

## **Mass Media as a Source of Public Responsiveness**

*Abstract:* There is a sizable literature finding evidence of public responsiveness to policy change, across a range of salient policy domains and countries. We have only a partial sense for what drives this responsiveness, however. One possibility is that individuals learn at least part of what they need to know from mass media. Work tends to emphasize failures in both media coverage, and citizens; but there is little work exploring the prevalence of relevant, accurate information in media content, or citizens' abilities to pick up on that information. This study examines both, through an automated content analysis of 35 years of defense spending reporting, validated by a coding exercise fielded to survey respondents. Results prompt an analysis of a unique set of ANES questions from 1980-1992, tracing both perceptions of and preferences for defense spending change over time, which illustrates how media might facilitate – but also confuse – public responsiveness.

Word count: 9.952 words.

There have been real concerns about governments' willingness to respond to citizens, and whether this even makes sense given questions about citizens' ability to provide useful input to governments. Converse's (1964) work has been particularly influential; and there is now a vast literature chronicling the political ignorance of the average citizen (e.g., Berelson et al., 1954; Converse, 1964, 1970; Bennett, 1988; Page and Shapiro, 1992; Delli Carpini and Keeter, 1996; Popkin and Dimock, 1999).

At the same time, there is a growing body of work suggesting that citizens can and often do respond to changes in the "real world" environment, and to changes in policy. Stimson's (1991, 1999) account of shifts in "policy mood" stands as one early account of public responsiveness to policy change; he argues that when governments move outside the public's "zone of acquiescence," public opinion offers strong negative feedback. (Also see Erikson et al., 2002.) Durr's (1993) subsequent exploration of "What Moves Policy Sentiment?" reveals a systematic pro-cyclical impact of macroeconomic conditions on aggregate-level policy preferences. Page and Shapiro's (1992) widely influential work identifies "rational" trends in aggregate-level public opinion, in reaction to economic and policy change, across a wide range of policy domains. Similar dynamics are reflected in Wlezien's subsequent work on "thermostatic" policy responsiveness (e.g., Wlezien, 1995, 1996; Soroka and Wlezien 2005, 2010; Wlezien and Soroka, 2012); and in a growing body of related research (e.g., Jennings, 2009; Ura and Ellis, 2012; Ellis and Faricy, 2011; Enns and Kellstedt, 2008; Kellstedt, 2003; Bartle et al., 2011). All of this work finds evidence of an ongoing tendency for aggregate publics to respond in understandable ways to the changing policy environment. There is not always public responsiveness, of course – work

cited above suggests that in some domains it is not evident at all. But in salient policy domains, there is a considerable and growing body of evidence, in the US and elsewhere, suggesting that people can and do adjust their preferences for more (or less) policy in response to actual policy.

How can we reconcile evidence of systematic public responsiveness with evidence of uninformed publics? Past work has focused on the advantages of aggregation (see especially Page and Shapiro 1992).<sup>1</sup> This cannot fully account for public responsiveness, however: while it might explain how there can be a sensible signal even where there is considerable noise, it cannot explain the underlying trend. *How does public opinion react to policy change?*

We regard this as one of the central, and largely unanswered, questions in current research on representative democracy. It has been on the minds of scholars of opinion-policy relationships for some time, of course. Consider Barabas' (2011:194) discussion of Soroka and Wlezien (2010): "At a more micro-level, there is an assumption throughout the book that people get the signal on policy change and then update their preferences accordingly. However, there is no direct examination of media messages or other ways of documenting these linkages." Consider also Hakhverdian's (2012) discussion of the same literature: "...the public has to possess knowledge on whether appropriations in defense and domestic domains have gone up or down. The mass media assumedly plays a large mediating role in conveying this message, and with spending data one can perhaps picture

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<sup>1</sup> Though see Althaus (2003) for a more complicated and less complimentary view of aggregation.

people adjusting their preferences for ‘more’ or ‘less’ spending based on media information they receive.” “Assumedly” and “perhaps” are accurate reflections of the state of the field. In spite of a vast body of work finding evidence that aggregate-level public opinion often reacts to policy change (in salient domains, at least), the literature is nearly silent on how exactly this occurs.

We propose an account below that is very simple, and based on the following propositions: (a) public responsiveness to policy requires only very basic levels of knowledge about policy and policy change, (b) this very basic information is readily available in media content, and (c) citizens are able to pick up on these informational media cues.

We are not suggesting that media are the *only* means by which citizens learn about policy, of course, nor are we suggesting that media are necessarily accurate.

Regarding the former, there quite clearly are various ways in which people might learn about policy change. Some citizens will have direct experience with certain policies; some may learn about policy change through social networks;<sup>2</sup> some may have a sense for policy change not through any observation about policy itself, but through the partisanship of government (i.e., if Republicans are in office one might simply assume that social welfare spending is decreasing). So to be clear: our argument is not that media are the only force driving public responsiveness to policy. It nevertheless seems likely that media can play a role in facilitating public responsiveness to policy change.

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<sup>2</sup> Though note that this information, too, likely comes from mass media.

Regarding the accuracy of media coverage, we readily acknowledge that even as accurate media reports may facilitate responsiveness, inaccurate reports may produce reactions that are not in line with actual policy change. Our first tests focus on whether the media facilitates public responsiveness; but a second consideration, taken up in a concluding section, examines the degree to which media coverage does not accurately reflect policy, and thus distorts effective responsiveness.

The argument that mass media matter for public responsiveness may, for some, seem obvious. Surely, mass mediated information must matter somehow. But this account does not fit easily with the considerable literature highlighting the political ignorance of the average citizen. It also appears to contradict literatures focused on the many failures in media coverage. We discuss both issues in some detail below. We then explore the possibility that mass media could drive public responsiveness, using US defense spending as an expository case. We focus first on a content analysis of roughly 50,000 stories in the *New York Times* and the *Washington Post* from 1980 to 2015 – an analysis that finds a surprisingly large number of informational cues about change in defense spending. We validate this automated analysis through coding exercises by both untrained and expert coders. We see these not just as tests of the automation, but tests of whether regular citizens are able to extract information about defense spending from news content. We are buoyed by what appear to be very strong results in both our content-analytic data and coding exercises – both suggest that some basic conditions for mass-media-informed public responsiveness are met. We then turn to an analysis of a unique set of questions that only co-existed in the 1980-1992 American National Election Studies (ANES), the results of which illustrate how media may well play a role in individual-level responsiveness to

policy. We reconsider all these findings in a concluding section, where we also consider how media coverage might not just facilitate public responsiveness, but also confuse it.

## Mass Media & Public Responsiveness

There is, as we have noted, a growing body of work finding evidence of aggregate-level public responsiveness to policy change. There is however little work that seeks to understand the underlying mechanism(s) driving the relationship.

Our mass media-focused account begins with the following supposition: in contrast to what some analysts seem to believe, public responsiveness to policy does not require a high level of information. We build here on Soroka and Wlezien's (2010) argument that public responsiveness requires only that people have a sense for the direction of policy change – whether policy has gone up or down – and perhaps also the magnitude – whether it has gone up by a little or a lot. These are rather basic pieces of information. Public responsiveness need not depend on citizens knowing what exactly is happening in a policy domain; it only requires that (some) citizens know the direction in which policy is changing (i.e., whether spending or regulation is increasing or decreasing).

