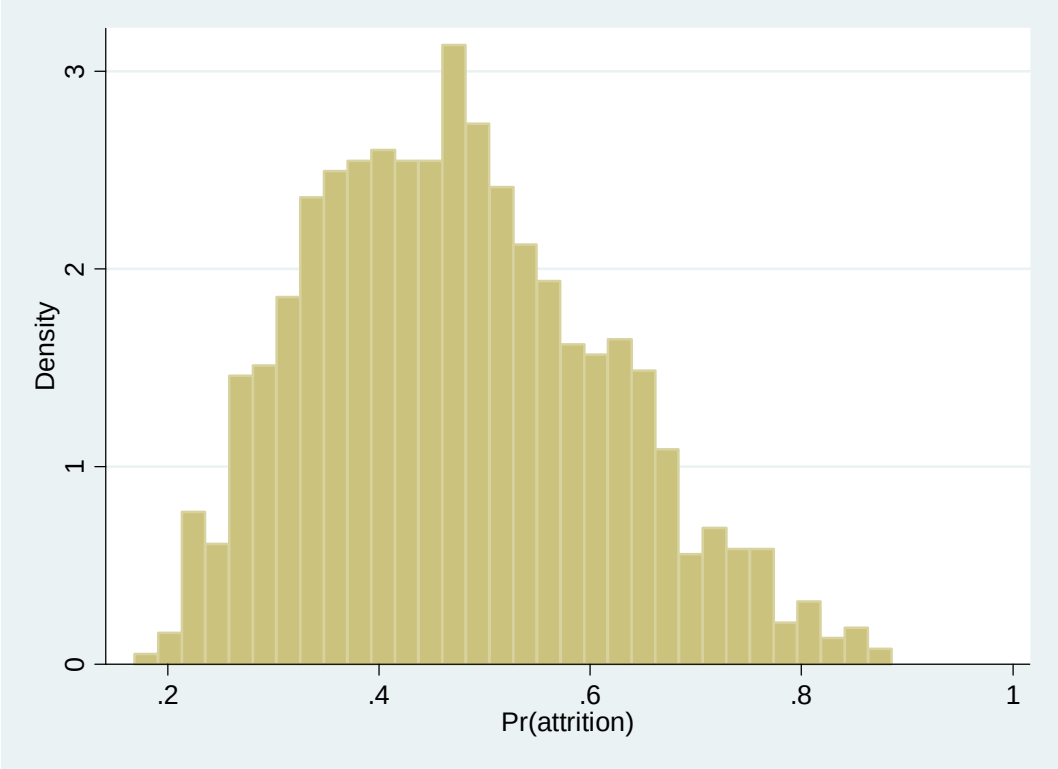

Table 2 by high and low probability of attrition: European integration in Britain, 1994 to 1997

To increase the sample size, I use the comparative party support measure as the dependent variable instead of vote choice. The results also look similar with vote choice.

	Place Labour more pro-EU than the Conservatives				*European integration coef.*		
High Probability of Attrition (above the median)							
	1994	1997	N	%	1994	1997	Diff.
All	-	-	757	100%	0.08	0.15	0.07
					(0.02)	(0.03)	(0.04)
Knew before	Yes	Yes	220	29%	0.25	0.29	0.04
					(0.04)	(0.04)	(0.06)
Learned	No	Yes	179	24%	0.01	0.27	0.26
					(0.04)	(0.04)	(0.06)
Partially learned	No	Better	151	20%	-0.04	0.07	0.11
					(0.05)	(0.05)	(0.07)
Never learned	No	No	119	16%	-0.12	-0.24	-0.12
					(0.07)	(0.07)	(0.10)
Forgot	Yes	No	88	12%	0.27	0.02	-0.25
					(0.06)	(0.08)	(0.11)
Low Probability of Attrition (below the median)							
	1994	1997	N	%	1994	1997	Diff.
All	-	-	764	100%	0.12	0.18	
					(0.03)	(0.02)	0.06
Knew before	Yes	Yes	427	56%	0.23	0.24	(0.04)
					(0.03)	(0.03)	0.01
Learned	No	Yes	150	20%	0.03	0.20	(0.04)
					(0.06)	(0.05)	0.17
Partially learned	No	Better	62	8%	-0.20	0.05	(0.08)
					(0.08)	(0.10)	0.25
Never learned	No	No	65	9%	0.07	-0.00	(0.13)
					(0.08)	(0.09)	-0.07
Forgot	Yes	No	60	8%	0.07	-0.01	(0.12)
					(0.09)	(0.07)	-0.08

OLS Regression

6.2 Investing Social Security Funds in the stock market and the 2000 Election

Histogram of predicted probability of panel attrition among those who survive the panel

This figure shows the predicted probability of attrition in the Annenberg panel. Although the models are somewhat similar, the demographics and political participation variables clearly don't predict attrition as well in the Annenberg panel as they do in the British case.

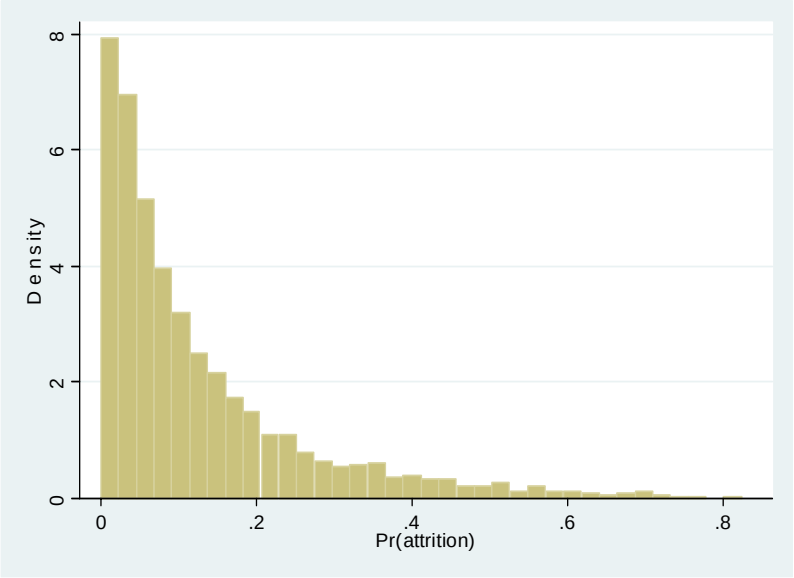

Table 3 by High and Low Probability of Attrition: Investing Social Security Funds in the Stock Market and the 2000 Election

	Correctly report candidate positions				***Investing Social Security funds coef.***		
High Probability of Attrition (above the median)							
	Pre-debates	Post-election	N	%	Pre-debates	Post-election	Diff.
All	-	-	466	100%	0.27	0.47	0.20
					(0.14)	(0.15)	(0.21)
Knew before	Yes	Yes	154	33%	1.78	1.26	*-0.52*
					(0.30)	(0.29)	(0.42)
Learned	No	Yes	128	27%	0.01	0.40	0.39
					(0.24)	(0.27)	(0.36)
Partially learned	No	Better	63	14%	-0.75	0.49	1.24
					(0.39)	(0.40)	(0.56)
Never learned	No	No	92	20%	-0.61	-0.46	0.15
					(0.31)	(0.34)	(0.46)
Forgot	Yes	No	29	6%	0.55	0.37	-0.18
					(0.60)	(0.53)	(0.80)
Low Probability of Attrition (below the median)							
	Pre-debates	Post-election	N	%	Pre-debates	Post-election	Diff.
All	-	-	475	100%	0.34	0.64	0.30
					(0.16)	(0.18)	(0.24)
Knew before	Yes	Yes	221	47%	0.74	1.06	0.32
					(0.23)	(0.29)	(0.37)
Learned	No	Yes	164	35%	0.25	0.80	0.55
					(0.25)	(0.30)	(0.39)
Partially learned	No	Better	23	5%	-0.10	-0.32	-0.22
					(0.53)	(0.52)	(0.74)
Never learned	No	No	43	9%	-0.56	-0.09	0.47
					(0.52)	(0.51)	(0.73)
Forgot	Yes	No	24	5%	0.45	-1.08	-1.53
					(0.57)	(0.58)	(0.81)

Panel attrition tables for the second and third cases coming soon.

Table 2: Granger tests of learning effects and Learning to opinion change By High and Low Probability of Attrition

	(1)	*(2)*	*(3)*	*(4)*
Probability of attrition:	High vote_b_2	Low vote_b_2	High inv_p_2	Low inv_p_2
vote_b_1	1.51	2.82	0.74	1.34
	(0.25)	(0.31)	(0.25)	(0.23)
inv_p_1	0.21	-0.64	1.44	0.71
	(0.27)	(0.32)	(0.27)	(0.22)
Constant	-1.26	-1.19	-1.10	-0.79
	(0.27)	(0.23)	(0.26)	(0.19)
Observations	131	164	131	164

Standard errors in parentheses