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Who Isn't Biased? Perceived Bias as a Dimension of Credibility in Communication of Science with Policymakers

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ABSTRACT: Identifying the determinants of success in communicating scientific information for use in policymaking has been a topic of longstanding interest for many fields. Perceptions of message and messenger credibility are recognized in many disciplines as key to information receptivity, and subsequent changes in attitudes, by decision-makers. Bias also appears as a component of credibility, but is not theoretically well-defined, and its effects can appear inconsistent. This study—comprised of interviews with congressional staff members with energy, environment, and science portfolios (n=16)—finds that perceptions of bias and expertise play a critical role in the way in which policymakers evaluate scientific information sources, building on early research on credibility and opinion change.
KEYWORDS: bias, Congress, credibility, expertise, policymakers, science communication, staff

1. INTRODUCTION

How to foster the use of scientific information by policymakers has been a longstanding topic of interest for many academic disciplines and communication practitioners alike (Jasanoff, 1990; Lach, List, Steel, & Shindler, 2003; Morgan & