Online Appendix to Estimating the Persuasive Effects of Advertising in Presidential Primary Elections

Robert Bird*
Michael Peress†

May 2025

*Gallup, rbird3@gmail.com
†SUNY-Stony Brook, michael.peress@stonybrook.edu

A Online Appendix

A.1 Additional Tables

	Gore	**Bradley**
Baseline	66.90%	33.10%
Positive Ads (+1000 GRPs)	1.50%	1.54%
Negative Ads (+1000 GRPs)		
Attack Gore		2.62%
Attack Bradley	2.51%	

Table A.1: Effect Sizes for Advertising (2000 Democratic Primary) – Analyses report the change in predicted vote share from increasing positive or negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

	Bush	**McCain**	**Forbes**	**Keyes**	**Bauer**
Baseline	63.78%	27.12%	4.26%	3.92%	0.93%
Positive Ads (+1000 GRPs)	1.57%	1.38%	0.29%	0.27%	0.07%
Negative Ads (+1000 GRPs)					
Attack Bush		2.62%	0.66%	0.61%	0.15%
Attack McCain	3.22%		0.86%	0.79%	0.20%
Attack Forbes	4.73%	4.52%		0.92%	0.23%
Attack Keyes	4.75%	4.53%	0.99%		0.23%
Attack Bauer	4.95%	4.63%	1.01%	0.93%	

Table A.2: Effect Sizes for Advertising (2000 Republican Primary) – Analyses report the change in predicted vote share from increasing positive or negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

	Kerry	**Edwards**	**Clark**	**Dean**	**Gepardt**	**Lieberman**	**Kucinich**	**Mosely-Braun**	**Sharpton**
Baseline	17.40%	7.33%	15.27%	26.16%	10.16%	15.52%	2.10%	2.43%	3.62%
Positive Ads (+1000 GRPs)	1.01%	0.48%	0.91%	1.35%	0.64%	0.92%	0.15%	0.17%	0.25%
Negative Ads (+1000 GRPs)									
Attack Kerry		1.51%	2.79%	4.00%	2.01%	2.83%	0.47%	0.54%	0.78%
Attack Edwards	3.30%		2.99%	4.33%	2.14%	3.03%	0.49%	0.57%	0.83%
Attack Clark	3.13%	1.53%		4.07%	2.03%	2.87%	0.47%	0.54%	0.79%
Attack Dean	2.89%	1.42%	2.62%		1.89%	2.65%	0.44%	0.51%	0.74%
Attack Gepardt	3.24%	1.58%	2.94%	4.24%		2.97%	0.49%	0.56%	0.82%
Attack Lieberman	3.12%	1.53%	2.83%	4.06%	2.03%		0.47%	0.54%	0.79%
Attack Kucinich	3.42%	1.66%	3.10%	4.50%	2.21%	3.14%		0.59%	0.86%
Attack Mosely-Braun	3.41%	1.66%	3.09%	4.49%	2.21%	3.13%	0.51%		0.86%
Attack Sharpton	3.39%	1.64%	3.07%	4.45%	2.19%	3.11%	0.51%	0.58%	

Table A.3: Effect Sizes for Advertising (2004 Democratic Primary) – Analyses report the change in predicted vote share from increasing positive or negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

	Obama	Clinton	Edwards	Gravel	Kucinich	Richardson
Baseline	38.89%	49.60%	9.56%	0.65%	0.85%	0.46%
Positive Ads (+1000 GRPs)	1.64%	1.72%	0.61%	0.05%	0.06%	0.03%
Negative Ads (+1000 GRPs)						
Attack Obama		3.49%	1.64%	0.13%	0.17%	0.09%
Attack Clinton	3.27%		1.51%	0.12%	0.16%	0.08%
Attack Edwards	5.02%	5.07%		0.15%	0.20%	0.11%
Attack Gravel	5.43%	5.57%	2.12%		0.21%	0.11%
Attack Kucinich	5.42%	5.55%	2.12%	0.16%		0.11%
Attack Richardson	5.43%	5.58%	2.12%	0.16%	0.21%	

Table A.4: Effect Sizes for Advertising (2008 Democratic Primary) – Analyses report the change in predicted vote share from increasing positive or negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

	McCain	Romney	Giuliani	Huckabee	Huntsman	Thompson	Ron Paul	Keyes
Baseline	41.59%	12.98%	10.01%	23.62%	0.67%	5.42%	4.08%	1.63%
Positive Ads (+1000 GRPs)	1.68%	0.80%	0.64%	1.26%	0.05%	0.36%	0.28%	0.11%
Negative Ads (+1000 GRPs)								
Attack McCain		2.06%	1.67%	3.09%	0.13%	0.97%	0.75%	0.31%
Attack Romney	4.91%		2.04%	3.90%	0.15%	1.18%	0.90%	0.37%
Attack Giuliani	5.06%	2.58%		3.99%	0.16%	1.20%	0.92%	0.38%
Attack Huckabee	4.41%	2.35%	1.90%		0.14%	1.10%	0.84%	0.35%
Attack Huntsman	5.51%	2.75%	2.21%	4.27%		1.27%	0.97%	0.40%
Attack Thompson	5.28%	2.66%	2.14%	4.13%	0.16%		0.95%	0.39%
Attack Ron Paul	5.34%	2.69%	2.16%	4.17%	0.16%	1.24%		0.39%
Attack Keyes	5.46%	2.73%	2.19%	4.24%	0.16%	1.26%	0.97%	

Table A.5: Effect Sizes for Advertising (2008 Republican Primary) – Analyses report the change in predicted vote share from increasing positive or negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

	Romney	**Gingrich**	**Paul**	**Perry**	**Huntsman**	**Santorum**	**Bachman**	**Cain**
Baseline	33.98%	24.81%	9.72%	7.26%	3.69%	15.73%	2.39%	2.43%
Positive Ads (+1000 GRPs)	1.56%	1.30%	0.62%	0.48%	0.25%	0.93%	0.17%	0.17%
Negative Ads (+1000 GRPs)								
Attack Romney		3.39%	1.72%	1.34%	0.72%	2.53%	0.47%	0.48%
Attack Gingrich	4.21%		1.84%	1.42%	0.76%	2.71%	0.50%	0.51%
Attack Paul	4.81%	4.12%		1.57%	0.84%	3.01%	0.55%	0.56%
Attack Perry	4.91%	4.20%	2.06%		0.85%	3.06%	0.56%	0.57%
Attack Huntsman	5.06%	4.31%	2.11%	1.63%		3.14%	0.57%	0.58%
Attack Santorum	4.57%	3.94%	1.95%	1.51%	0.81%		0.53%	0.54%
Attack Bachman	5.11%	4.35%	2.13%	1.64%	0.88%	3.16%		0.59%
Attack Cain	5.11%	4.35%	2.13%	1.64%	0.88%	3.16%	0.58%	

Table A.6: Effect Sizes for Advertising (2012 Republican Primary) – Analyses report the change in predicted vote share from increasing positive or negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

	Gore	**Bradley**
Baseline	66.90%	33.10%
Negative Ads (+1000 GRPs)		
Attack Gore		2.62%
Attack Bradley	2.51%	

Table A.7: Effect Sizes for Advertising on Attacked Candidate (2000 Democratic Primary) – Analyses report the change in predicted vote share from increasing negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

	Bush	**McCain**	**Forbes**	**Keyes**	**Bauer**
Baseline	63.78%	27.12%	4.26%	3.92%	0.93%
Negative Ads (+1000 GRPs)					
Attack Bush		2.62%	0.66%	0.61%	0.15%
Attack McCain	3.22%		0.86%	0.79%	0.20%
Attack Forbes	4.73%	4.52%		0.92%	0.23%
Attack Keyes	4.75%	4.53%	0.99%		0.23%
Attack Bauer	4.95%	4.63%	1.01%	0.93%	

Table A.8: Effect Sizes for Advertising on Attacked Candidate (2000 Republican Primary) – Analyses report the change in predicted vote share from increasing negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

	Kerry	**Edwards**	**Clark**	**Dean**	**Gepardt**	**Lieberman**	**Kucinich**	**Mosely-Braun**	**Sharpton**
Baseline	17.40%	7.33%	15.27%	26.16%	10.16%	15.52%	2.10%	2.43%	3.62%
Negative Ads (+1000 GRPs)									
Attack Kerry		1.51%	2.79%	4.00%	2.01%	2.83%	0.47%	0.54%	0.78%
Attack Edwards	3.30%		2.99%	4.33%	2.14%	3.03%	0.49%	0.57%	0.83%
Attack Clark	3.13%	1.53%		4.07%	2.03%	2.87%	0.47%	0.54%	0.79%
Attack Dean	2.89%	1.42%	2.62%		1.89%	2.65%	0.44%	0.51%	0.74%
Attack Gepardt	3.24%	1.58%	2.94%	4.24%		2.97%	0.49%	0.56%	0.82%
Attack Lieberman	3.12%	1.53%	2.83%	4.06%	2.03%		0.47%	0.54%	0.79%
Attack Kucinich	3.42%	1.66%	3.10%	4.50%	2.21%	3.14%		0.59%	0.86%
Attack Mosely-Braun	3.41%	1.66%	3.09%	4.49%	2.21%	3.13%	0.51%		0.86%
Attack Sharpton	3.39%	1.64%	3.07%	4.45%	2.19%	3.11%	0.51%	0.58%	

Table A.9: Effect Sizes for Advertising on Attacked Candidate (2004 Democratic Primary) – Analyses report the change in predicted vote share from increasing negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

	Obama	Clinton	Edwards	Gravel	Kucinich	Richardson
Baseline	38.89%	49.60%	9.56%	0.65%	0.85%	0.46%
Negative Ads (+1000 GRPs)						
Attack Obama		3.49%	1.64%	0.13%	0.17%	0.09%
Attack Clinton	3.27%		1.51%	0.12%	0.16%	0.08%
Attack Edwards	5.02%	5.07%		0.15%	0.20%	0.11%
Attack Gravel	5.43%	5.57%	2.12%		0.21%	0.11%
Attack Kucinich	5.42%	5.55%	2.12%	0.16%		0.11%
Attack Richardson	5.43%	5.58%	2.12%	0.16%	0.21%	

Table A.10: Effect Sizes for Advertising on Attacked Candidate (2008 Democratic Primary) – Analyses report the change in predicted vote share from increasing negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

	McCain	Romney	Giuliani	Huckabee	Huntsman	Thompson	Ron Paul	Keyes
Baseline	41.59%	12.98%	10.01%	23.62%	0.67%	5.42%	4.08%	1.63%
Negative Ads (+1000 GRPs)								
Attack McCain		2.06%	1.67%	3.09%	0.13%	0.97%	0.75%	0.31%
Attack Romney	4.91%		2.04%	3.90%	0.15%	1.18%	0.90%	0.37%
Attack Giuliani	5.06%	2.58%		3.99%	0.16%	1.20%	0.92%	0.38%
Attack Huckabee	4.41%	2.35%	1.90%		0.14%	1.10%	0.84%	0.35%
Attack Huntsman	5.51%	2.75%	2.21%	4.27%		1.27%	0.97%	0.40%
Attack Thompson	5.28%	2.66%	2.14%	4.13%	0.16%		0.95%	0.39%
Attack Ron Paul	5.34%	2.69%	2.16%	4.17%	0.16%	1.24%		0.39%
Attack Keyes	5.46%	2.73%	2.19%	4.24%	0.16%	1.26%	0.97%	

Table A.11: Effect Sizes for Advertising on Attacked Candidate (2008 Republican Primary) – Analyses report the change in predicted vote share from increasing negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

	Romney	**Gingrich**	**Paul**	**Perry**	**Huntsman**	**Santorum**	**Bachman**	**Cain**
Baseline	33.98%	24.81%	9.72%	7.26%	3.69%	15.73%	2.39%	2.43%
Negative Ads (+1000 GRPs)								
Attack Romney		3.39%	1.72%	1.34%	0.72%	2.53%	0.47%	0.48%
Attack Gingrich	4.21%		1.84%	1.42%	0.76%	2.71%	0.50%	0.51%
Attack Paul	4.81%	4.12%		1.57%	0.84%	3.01%	0.55%	0.56%
Attack Perry	4.91%	4.20%	2.06%		0.85%	3.06%	0.56%	0.57%
Attack Huntsman	5.06%	4.31%	2.11%	1.63%		3.14%	0.57%	0.58%
Attack Santorum	4.57%	3.94%	1.95%	1.51%	0.81%		0.53%	0.54%
Attack Bachman	5.11%	4.35%	2.13%	1.64%	0.88%	3.16%		0.59%
Attack Cain	5.11%	4.35%	2.13%	1.64%	0.88%	3.16%	0.58%	

Table A.12: Effect Sizes for Advertising on Attacked Candidate (2012 Republican Primary) – Analyses report the change in predicted vote share from increasing negative ad spending by 1000 GRPs, relative to a baseline of no ad spending by all candidates.

A.2 Details of the Sample

In Table A.13, we report additional details of the sample. The original sample had about 800,000 respondents, but both the NAES and the Gallup data stretched to well after the primary was over, where the relevant survey items for our analysis were no longer asked. Once we paired down the sample, we had 198,123 respondents and 566,500 observations for the favorability dependent variable and 121,015 respondents for the vote intention dependent variable. A little less than half of this data occurred after the relevant primary contest, which is excluded from the main analysis. Most of the remaining data occurred more than 4 weeks before the primary election, suggesting that relatively few observations are lost due to our restriction of the sample to observations with no imminent election using the 2 and 4 week windows, but advertising is heavily concentrated in the weeks leading up to an election. As such, our sample had a large number of observations, but the variability of the dependent variable was reduced among these observations. This highlights the need of starting from a large sample size—our final sample has about 26,000 observations and 8,500 respondents with positive advertising for the favorability data and about 3,500 respondents with positive advertising for the vote intention data.

A.3 Robustness Checks

In this section, we consider the robustness of our analysis to a number of alternative specifications. We first consider a specification which measures the independent variables based on a count of ads rather than the number of GRPs. These results are reported in Table A.14. We continue to find that running both positive and negative ads increases a candidates favorability. Negative ads appear to be more effective in increasing a candidates favorability. The difference in effects is marginally significant in the 2 week specification, significant in the 4 week specification, and insignificant in the 8 week specification. One difference from

DV:		Favorability			Vote Intention	
	Observations	Per. w/ Pos. Adv.	Respondents	Per. w/ Pos. Adv.	Respondents	Per. w/ Pos. Adv.
Full Sample	566500	10.5	198123	9.7	121015	27.1
2 Week Window:						
No Eminent Election	306273	9.3	105634	8.8	54160	12.7
Eminent Election	26860	51.5	4916	47.6	13056	60.3
4 Week Window:						
No Eminent Election	306273	8.0	101647	7.7	42732	8.5
Eminent Election	26860	46.3	8991	43.0	24484	45.4
8 Week Window:						
No Eminent Election	277205	6.3	93039	5.9	28740	7.2
Eminent Election	55928	34.9	17626	34.5	38476	32.9
After Election	233367	9.6	88521	9.4	53799	33.5

Table A.13: Sample Summary

the specification based on GRPs is the we find that getting attacked increases favorability in the 4 week specification. The results on vote intention are very similar to what we found earlier.

We next considered replacing candidate fixed effects with candidate-month fixed effects. The results are presented in Table A.15. We continue to find that running positive and negative ads increases the favorability of the candidate running the ads, with negative ads having a larger effect. We continue to find that the latent tendency to support a candidate increases when the candidate runs both positive and negative ads, with negative ads having a larger effect. Positive advertising now is only statistically significant with a 2 week window. We continue to find that being attacked increases the latent tendency to support a candidate.

We considered the possibility that advertising exhibits diminishing returns by considering a log-specification. Specifically, we considered $log(1 + GRPS/1000)$, where the 1 was used to handle instances where a candidate ran zero ads of a given type in a media market. The results are given in Table A.16. The next set of results repeat the analyses omitting Iowa,

DV:	(1)	(2)	(3)	(4)	(5)	(6)
	Favorability			Candidate Choice		
	2 weeks out	4 weeks out	8 weeks out	2 weeks out	4 weeks out	8 weeks out
Independent Variables:						
Party Match	0.451***	0.460***	0.493***			
	(0.003)	(0.003)	(0.003)			
Run Positive Ads	0.042***	0.047***	0.057***	0.736***	0.528***	0.733***
	(0.007)	(0.008)	(0.012)	(0.085)	(0.129)	(0.188)
Run Negative Ads	0.091***	0.113***	0.087+	1.912***	1.790***	1.233***
	(0.025)	(0.028)	(0.048)	(0.217)	(0.241)	(0.344)
Attacked by Negative Ads	0.033	0.084**	0.082	0.795***	1.132***	1.206**
	(0.027)	(0.032)	(0.052)	(0.225)	(0.255)	(0.390)
Observations	319044	306273	277205			
Respondents	105679	101692	93084	54160	42732	28740

Table A.14: The Effects of Ads on Favorability and Candidate Choice, Independent Variables Based on Number of Ads. Analyses include respondent and candidate fixed effects (columns 1-3) and candidate fixed effects (columns 4-6). Standard errors are in parentheses and are clustered by respondent in columns 1-3. One star indicates statistical significance at the 5% level. Two stars indicates statistical significance at the 1% level. Three stars indicates statistical significance at the 0.1% level. A plus sign indicates statistical significance at the 10% level.

New Hampshire, and South Carolina. We considered excluding these early states because it is possible that the candidates intended to target them outside of the 2 week, 4 week, and 8 week windows. We report these results in Table A.17. Finally, we considered aggregating ads over a 2 week and 8 week window. These specifications allow for the possibility that voter memory of advertising operates over a shorter or longer window of time than 4 weeks. We report these results in Tables A.18 and A.19. In each of these specifications, the main findings concerning the statistical significance of advertising effects hold up.

We similarly would like to demonstrate the robustness of our conclusions about the magnitude of advertising effects, the relative effectiveness of positive and negative advertising, and the tendency of low polling candidates to benefit from being attacked. To address the first of these, we measured the change in vote share we would observe in a two-candidate primary starting from a baseline where the candidates had equal vote shares and considered increasing the amount of either positive or negative advertising by 1000 GRPs in each of the alternative specifications. To focus first on the overall effect of advertising, we averaged the