This information needs to come from somewhere, however, and there are good reasons to expect that at least some policy information is transmitted by mass media. People do not typically directly observe what policymakers do, after all, and they also do not have copies of the federal budget (or other policies) on their coffee tables, laptops or cellphones.

Information about what policymakers do is thus conveyed to the public by some other means, and the most likely suspect is mass media.<sup>3</sup>

The prospect that mass media provide the information that drives public responsiveness may well seem to be at odds with common critiques of media content. There are considerable bodies of work detailing a range of biases in media content, and a good deal of work lamenting variability in, or a total lack of, policy content specifically (e.g., Dunaway 2011; Lawrence, 2000; Bennett et al. 2008), alongside work identifying inadequate and sometimes misleading coverage of complex scientific issue domains in particular (e.g., Friedman et al. 1999; Bucchi and Mazzolini 2003; Stocking and Holstein 2009). Consider also the vast body of work on sensationalism and/or negativity in news content (e.g., Altheide 1997; Davie and Lee 1995; Lichter and Noyes 1995; Meyrowitz 1985; Patterson 1994; Sabato 1991; Soroka 2014). These are just some of the literatures concerned with problems of both the frequency and accuracy of media coverage. And they are illustrative of much broader concerns that media content offers a barely perceptible and systematically biased view of public policy.

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<sup>3</sup> Although the structure and form of mass media has changed substantially over time, the public still relies primarily on large-scale media organizations for its information about politics. See, for instance, <http://www.people-press.org/2012/02/07/cable-leads-the-pack-as-campaign-news-source/>. Of course, citizens may also rely on “new” media for policy information; and these too could facilitate thermostatic responsiveness, particularly if people’s various new media sources track policy over time.

Just as we suspect that citizens may not need much information to form general opinions, however, we suspect that media can be inefficient and biased in many different ways but still provide the basic information citizens need to assess the direction of policy change, at least in very salient policy areas that attract a lot of public, political and media attention. Put differently, we suggest that news coverage contains informational cues that allow citizens to learn about the direction and magnitude of spending changes without necessarily increasing specific knowledge about policy.

Note that this view of media coverage – as providing not all, but some, and perhaps the most important pieces of policy-relevant information – fits nicely with recent work on political knowledge, and political learning from media coverage. Even as there is a vast literature on the political ignorance of the average citizen (see above), there also is work suggesting that people can and do learn from the mass media (Robinson and Levy, 1986; Chaffee et al., 1970; Price and Czilli, 1996; Druckman, 2005; Jerit et al., 2006). Recent work on political knowledge also highlights the importance of focusing on more than just citizens' ability to recall and learn static political facts. First, scholars have shown how learning from media coverage is particularly pronounced for policy-specific knowledge and surveillance knowledge (Barabas and Jerit, 2009; Barabas, Jerit, Pollock, and Rainey 2014). Second, Prior and Lupia (2008) show that monetary incentives enhance recall and that people can use procedural knowledge to learn the necessary information.

In sum, it seems entirely possible that citizens are able to respond to policy change in part because of information they receive from mass media; and this does not require that we believe that media and citizens are perfectly informed, only that they are able to provide, and identify simple pieces of information amongst an admittedly noisy and complex

information environment. How can we best explore the possibility that media play a central role in public responsiveness to policy change? If mass media are one driver of public responsiveness, we should be able to identify the following patterns:

1. Mass media content will contain some sufficient number of cues about policy.
2. Mass media cues about policy change will reflect – to some degree – what actually happens to policy.
3. Citizens will be able to identify cues about policy change in media content.  
(Consider this an important validity check, connecting 1 and 2 to 4 and 5.)
4. These policy cues will structure citizens' perceptions of policy change.
5. Citizens' policy preferences will respond to perceptions of policy change.<sup>4</sup>

The sections that follow examine these five patterns in turn.

## Are There Policy Cues in Mass Media?

We begin with an exploration of cues about defense spending available in mass media coverage. We rely on news content in the *New York Times* and *Washington Post*, from 1980 to 2015, using data from Factiva full-text indices. We focus on defense for two

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<sup>4</sup> Note that the list does not differentiate between the (a) receipt and (b) acceptance of cues, both of which are necessary for public responsiveness (especially see Zaller 1992). To be clear, we explicitly address the former (in item 3) but not the latter. Our analysis still does allow us to test for acceptance, particularly when we examine whether perceptions respond to media cues (in item 4) and then whether those perceptions inform preferences (in item 5). To the extent that media cues affect public perceptions and those perceptions influence preferences, the public must both receive and accept those cues.

reasons: (1) it is a domain for which we have good measures of both relative preferences and budgetary policy, and (2) it is a highly salient domain for which there is ample evidence of public responsiveness (e.g., Page and Shapiro 1992; Wlezien 1995; Eichenberg and Stoll 2003; Soroka and Wlezien 2010).

We discuss the extraction of relevant media articles in more detail in the Appendix. Note here that our aim was to identify policy-relevant articles in the two newspapers, relying primarily on subject codes in the Factiva database, checked by human coders. Our search produced a database of just over 50,000 stories on defense, which we analyze using Lexicoder 3.0, software designed for large-scale dictionary-based content analyses (Daku et al. 2015).

We begin with a simple text-cleaning function that removes punctuation and changes all words to lower case. Subsequent analyses rely on both word-count and dictionary-count functions. Our identification of mentions of spending increases and decreases proceeds in two steps: we capture all mentions of *spending*, and then identify the direction of *change* (if there is any). In this section, we focus just on results from the first step, which relies on a simple dictionary search for terms related to spending. (The complete dictionary is included in the Appendix.) Of the 52,805 articles on defense, there are 31,534 articles that include no mention of spending, and 21,271 articles that include at least one mention of spending. Put differently, roughly 40% of our articles include at least one mention of spending. These articles form the body of data on which we will focus our analyses below.

We do not focus on article-level results, however, but rather on sentence-level results. These sentences are identified using a *kwic* (keyword-in-context) function, which both identifies and then extracts (into a separate database) all instances in which a given set of

keywords is used. Note that the *kwic* function captures not just the keyword, but the surrounding sentence.<sup>5</sup> From our 21,271 articles with at least one spending mention, we extract a database of 68,873 sentences. These are distributed relatively evenly across years. (See Appendix Table 2 for basic descriptive data on the distribution of articles and *kwic* sentences across years.)

We readily acknowledge that these sentences are a partial, not a perfect, reflection of spending policy content in mass media. Some articles will deal with budgetary policy but not mention “spending” explicitly. Some articles will also focus on policy proposals and arguments, rather than on what spending is actually enacted. These are some of the reasons why our *kwic* entries offer only a partial representation of spending policy content in media. To the extent that our measures miss relevant information, results should understate the degree to which media coverage drives public responsiveness. And for those who suspect that media do not provide any information about budgetary policy, the size alone of the *kwic* dataset should be striking: our corpus amounts to an average of more than 37 defense spending-related sentences every week for the past 35 years. The extent to which these data capture actual spending change is a testable proposition, which we turn to below.

## Do Media Cues Reflect Budgetary Policy?

Do media cues actually reflect spending change? We explore this possibility by producing a measure of the “media policy signal” – the direction of policy, as suggested

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<sup>5</sup> The function actually extracts the surrounding *x* words, for every mention of words in a dictionary. We set a wide, 30-word window here, and in so doing capture the entire sentence in which a set of spending-related keywords are used.

by media content. We begin by identifying all instances in which a spending keyword co-occurs with a direction keyword – for instance, “spend” occurring alongside “more” or “less” offers very clear information about the direction of fiscal policy. Focusing on co-occurrences of spending and direction keywords leaves us with roughly 35,207 sentences in our database that suggest the direction of fiscal policy.<sup>6</sup>

Converting dictionary counts into a media spending policy signal is not necessarily straightforward, but we rely here on the simplest approach: we use co-occurring spending and directional keywords to attribute one of two codes to every *kwic* retrieval, (a) increasing spending (+1), or (b) decreasing spending (-1); we then calculate the sum of all mentions, aggregated by fiscal year, over the 35-year time period.<sup>7</sup>

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<sup>6</sup> More specifically, of the 68,873 sentences on defense spending, 35,207 also include direction keywords.

<sup>7</sup> This approach takes the frequency of co-occurrences as an indication of magnitude, and there may be weaknesses with this method. A month in which there are many co-occurrences in a positive direction will show a strongly positive signal, while a month in which there are only a few co-occurrences in a positive direction will show a weakly positive signal, for instance; and it may not be the case that the magnitude of spending change is systematically related to the number of mentions of upward or downward movement. There still are good reasons to expect a relationship – a larger change in spending is bigger news, after all – but we do not expect a perfect correspondence between our current media signal and fiscal policy. In the absence of a clear alternative, we employ our simple approach, which works quite well, as we will see.

Is there *any* correspondence between media coverage and policy? Are there any hints in these data that media content captures over-time trends in policy? Figure 1 offers a preliminary test, relying on a comparison of our media signal and actual budgetary policy, drawn from the Policy Agendas' database of appropriations.<sup>8</sup>

[Figure 1 about here]

The top panel of the figure shows a simple scatterplot of the media signal in each fiscal year and the corresponding change in appropriations in billions of constant dollars. Each dot represents a fiscal year, and the dashed lines show the zero-point for both axes. (We have data for 32 fiscal years since 1980 because Factiva stories are missing subject codes in three years. See Appendix Table 2 for details.) To the extent that media content points in the same direction as actual spending, we expect dots to appear in either the bottom left quadrant – where spending is decreasing, and media content suggests a decrease – or in the upper right quadrant – where spending is increasing, and media content suggests an increase. Dots in the other two quadrants indicate years in which the media signal is in conflict with the direction of spending. In the top panel we can see that few dots (6 of 32) are in those off-diagonal quadrants, which indicates a strong match between the direction

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<sup>8</sup> These data are available at [policyagendas.org](http://policyagendas.org), and have the advantage of using functional definitions that are more temporally consistent than the standard OMB Historical Tables. OMB classification actually changes over time, though probably less often than in other countries, where reliable spending data can be even more difficult to identify (see, e.g., Soroka, Wlezien and McLean 2006).

of defense budgetary change and the media signal.<sup>9</sup> Indeed, the data suggest a strong relationship in magnitudes as well: the correlation between the two measures is a healthy 0.68. The “Net Media Signal” thus appears to capture the direction and magnitude of spending change relatively effectively (also see footnote 9).

The bottom panel of Figure 1 shows over-time trends in both policy change and the media signal. The dark line shows changes in defense appropriations and the grey line shows our media measure. (The correlation between the two series is of course the same as in the scatterplot, 0.68.) There is no escaping the conclusion that media coverage of defense budgetary policy closely follows actual policy change. Indeed, given the vast body of work on biases and flaws in media coverage (cited above) – and the very basic approach we use to capture magnitude in our media signal – the relationship in Figure 1 is striking.

We take these results as strong evidence that, on average, media cues in these newspapers reflect what actually happens to policy, at least in the defense spending domain. We accordingly proceed to the next step.

### Can Citizens Identify Mediated Policy Cues?

Recall that subsequent sections of this paper assess responsiveness of public perceptions of policy change to media coverage and its impact on preferences. Results of

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<sup>9</sup> Note in this instance that the media signal sometimes suggests upward change even as spending shifts downward, but that the opposite is never the case. This bias disappears when we look at spending in current instead of constant dollars. This may suggest that media coverage reports spending without taking inflation into account – though demonstrating this requires more detailed content analysis than we can provide here.

such analyses can offer only indirect evidence that the public is receiving and processing media signals, however. We consequently offer here a more direct, intermediary assessment, focusing on whether citizens can identify spending cues in media content.

Our first test of whether citizens can identify spending cues in media content comes in the form of a simple coding exercise, fielded in Amazon Mechanical Turk (MTurk). Note that we do not require that MTurkers are broadly representative in this instance – we regard them only as non-expert coders, and examine their ability to identify policy cues in media content.<sup>10</sup>

We selected a sample of media stories as follows. We began with a random draw of 120 stories using the GDEF Factiva subject code from our database. Specifically, we first excluded stories with no spending keywords in order to have stories with at least a minimal amount of policy content. We then divided all articles into three terciles based on the total number of spending keywords and randomly drew 40 articles from each tercile. A single expert coder read through all stories to ensure that they were relevant, i.e., that they dealt with defense spending. We then took a random sample of 40 articles from all articles deemed relevant. In the process of data cleaning we dropped three articles that turned about

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<sup>10</sup> The degree to which MTurkers are actually “untrained” is up for debate. They clearly are not trained in the specific task that we require – in that sense, they are closer to regular citizens than they are to expert student coders. At the same time, MTurkers perform online tasks for money, and the most effective ones will be very good at following instructions. It is of some significance, then, that we offer very few instructions in this task.

to be amalgams of what had been published as several different news stories. This left 37 stories which we then inserted into our online coding exercise, built in Qualtrics.

The instructions to MTurkers were straightforward: they were told only that “We are interested in understanding information in news content,” that they would be presented with a newspaper article from the last 35 years, and that they should take their time reading before clicking the “next” button. Respondents were then presented with one article randomly drawn from the set of 37. Following the article, they answered several questions, including the following:<sup>11</sup>

*Policy Change:* Now, thinking about the article you have just read: Did this news article offer any information about changes in government spending on defense (yes, no, unsure);

*Direction:* Did the article indicate whether spending was increasing or decreasing (increasing, decreasing, unsure);

*Magnitude:* How would you describe the size of this spending change? On a scale from 1 to 5, would you say that the spending change is... very small to very large.

Note that the *Direction* and *Magnitude* questions were asked conditional on answers to the preceding questions. And note that for this first article, respondents received no information about what they should be looking for in the article. We thus see this first coding attempt as being relatively realistic, in the sense that respondents are reading for no particular reason. They then code a second article, preceded by “Now we would like you

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<sup>11</sup> The titles of questions were not part of the survey; they are included for the sake of exposition here.

to read another article. After reading it you will be asked the same set of questions we asked for the previous article.” Now our participants are trained, minimally at least. The extent to which there are differences between the first and second articles is thus of some interest.

This procedure provides us with responses on two articles from roughly 1350 unique US-based MTurkers, and 1767 assessments of defense-oriented stories. We begin our analysis with some aggregate results, specifically, the mean ratings for each of the 37 articles. We note first that the tendency to report *Policy Change* increases with the number of spending mentions in an article ( $B = 0.03$ ,  $p < .001$ ). The idea that reports and mentions are related may seem trivial, but we consider it strong evidence that the cues we capture using Lexicoder-driven dictionary searches are relevant when humans read news articles.<sup>12</sup>

[Figure 2 about here]

Can readers identify not just that there is change, but the direction of that change? The top panel of Figure 2 plots the mean MTurker-assessed *Magnitude*, which effectively incorporates responses to earlier questions on *Policy Change* and *Direction*, and the

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<sup>12</sup> Note that there are some articles for which few respondents identify change, and in twelve of the 37 cases less than half of our sample did so. This can be taken as evidence that the public’s ability to receive policy information is limited. It also may highlight variation in the degree to which change is reflected in different stories. Indeed, in some instances, coverage may signal stability more than change, and this may indicate what actually is happening with spending. Whatever the cause, it has little consequence for the analysis that follows, e.g., excluding the twelve cases only slightly improves the relationship between *Policy Change* and *Direction*.

spending signal from Lexicoder. The line in this panel shows the slope estimated from regressing *Magnitude* on *Net Spending* ( $B = 0.55, p < .001$ ). The line makes clear the strong relationship between Lexicoder-based results and aggregated MTurk responses: increases in the media measure are associated with aggregate perceptions that spending is increasing. A model that captures the impact of upward and downward cues independently suggests that both are associated with perceptions that spending is increasing or decreasing. Models that estimate the relationship between logged versions of the net spending measure, and upward and downward cues independently, confirm what the pattern in the figure implies: the relationship is slightly stronger when we allow for a nonlinear relationship. This makes good sense – a shift from one to two cues will likely matter a lot to perceptions in comparison with a shift from four to five. (See Appendix Table 3 for the complete models.)<sup>13</sup>

That said, the task is more difficult for articles that do not contain a clear policy signal. This can be seen in the bottom panel of Figure 2, which shows the same data from the top panel but now highlighting the clear instances of policy change – in this case, the articles with net spending measures either below -2 or above +2. We indicate the zero-points on

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<sup>13</sup> Recall also that our coding exercise includes one “untrained” reading of a first story, followed by a “trained” reading of a second. Appendix Figure 1 offers an illustration similar to Figure 2, but comparing results across these first and second readings of each article. The difference in the regression lines for first versus second readings is insignificant. That is, coders are equally good at identifying cues, even when they are untrained.

both axes to make clear that there are very few of these “clear” cases in which the mean MTurk rating is not in the right direction. The grayed-out “unclear” cases produce much more varied ratings, however. Our analyses suggest that these 23 unclear cases are evenly split between what we could characterize as “limited” cases, which include just one mention of spending change, and “mixed” cases, which include a number of both upward *and* downward mentions. (See Appendix Figure 2 for a graphic showing the number of upward and downward cues in all “unclear” cases.) It makes sense that our respondents do not converge on an answer for these articles, as media coverage is not clear about the direction of spending change.

We can explore these same data at the individual level as well, and do so using a stacked dataset for which each respondent-article combination is a case. To be clear, we estimate regression models using a dataset that includes up to two cases for each respondent (where standard errors are adjusted accordingly). The models themselves are relatively simple: we regress individual responses for the direction/magnitude measure on either (a) the net spending measure or (b) separate measures of upward and downward spending cues. Note that because direction and magnitude variables are conditional on respondents identifying spending change, these models rely on 1,050 observations of the 37 articles; that is, they exclude instances in which respondents did not identify change.

[Table 1 about here]

Results are presented in Table 1. Models 1 and 2 regress the direction and magnitude of change variable (which runs from -5 to +5 in the individual-level data, but once the data are aggregated has a range of -4 to +4) on the Lexicoder-derived net spending measure, and then upward and downward spending cues respectively. Results in Model 1 make clear

the strong relationship between the automated cues and individuals' perceptions of policy change; Model 2 shows that respondents are able to identify both upward and downward cues, though are more reactive to the latter.<sup>14</sup>

Model 3 adds an interaction between upward and downward mentions. This allows us to see whether the impact of cues in one direction depends on the existence of cues in the other direction. The magnitude of the coefficients for upward and downward changes thus shift here, as they should; with the inclusion of the interaction term, the direct effect of upward (downward) mentions captures the impact of an upward (downward) mention when the number of downward (upward) mentions is 0. The significant interaction makes clear that the impact of both upward and downward cues is moderated by the presence of cues in the opposite direction. So articles with multiple cues, in multiple directions, make identifying the direction of change more difficult. (This is depicted in Appendix Figure 3,

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<sup>14</sup> To examine potential heterogeneity in peoples' ability to identify these cues we also ran the models in Table 1 separately for those with no college degree and those with a college degree. Results indicate that the dynamics described here hold across both sets of respondents (both in terms of statistical and substantive significance). Also see Appendix Table 4 for two additional models comparing results from first and second mentions independently. Results suggest only a slight, borderline insignificant improvement in coding from first to second articles. Results using a nonlinear version of net spending, or upward and downward counts, also point to rather small improvements in fit (as in the aggregate-level results in Appendix Table 3). We accordingly rely on the more readily-interpretable linear measures here.

which shows both that the estimated baseline perception of spending is upward, and that the impact of upward or downward cues is moderated by the existence of cues in the other direction.) The results illustrate the complications of multiple cues and also provide further evidence that respondents are sensitive to the kinds of spending cues that we are capturing in automated analyses.

As an additional validation test – of both the automated coding and the MTurk coding exercise – we asked three expert (student) coders who were unaware of the contents of the content-analytic dictionaries to code the same 37 articles, using the same questions provided to our MTurk respondents. The full results of this analysis can be found in the Appendix, but the key takeaway is that MTurk and Expert coder ratings are highly correlated ( $\sim .80$ ), and the sentences identified as indicative of spending change by the expert coders largely overlapped with sentences identifying spending change using Lexicoder.

## Do Perceptions Reflect Mediated Policy Cues?

The preceding sections make clear the availability of spending cues in media content, and readers' ability to correctly identify those cues. These findings reflect rather simple expectations. When people encounter articles about government spending, they learn how that spending is changing. Recall however that neither the frequency nor reliability with which newspapers provide policy information, or the ability of citizens to pick up on that information in media, is widely accepted. The standard account in both the academic literature and in popular discussions focuses on flaws in media and opinion. These flaws do exist, of course, but our findings indicate that the policy information necessary for public responsiveness is both transmitted in coverage and can be received by the public.