DV:	(1)	(2)	(3)	(4)	(5)	(6)
	Favorability			Candidate Choice		
	2 weeks out	4 weeks out	8 weeks out	2 weeks out	4 weeks out	8 weeks out
Independent Variables:						
Party Match	0.449***	0.458***	0.492***			
	(0.003)	(0.003)	(0.003)			
Run Positive Ads	0.005**	0.005***	0.006**	0.047**	0.020	0.021
	(0.002)	(0.002)	(0.002)	(0.016)	(0.022)	(0.033)
Run Negative Ads	0.018***	0.018***	0.013+	0.271***	0.238***	0.130*
	(0.004)	(0.004)	(0.007)	(0.039)	(0.047)	(0.060)
Attacked by Negative Ads	0.000	0.002	0.011+	0.100**	0.095**	0.077+
	(0.003)	(0.004)	(0.006)	(0.031)	(0.036)	(0.045)
Observations	319044	306273	277205			
Respondents	105898	101911	93296	54160	42732	28740

Table A.15: The Effects of Ads on Favorability and Candidate Choice, Candidate-Month Fixed Effects. Analyses include respondent and candidate fixed effects (columns 1-3) and candidate fixed effects (columns 4-6). Standard errors are in parentheses and are clustered by respondent in columns 1-3. One star indicates statistical significance at the 5% level. Two stars indicates statistical significance at the 1% level. Three stars indicates statistical significance at the 0.1% level. A plus sign indicates statistical significance at the 10% level.

DV:	(1)	(2)	(3)	(4)	(5)	(6)
	Favorability			Candidate Choice		
	2 weeks out	4 weeks out	8 weeks out	2 weeks out	4 weeks out	8 weeks out
Independent Variables:						
Party Match	0.451***	0.460***	0.493***			
	(0.003)	(0.003)	(0.003)			
Run Positive Ads	0.020***	0.022***	0.018**	0.535***	0.430***	0.588***
	(0.005)	(0.005)	(0.006)	(0.045)	(0.072)	(0.105)
Run Negative Ads	0.042***	0.046***	0.043*	0.514***	0.490***	0.219+
	(0.010)	(0.011)	(0.017)	(0.079)	(0.096)	(0.133)
Attacked by Negative Ads	0.006	0.018	0.037*	0.214**	0.330**	0.288*
	(0.009)	(0.011)	(0.016)	(0.081)	(0.103)	(0.141)
Observations	319044	306273	277205			
Respondents	105679	101692	93084	54160	42732	28740

Table A.16: The Effects of Ads on Favorability and Candidate Choice, Logged Ads. Analyses include respondent and candidate fixed effects (columns 1-3) and candidate fixed effects (columns 4-6). Standard errors are in parentheses and are clustered by respondent in columns 1-3. One star indicates statistical significance at the 5% level. Two stars indicates statistical significance at the 1% level. Three stars indicates statistical significance at the 0.1% level. A plus sign indicates statistical significance at the 10% level.

DV:	(1)	(2)	(3)	(4)	(5)	(6)
	Favorability			Candidate Choice		
	2 weeks out	4 weeks out	8 weeks out	2 weeks out	4 weeks out	8 weeks out
Independent Variables:						
Party Match	0.446***	0.455***	0.489***			
	(0.003)	(0.003)	(0.003)			
Run Positive Ads	0.008***	0.010***	0.009***	0.117***	0.061*	0.082**
	(0.002)	(0.002)	(0.002)	(0.016)	(0.024)	(0.032)
Run Negative Ads	0.015***	0.014***	0.007	0.283***	0.219***	0.098+
	(0.004)	(0.004)	(0.007)	(0.041)	(0.045)	(0.054)
Attacked by Negative Ads	0.000	0.005	0.007	0.096**	0.108**	0.080+
	(0.004)	(0.005)	(0.007)	(0.032)	(0.034)	(0.041)
Observations	306207	294048	266169			
Respondents	101490	97709	89520	53665	42382	28552

Table A.17: The Effects of Ads on Favorability and Candidate Choice, No IA, NH, or SC. Analyses include respondent and candidate fixed effects (columns 1-3) and candidate fixed effects (columns 4-6). Standard errors are in parentheses and are clustered by respondent in columns 1-3. One star indicates statistical significance at the 5% level. Two stars indicates statistical significance at the 1% level. Three stars indicates statistical significance at the 0.1% level. A plus sign indicates statistical significance at the 10% level.

DV:	(1)	(2)	(3)	(4)	(5)	(6)
	Favorability			Candidate Choice		
	2 weeks out	4 weeks out	8 weeks out	2 weeks out	4 weeks out	8 weeks out
Independent Variables:						
Party Match	0.451***	0.460***	0.493***			
	(0.003)	(0.003)	(0.003)			
Run Positive Ads	0.009***	0.010***	0.008*	0.183***	0.110**	0.098*
	(0.003)	(0.003)	(0.003)	(0.021)	(0.036)	(0.048)
Run Negative Ads	0.029***	0.031***	0.024*	0.389***	0.339***	0.183*
	(0.006)	(0.007)	(0.010)	(0.059)	(0.064)	(0.077)
Attacked by Negative Ads	0.004	0.008	0.018+	0.161***	0.152**	0.123+
	(0.005)	(0.006)	(0.009)	(0.048)	(0.052)	(0.066)
Observations	319044	306273	277205			
Respondents	105679	101692	93084	54160	42732	28740

Table A.18: The Effects of Ads on Favorability and Candidate Choice, Independent Variables Based on Two Weeks of Ads. Analyses include respondent and candidate fixed effects (columns 1-3) and candidate fixed effects (columns 4-6). Standard errors are in parentheses and are clustered by respondent in columns 1-3. One star indicates statistical significance at the 5% level. Two stars indicates statistical significance at the 1% level. Three stars indicates statistical significance at the 0.1% level. A plus sign indicates statistical significance at the 10% level.

DV:	(1)	(2)	(3)	(4)	(5)	(6)
	Favorability			Candidate Choice		
	2 weeks out	4 weeks out	8 weeks out	2 weeks out	4 weeks out	8 weeks out
Independent Variables:						
Party Match	0.451***	0.460***	0.493***			
	(0.003)	(0.003)	(0.003)			
Run Positive Ads	0.004***	0.004***	0.003**	0.094***	0.072***	0.079***
	(0.001)	(0.001)	(0.001)	(0.013)	(0.018)	(0.023)
Run Negative Ads	0.009***	0.010***	0.007	0.168***	0.126***	0.027
	(0.002)	(0.003)	(0.005)	(0.030)	(0.034)	(0.041)
Attacked by Negative Ads	0.002	0.004	0.001	0.078***	0.087***	0.072*
	(0.003)	(0.003)	(0.004)	(0.022)	(0.024)	(0.028)
Observations	319044	306273	277205			
Respondents	105679	101692	93084	54160	42732	28740

Table A.19: The Effects of Ads on Favorability and Candidate Choice, Independent Variables Based on Eight Weeks of Ads. Analyses include respondent and candidate fixed effects (columns 1-3) and candidate fixed effects (columns 4-6). Standard errors are in parentheses and are clustered by respondent in columns 1-3. One star indicates statistical significance at the 5% level. Two stars indicates statistical significance at the 1% level. Three stars indicates statistical significance at the 0.1% level. A plus sign indicates statistical significance at the 10% level.

effects of positive and negative advertising. Here, we find somewhat larger effect sizes in the log specification and the specification that excludes the early primary states, though this does not alter our conclusion that effect sizes were smaller than what Huber and Arceneaux (2007) found for general elections. Furthermore, consistent with patterns found in Huber and Arceneaux, we found larger effect sizes when advertising was aggregated over a 2 week window and smaller effect sizes when advertising was aggregated over an 8 week window.

We next wanted to demonstrate that our findings that positive advertising is less effective and that low polling candidates increase their vote share when attacked continue to hold in the other models. In principal, we could report versions of Tables A.1 through A.12. To save the reader the trouble of interpreting a very large number of effect sizes, we instead report limiting effect sizes which parallel those we reported in Section 4.3. In Table A.20, we report the effectiveness of positive relative to negative advertising for small changes in advertising. The alternative specifications generally yield results that are similar to our main specifications where we found that negative advertising was more effective than positive

advertising, with the ratio of effects statistically distinguishable from 1 in the 2 week and 4 week specifications in all cases. For the model that includes candidate-month fixed effects, the relative effectiveness of positive advertising is smaller than in our main specifications. In the model where the IVs are constructed based on 8 weeks of ads, the relative effectiveness cannot be statistically distinguish from 1 using the 4 week window for an imminent election. In the log model, there is less support for the finding that negative advertising is more effective. This is consistent with either the relative effectiveness of negative advertising being due to diminishing returns to advertising or with it being more difficult to precisely estimate the relative effectiveness of negative advertising when one allows for diminishing returns to advertising. The remaining results are very similar in magnitude and statistical significance.

We also considered whether attacked candidates were hurt by negative ads. To investigate this, we examined the crossover point, $\frac{\theta_3}{\theta_2}$, derived in Section 4.3. If this ratio falls between zero and one, it indicates than high-polling candidates will be harmed when attacked and low polling candidates will be helped when attacked. In the baseline specification, we found that this ratio was close to a half and statistically distinguishable from both zero and one using the two week and four week windows. In Table A.21, we report the crossover point for a number of alternative specifications. We find very similar results in the six alternative models, with the exception that the crossover point is not statistically distinguishable from 1 in the model where the IVs are based on 8 weeks of ads and where an election 4 weeks away is considered imminent.