Our exploration has nevertheless not yet demonstrated that citizens' policy preferences respond to the cues about policy they receive through mass media. Although we have seen that spending cues exist, and that they reflect policy, and that citizens can understand them, we lack indications that people actually do receive and accept that information out in the world. That is, we do not know whether individuals' perceptions of policy change are informed by media content. This section addresses this issue.

It does so by leveraging two questions that were only included in seven election waves (both presidential and midterm) of the American National Election Study (ANES), from 1980 to 1992. Respondents during this period were asked the following two questions:

*Perceived Spending Change:* Some people believe that we should spend much less money for defense. Others feel that defense spending should be greatly increased.

Where would you place what the Federal Government is doing at the present time?

1. Greatly decrease defense spending...7. Greatly increase defense spending

*Preference for Spending Change:* Some people believe that we should spend much less money for defense. Others feel that defense spending should be greatly increased.

Where would you place yourself on this scale or haven't you thought much about this? 1. Greatly decrease defense spending...7. Greatly increase defense spending.

To be clear: the 1980 to 1992 surveys are repeated cross sections, not a panel. And while the latter measure is relatively standard, and included across a good number of years of the ANES surveys, the former is rare, and only fielded from 1980 to 1992. It is for this reason that we focus on these years.

Note that these questions tap not only respondents' own preference for increasing or decreasing federal defense spending, but also what they believe the federal government is

actually doing. These data thus offer an entirely unique opportunity to examine two important components of public responsiveness. First, we can assess whether individual-level perceptions of government spending are associated with media content. Second, we can test whether these perceptions of government spending produce responsiveness in defense spending preferences. In short: we can assess the connection between media content and relative preferences for policy.

Our analytic approach here draws on Wlezien's (1995) model of thermostatic public responsiveness. As noted above, this is one of several accounts of how public opinion might respond to policy change, and has the advantage of laying out very clear expectations. In short, the public's relative preference ( $R$ ) for policy is a function of the preferred level of policy ( $P^*$ ) and policy ( $P$ ) itself, where the public preference for more policy goes down (up) when policy goes up (down), other things being equal.<sup>15</sup> Where the current analysis is concerned, *Preference for Spending Change* is our measure of relative preferences, and is the same variable used in Wlezien's work. If there is thermostatic responsiveness, people's responses will be negatively related to spending.

Table 2 shows results of regression models exploring the determinants of *Perceived Spending Change* for the 1982-1992 period. (Data for the 1980 election are excluded because we have only partial media data for 1979-1980.) The model includes a basic set of demographic controls: binary variables capturing gender (1 = female) and education (1 = some university or more); a variable capturing income (0 - 4, for 5 income quintiles as

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<sup>15</sup> The relationship can apply across space and time, though the latter is more common and also the focus of the analysis in this paper.

defined in the ANES cumulative dataset); and a seven-point party ID variable (where 1 = strong Democrat and 7 = strong Republican). These variables are included only as controls and their effects will not be interpreted in any detail, though note that they partly capture  $P^*$  in the general thermostatic model. Most importantly, we incorporate two annual variables: (1) defense appropriations, in constant dollars, over the past year, drawn from the Policy Agendas dataset, and (2) the media policy signal, over the past year, from the content analysis described above. As individual respondents are nested within years, standard errors are clustered accordingly.

[Table 2 about here]

Results in Table 2 indicate that both actual defense spending change and the media signal matter for perceptions of government spending. In Model 1, we can see that changes in defense spending have a significant positive effect on perceptions; that is, when spending increases, people are more likely to perceive a spending increase. Model 2 explores the impact of spending levels in addition to change. Those results demonstrate that levels of spending also have a significant positive effect on perceptions, if smaller and less reliable. It thus appears that public perceptions of defense spending change respond to both the levels of and change in spending. This means that there is a partial mismatch between the question wording (focused on change) and people's responses (based on both change and levels), which is of consequence for our analysis of preferences in the subsequent section, as we will see.

Model 3 adds the media signal derived from the automated content analysis, which has a clear positive effect on perceptions, above and beyond the impact of spending itself. Indeed, the inclusion of the media signal, focused on language about change in news

content, completely overwhelms the impact of defense spending change, the coefficient for which drops substantially and is not significantly different from zero. This implies that the effect of spending on perceptions occurs in part through mass media, at least for change, which is not surprising given that our measure of media coverage taps spending change. In order to assess whether the effect of spending levels is mass-mediated, however, we need a media measure that reflects spending levels. This is difficult to imagine, let alone construct, though we can simulate one by simply cumulating our media signal over time: since the measure captures policy change, the running tally of it should capture the sum of policy change. The resulting measure does not literally tap spending levels at each point in time, of course, and it seemingly will differ in the form of an intercept, i.e., the time-serial correspondence should be high.

Model 4 in Table 2 shows results including the cumulative media signal and excluding the spending change variable from this model since it has no impact once media coverage is added. The new cumulative media variable has a positive, significant effect on respondents' perceptions, and the impact of spending levels goes to zero. Respondents still respond to the media signal tapping spending change, and the coefficients for the two media variables are almost identical, which implies that perceptions about equally reflect coverage of levels and changes in spending. These results support the conjecture that people are responding to media coverage and not directly to spending per se.

While models in Table 2 confirm that preferences react to our media-based measure, they do not directly get at the possibility that it is media *exposure* that is driving the process. Thankfully, the ANES includes media exposure measures; and we capture individuals' media exposure using a variable, rescaled from 0 to 1, that combines the self-reported

number of days a respondent read a newspaper in the past week, and the number of days they reported watching national TV news.

[Figure 3 about here]

Appendix Table 5 shows results from models that allows the impact of each of our media signals to vary across levels of media exposure (one at a time, to avoid problems of collinearity amongst interacted variables). For the sake of simplicity, we focus here just on effects of the media variables, which we will illustrate in Figure 3. The top panel shows the estimated impact of the media policy signal on perceptions of government spending, for those who report very low (0) versus very high (1) levels of media exposure. The bottom panel shows the impact of the cumulative media signal for the same two groups. Results suggest that both media signals affect citizens' perceptions of government spending, but the impact is more pronounced for those with high media exposure. We take these results as further evidence that media coverage plays a role in individuals' perceptions of government spending.

Just how considerable is the effect of media coverage? Consider the following, drawing on results from the fourth model in Table 2. The *Media Policy Signal* ranges from -163 to +388 within our sample, with a standard deviation of 187. A 187-unit shift in that signal leads, *ceteris paribus*, to an average 0.187-unit shift in perceptions of government spending – roughly 14% of the standard deviation (1.3) in perceptions of government spending. This is a small but nontrivial amount. And we also must consider the impact of the *Cumulative Media Policy Signal*, which effectively doubles the impact of media coverage on perceptions.

Media coverage clearly does not completely determine perceptions, but it is important. Most importantly, coverage mediates public perceptions of defense spending; it effectively informs people about what government is doing. Given that media content does not exactly follow spending change over time, public perceptions of government action are imperfect – we return to this issue below. That said, there clearly are strong links between policy, the media and public perceptions.

### Do Preferences Respond Thermostatically to Perceived Spending Change?

Do perceptions of government policy condition preferences for policy change? The tests are in Table 3. Here, *Preferences for Spending Change*, also scaled from 1 to 7, is the dependent variable. *Perceived Spending Change* is an independent variable, alongside the same set of demographic and budgetary predictors included in Table 2. We are interested in seeing whether preferences reflect perceptions of spending change or actual spending.

[Table 3 about here]

Model 1 in Table 3 shows a model including defense spending levels only, which is the specification implied by the thermostatic model outlined above. Here we see the significant (albeit at  $p < .10$ ), negative coefficient the model implies: when spending is higher (lower), preferences for spending change move downward (upward). Model 2 adds spending change, which does not influence preferences independent of levels. This also is as we expect given the thermostatic model. Model 3 further adds the impact of *Perceived*

*Spending Change*, the dependent variable in Table 2.<sup>16</sup> The coefficient for defense spending levels drops and is no longer statistically significant. Given that Table 2 demonstrates a powerful connection between actual spending levels and perceptions of spending change, this is exactly as we expect. That is, perceptions mediate the effect of spending on preferences.

Results in Table 3 indicate that perceived spending change drives thermostatic public responsiveness. The magnitude of the effect is as follows: the coefficient (-0.186) implies that a one-standard deviation shift in perceptions (1.4 units in this sample) is associated with an average shift in relative preferences of 0.26 – roughly 16% of the standard deviation

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<sup>16</sup> Appendix Table 6 shows the same models as Table 3, but including another second-order variable, US-Russia Dislike, which is the percentage of Americans who disliked Russia minus the percentage who liked the country. The variable is drawn directly from the data used in Soroka and Wlezien (2010), and is intended to capture variation in perceived security threat. Past work suggests that preferences for spending change are positively correlated with this variable and the results in Appendix Table 6 confirm this. The results suggest that, while preferences do reflect perceptions of spending change, they are more responsive to actual spending, i.e., the public discounts the other influences on perceptions. Note that this is in line with past work, including research by De Boef and Kellstedt (2004) on the influence of media coverage on economic perceptions, which finds that non-political effects on consumer confidence are more meaningful than political ones.

of the dependent variable.<sup>17</sup> Of course, what ultimately matters is that the results reveal that people update their preferences based on perceptions of spending, not spending levels per se. Spending still matters, but indirectly, as reflected in media coverage, which influences people's perceptions. That is, it appears that people respond thermostatically to mass-mediated spending change.

## Discussion

Taken together, the evidence from the automated content analysis, the MTurk-coded studies, and the ANES analyses, suggest that spending cues exist, that citizens can extract these cues from news content, and that this information matters for perceptions of government spending, and thus to preferences for policy change.

All of this points to the very real possibility that the basic information needed for the kind of responsiveness identified by a large and growing number of researchers is readily available. Recognizing this is a significant step towards better understanding the role of media content in public responsiveness, and in representative democracy more broadly. This is not an argument that media perfectly represent policy change or that citizens are deeply informed. It is an indication, however, that even in the presence of flawed reporting,

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<sup>17</sup> This is comparable to the estimated impact of spending levels themselves: in Model 2, the coefficient (-0.007) implies that a one standard deviation (or 56 billion dollar) shift in spending produces a -0.39, or 24% of the standard deviation, drop in preferences. Not surprisingly, the estimated impact of perceptions (-0.33) is even closer in magnitude based on results from separate analyses excluding spending levels from the model.

low attentiveness, and misinformation, there are signals in media content that can facilitate a form of public responsiveness necessary to a functioning representative democracy.

These findings fit with past work identifying some areas in which the public actually has relatively high policy-specific knowledge (e.g., Delli Carpini and Keeter 1996; also see citations above), and, especially, with a recent shift in the literature on political information towards the belief that citizens might be more politically competent than previously thought (e.g., Prior and Lupia 2008; Barabas, Jerit, Pollock, and Rainey 2014). Like this recent work, our results suggest that people can extract and use political information in meaningful ways; and spending change is an aspect of political knowledge that is not captured in survey questions focused on citizens' ability to recall static political facts. To be perfectly clear: what we find here does not conflict with the frequently-demonstrated tendency for people to know few specific political facts; it is the product of a rather different kind of political knowledge.

There are some important caveats. We have already looked at correlations between expert- and MTurker-coded news stories above, and seen strong relationships between the two. But we can also take the mean expert code as the "correct" response, and then see how many of our MTurk codes (across all individuals and stories) match this response. Where *Policy Change* is concerned, 57% of MTurk responses correctly identify whether spending is changing. Of those responses, 79% then correctly identify the direction of this change. Aggregation is thus an important part of the process that gets us to thermostatic responsiveness, though the underlying trend evidently is driven by a large (and diverse) minority receiving relatively reliable mediated cues about policy change. Put differently,

our results indicate that many, though not all, citizens can pick up on cues about defense spending in media content.

It is also the case that our results cannot speak to whether preferred levels of policy are “correct.” We are not arguing for a rationality in preferences at odds with recent research suggesting that individuals’ preferences for levels of redistribution are well below where they should be given individuals’ own economic situation (e.g., Bartels 2005), for instance. Our argument focuses entirely on over-time change in preferences for policy change; it cannot speak easily to the possibility that preferred levels are right, or wrong.

We also want to highlight the possibility that media coverage may both facilitate and frustrate public responsiveness, recalling that media coverage does not perfectly reflect policy change. To make this clear, Figure 4 provides an illustration, depicting hypothetical mean values for both perceived spending change and relative preferences for spending as if they had been driven by (a) only spending-driven (i.e., accurate) media coverage, or (b) both spending-driven and residual (i.e., seemingly inaccurate) media coverage. The figure is produced using a model regressing media coverage on spending change, together with coefficients for perceptions and preferences in Tables 2 and 3 to produce predictions for perceived spending, and also preferences for spending. We outline each step of the estimation in some detail in the Appendix; here, we focus on the difference between perceptions and preferences under the two hypothetical media conditions.

[Figure 4 about here]

Figure 4 shows how media coverage can impact both perceptions and preferences. In the top frame, we see how media coverage that overstated the decrease in defense spending after 1990 could have structured perceptions of spending change. That is, the black line

predicted from all media coverage drops and remains below the grey line predicted by spending-based media. This spills over into relative spending preferences, in the bottom panel of Figure 4, where preferences for spending change after 1990 are higher than they might be were media coverage more accurate. Of course, as discussed, these estimates are meant to be illustrative, not a test of the extent to which public preferences are driven by media inaccuracy. The figure still does make clear the potential consequences of media coverage: just as it can help facilitate public responsiveness, so too can it lead the public astray. The degree to which one or the other is true represents an important avenue for further research.

The degree to which these findings are generalizable beyond the defense domain also is not clear. There are good reasons to think that defense is an easy case – one in which policy change is often directly linked to (and discussed in terms of) spending, and one that is consistently highly salient. We expect that shifting to a low-salience domain in which a large proportion of policy change is regulatory rather than budgetary, for instance, would produce weaker results. Indeed, past work already highlights the tendency for low-salience domains to exhibit weaker opinion-policy links (e.g., Wlezien 1995; 2004; Soroka and Wlezien 2010). Our supposition is that this cross-domain variation is partly explained by what is likely much less, and much less clear, media coverage of policy change in these domains. We leave a test of this possibility to future work.