Relative vote share of Attacked Candidate	2 weeks out 0	0.5	1	4 weeks out 0	0.5	1	8 weeks out 0	0.5	1
Baseline	0.462†	0.562†	0.715	0.305†	0.403†	0.592	0.990	1.699	5.986
	(0.095)	(0.118)	(0.184)	(0.127)	(0.172)	(0.296)	(0.684)	(1.671)	(20.382)
Number of Ads	0.385†	0.486†	0.659†	0.295†	0.431†	0.802	0.594	1.162	26.545
	(0.068)	(0.090)	(0.164)	(0.089)	(0.139)	(0.387)	(0.241)	(0.673)	(375.015)
Cand.-Month FEs	0.174†	0.213†	0.274†	0.082†	0.103†	0.137†	0.164†	0.233	0.401
	(0.067)	(0.081)	(0.110)	(0.097)	(0.121)	(0.163)	(0.274)	(0.401)	(0.783)
Log	1.041	1.315	1.785	0.877	1.323	2.689	2.681	7.807	-8.559
	(0.198)	(0.284)	(0.586)	(0.253)	(0.461)	(1.987)	(1.808)	(14.012)	(20.702)
No IA, NH, or SC	0.414†	0.499†	0.626†	0.277†	0.368†	0.548	0.842	1.426	4.657
	(0.086)	(0.105)	(0.155)	(0.128)	(0.175)	(0.302)	(0.594)	(1.383)	(14.138)
IVs Based on 2 Weeks of Ads	0.470†	0.593†	0.802	0.326†	0.420†	0.590	0.537	0.808	1.630
	(0.090)	(0.120)	(0.216)	(0.125)	(0.164)	(0.265)	(0.358)	(0.632)	(2.335)
IVs Based on 8 Weeks of Ads	0.558†	0.728	1.047	0.574	0.879	1.869	2.934	-8.735	-1.755
	(0.135)	(0.188)	(0.354)	(0.235)	(0.419)	(1.566)	(4.792)	(34.490)	(1.358)

Table A.20: Robustness Checks for the Relative Effectiveness of Positive Advertising – Each entry computes $\frac{\theta_1}{\theta_2 - \frac{e^{u_2}}{e^{u_2}+C}\theta_3}$ for a particular model, where $\frac{e^{u_2}}{e^{u_2}+C}$ is the vote share of the attacked candidate relative to all candidates except the attacker. A dagger indicates that the coefficient is statistically significantly different than 1 at the 5% level.

In explaining the mechanism through which candidates might increase their vote share when attacked, we argued that candidates should be harmed (or at least, not helped) in term of favorability by being attacked, but that being attacked might increase a candidate's perceived viability which may lead voters to vote for that candidate. In Table 2, we found that candidates did not increase their favorability when attacked and in Table 4, we found that respondents increased their estimation of the likelihood that a candidate would win when that candidate was attacked (as long as the candidate was not extremely likely to win). A potential weakness of the first finding is that favorability was measured in different ways in different years. We attempted to make these different measures comparable by scaling each measure to range between zero and one. Here, we consider a different approach—we generated a binary measure of favorability.[1] These results are given in Table A.22. The results are nearly identical to what we found in Table 2 and in particular, we find that a candidate's favorability does not increase when the candidate is attacked. This, in turn, argues that the increase in vote share we observe when a candidate is attacked is not due to evaluations of the candidate and is instead due to strategic considerations (such as perceived viability).

A.4 Analysis of Contrast Ads

In this section, we present results that separately consider primarily negative ads and contrast ads. We report these results in Table A.23. Our interpretation focuses on whether there are statistical significant differences in the effects of contrast and primarily negative ads. Columns 1-3 report the results when favorability is the dependent variable. Positive ads have a positive and statistically significant effect on favorability in all three specifications. We also find that at least one kind of negative ad has a statistically significant effect

[1] In the 2000 and 2004 NAES, neutral responses (50 and 5, respectively) were allowed. We coded such values as missing in the analysis using the binary measure.

	2 weeks out	4 weeks out	8 weeks out
Baseline	0.354*†	0.484*†	0.835
	(0.110)	(0.138)	(0.496)
Number of Ads	0.416*†	0.632*†	0.978*
	(0.109)	(0.133)	(0.313)
Cand.-Month FEs	0.367*†	0.398*†	0.591
	(0.102)	(0.131)	(0.320)
Log	0.417*†	0.674*	1.313
	(0.153)	(0.209)	(0.879)
No IA, NH, or SC	0.339*†	0.495*†	0.819
	(0.102)	(0.141)	(0.475)
IVs Based on 2 Weeks of Ads	0.413*†	0.448*†	0.671
	(0.111)	(0.137)	(0.367)
IVs Based on 8 Weeks of Ads	0.466*†	0.693*	2.672
	(0.118)	(0.185)	(3.641)

Table A.21: Robustness Checks for the Crossover Point. Each entry computes $\frac{\theta_3}{\theta_2}$ for a particular model, where attacked candidates loose vote share when $\frac{1}{1+C} < \frac{\theta_3}{\theta_2}$ and gain vote share otherwise. Here, $\frac{1}{1+C}$ is the vote share of the attacking candidate relative to all candidates except the attacked candidate. One star indicates that the coefficient is statistically significantly different from 0 at the 5% level and one dagger indicates that the coefficient is statistically significantly different from 1 at the 5% level.