So too do we note, and leave for future research, the possibility that different media sources offer rather different kinds of policy information. We have focused here on two prestigious broadsheet newspapers, and these may be the sources most likely to produce a large number of accurate policy stories. Can we expect the same from the *Houston*

*Chronicle*, the *Huffington Post*, ABC News and an increasingly wide range of online news providers? There surely are important differences in the quantity and quality of policy content across media sources, and the likelihood that individuals respond thermostatically to policy will be affected by their varying news streams.

For the time being, however, we have been able to demonstrate each of the patterns that we expect in order for mass media to play a role in public responsiveness, and offer a template for future work on the role of media coverage in representative democracy. There are a good number of cues about policy change in media coverage of defense spending; these cues reflect changes in budgetary policy; humans are able to identify the cues; individuals' perceptions of policy change shift alongside trends in media coverage; and individuals' relative preferences for policy react to their perceptions of policy change. Each of these five patterns is central to the functioning of representative democracy. That they occur, even in one domain, is thus of considerable importance. That they may differ over time, and in other policy domains, is as well.

That these patterns are evident serves to highlight the significance of mass media in responsiveness and representation. The argument that the quality and quantity of media are critical to representative government is of course not new – it has been widely accepted, and repeated, at least since *The Federalist Papers*. But the preceding analyses lay bare the potential significance of mass media, and in so doing, this paper elucidates one mechanism underlying public responsiveness, a widely accepted but as-yet largely unexplained element of functioning representative democracy.

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Figure 1. Media Cues and Budgetary Policy

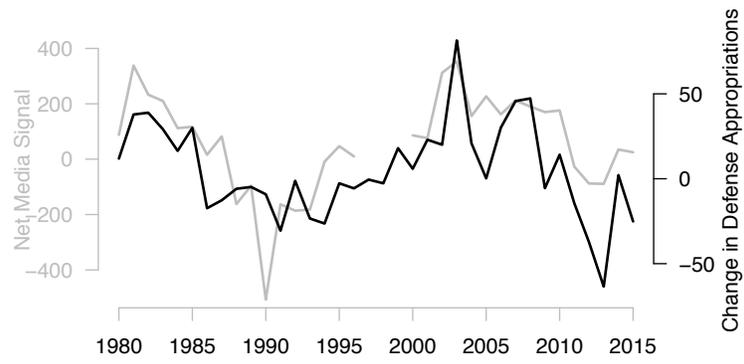
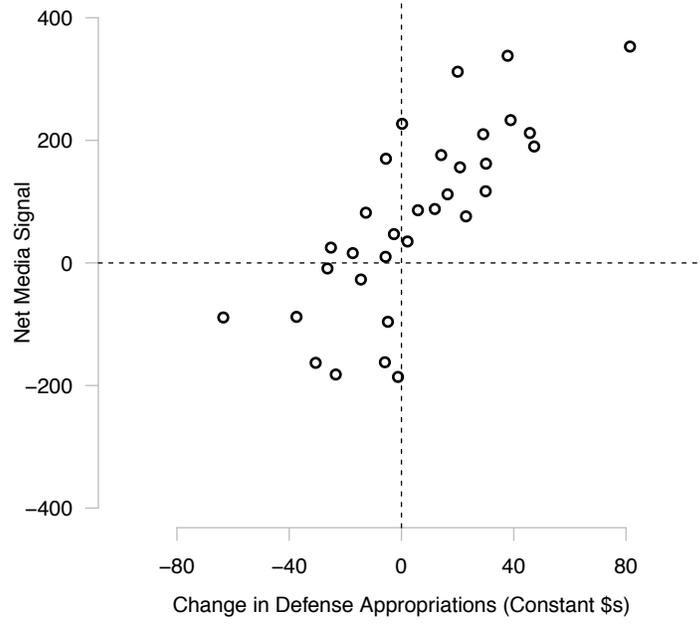


Figure 2. Media Cues and Aggregated MTurk Ratings of the Magnitude of Policy Change

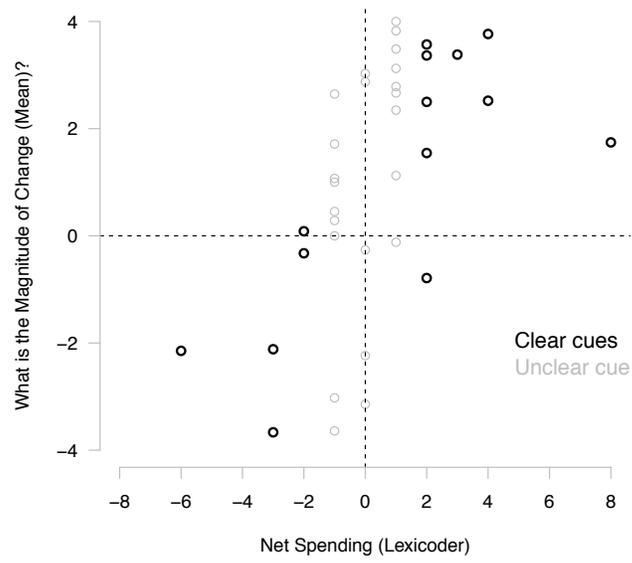
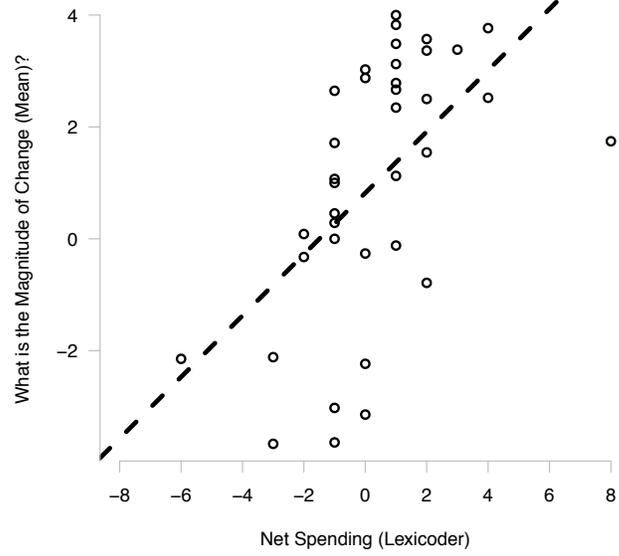


Figure 3. The Impact of Media, Moderated by Media Exposure, on Perceptions of Government Spending

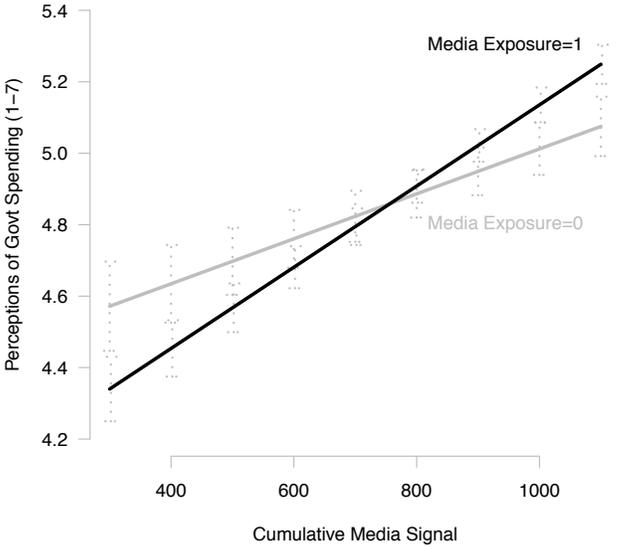
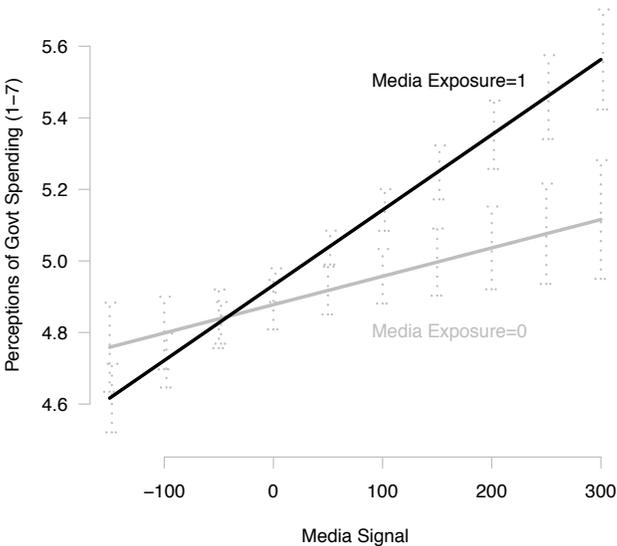


Figure 4. Perceived Spending Change and Relative Preferences, Under Different Media Conditions

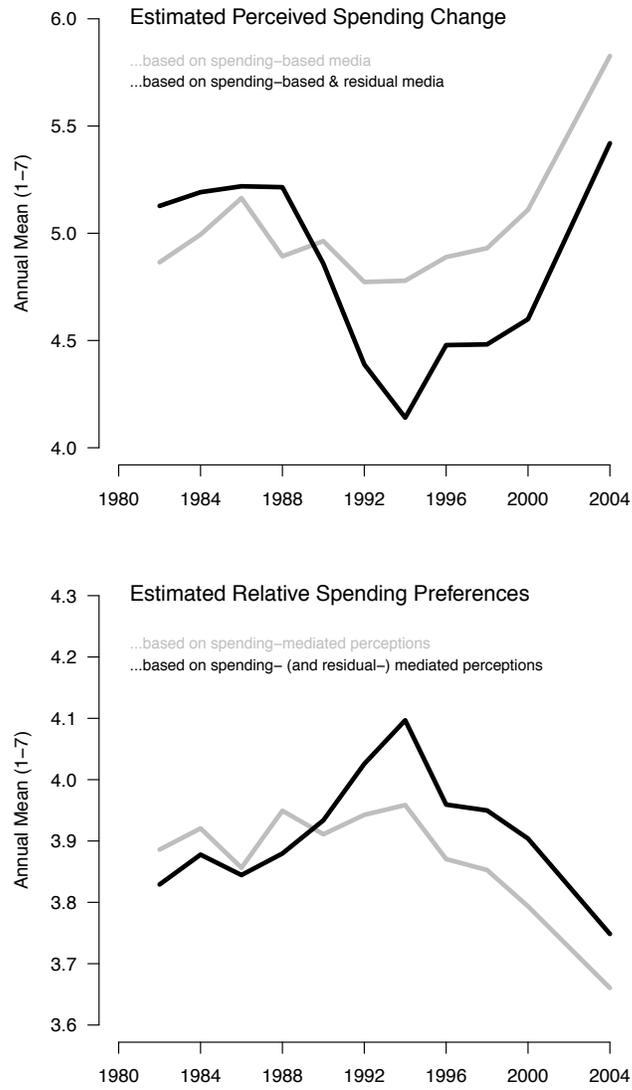


Table 1. The Direction and Magnitude of Change and Spending Cues

	DV: Perceived Direction & Magnitude of Spending Change		
	Model 1	Model 2	Model 3
Net spending mentions	.533*** (.037)		
Upward spending mentions		.457*** (.047)	.036 (.064)
Downward spending mentions		-.590*** (.038)	-1.148*** (.078)
Upward * Downward mentions			.164*** (.019)
Constant	.596** (.094)	.957*** (.155)	1.918*** (.187)
N	1050	1050	1050
R2	.175	.182	.237

Cells contain regression coefficients and clustered standard errors by respondent. \*\*\*p < .01; \*\*p < .05; \*p < .1

Table 2. Modeling Perceptions of Spending Change, ANES, 1982-1992

	<b>DV: Perceived Spending Change</b>			
	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
Female	0.108** (0.048)	0.103** (0.048)	0.099** (0.048)	0.099*** (0.048)
Education	0.128** (0.055)	0.135** (0.054)	0.135** (0.056)	0.140*** (0.054)
Income	-0.009 (0.010)	-0.006 (0.009)	-0.004 (0.009)	-0.004 (0.009)
Party ID	-0.078*** (0.005)	-0.080*** (0.005)	-0.083*** (0.006)	-0.083*** (0.006)
Defense Spending Change	0.033** (0.013)	0.032*** (0.008)	-0.003 (0.013)	
Defense Spending Levels ( <i>t</i> )		0.004** (0.002)	0.005*** (0.001)	-0.001 (0.001)
Media Policy Signal ( <i>t</i> )			0.002** (0.001)	0.001*** (0.0001)
Cumulative Media Policy Signal				0.001*** (0.0001)
Constant	5.106*** (0.115)	3.494*** (0.590)	3.263*** (0.338)	4.908*** (0.323)
N	8802	8802	8802	8802
R2	0.052	0.064	0.072	0.077

Cells contain regression coefficients and clustered standard errors by year. \*\*\*p < .01; \*\*p < .05; \*p < .1

Table 3. Modeling Relative Preferences for Spending Change,  
ANES, 1980-1992

	<b>DV: Preferences for Spending Change</b>		
	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>
Female	-0.185*** (0.054)	-0.188*** (0.052)	-0.169*** (0.054)
Education	-0.483*** (0.060)	-0.482*** (0.058)	-0.457*** (0.065)
Income	0.027* (0.016)	0.026 (0.016)	0.024 (0.016)
Party ID	0.184*** (0.012)	0.185*** (0.012)	0.168*** (0.014)
Defense Spending Levels ( <i>t</i> )	-0.006* (0.004)	-0.007* (0.004)	-0.005 (0.003)
Defense Spending Change ( <i>t</i> )		0.017 (0.021)	0.023 (0.019)
Perceived Spending Change			-0.186*** (0.036)
Constant	5.855*** (1.415)	5.921*** (1.439)	6.346*** (1.373)
N	9857	9857	9857
R2	0.111	0.116	0.139

Cells contain regression coefficients and clustered standard errors by year. \*\*\*p < .01; \*\*p < .05; \*p < .1