	(1)	(2)	(3)
DV:		Favorability	
	2 weeks out	4 weeks out	8 weeks out
Independent Variables:			
Party Match	0.509***	0.513***	0.531***
	(0.004)	(0.004)	(0.005)
Run Positive Ads	0.006**	0.006**	0.005*
	(0.002)	(0.002)	(0.002)
Run Negative Ads	0.016***	0.017***	0.008
	(0.005)	(0.005)	(0.009)
Attacked by Negative Ads	0.001	0.003	0.008
	(0.004)	(0.005)	(0.008)
Observations	301803	290664	265562
Respondents	104496	100628	92268

Table A.22: The Effects of Ads on Favorability, Binary Measure. Analyses include respondent and candidate fixed effects. Standard errors clustered by respondents are in parentheses. One star indicates statistical significance at the 5% level. Two stars indicates statistical significance at the 1% level. Three stars indicates statistical significance at the 0.1% level. A plus sign indicates statistical significance at the 10% level.

in all three specifications, though the difference in effects is not statistically significant in the 2 week specification and only marginally significant in the 4 week specification. Being attacked by contrast ads has a marginally significant effect in the 4 week specification, but the difference in effects between getting attacked and getting contrasted is not statistically significant. Overall, we have fairly weak evidence that running contrast ads is more effective than running primarily negative ads and no convincing evidence that getting attacked and getting contrasted have different effects on favorability.

Columns 4-6 report the results when vote intention is the dependent variable. The relative effectiveness of contrast ads relative to positive ads depends on the vote share of the contrasted candidate and is given by $\frac{\theta_1}{\theta_2 - s\theta_4}$ where s is the vote share of the attacked candidate. The same quantity for the relative effectiveness of primarily negative ads is given by $\frac{\theta_1}{\theta_3 - s\theta_5}$. In the table, we report the difference between these two quantities when the vote share of the attacked candidate is 0, 1/2, and 1. In no case is the difference statistically significant. There is also a crossover point for when a candidate is hurt by being attacked. Only in the 8 week specification is the difference statistically distinguishable from 0. We thus find almost no evidence that contrast ads and primarily negative ads have a differential effect on vote intention.

DV:	(1)	(2)	(3)	(4)	(5)	(6)
		Favorability			Candidate Choice	
	2 weeks out	4 weeks out	8 weeks out	2 weeks out	4 weeks out	8 weeks out
Independent Variables:						
Party Match	0.451***	0.460***	0.493***			
	(0.003)	(0.003)	(0.003)			
Run Positive Ads	0.005***	0.005**	0.005*	0.114***	0.058*	0.090**
	(0.001)	(0.002)	(0.002)	(0.016)	(0.024)	(0.032)
Run Contrast Ads	0.016***	0.016***	0.009	0.325***	0.325***	0.176**
	(0.004)	(0.004)	(0.007)	(0.038)	(0.047)	(0.060)
Run Negative Ads	0.030	0.099*	0.113*	0.071	-0.016	-0.091
	(0.025)	(0.044)	(0.048)	(0.062)	(0.075)	(0.100)
Attacked by Contrast Ads	0.009	0.010+	0.016	0.214**	0.424***	0.445**
	(0.005)	(0.006)	(0.010)	(0.067)	(0.113)	(0.156)
Attacked by Negative Ads	-0.006	-0.005	0.001	0.034	0.029	0.001
	(0.005)	(0.007)	(0.010)	(0.036)	(0.038)	(0.052)
Observations	319044	306273	277205			
Respondents	105681	101694	93086	54160	42732	28740
P-Value for Test of Attack = Contrast	0.567	0.059+	0.032*			
P-Value for Test of Get Attacked = Get Contrasted	0.075+	0.141	0.300			
Con. - Att. Rel. Eff. at 0				-1.250	3.803	1.498
Con. - Att. Rel. Eff. at 1/2				-1.579	2.413	-0.954
Con. - Att. Rel. Eff. at 1				-2.029	0.701	0.643
Con. - Att. Crossover				0.183	3.114	2.537*

Table A.23: The Effects of Ads on Favorability and Candidate Choice, Contrast vs. Primarily Negative Ads. Analyses include respondent and candidate fixed effects (columns 1-3) and candidate fixed effects (columns 4-6). Standard errors are in parentheses and are clustered by respondent in columns 1-3. One star indicates statistical significance at the 5% level. Two stars indicates statistical significance at the 1% level. Three stars indicates statistical significance at the 0.1% level. A plus sign indicates statistical significance at the 10% level.

References

Huber, Gregory A. and Kevin Arceneaux. 2007. "Identifying the Persuasive Effects of Presidential Advertising." *American Journal of Political Science* 51:957–977.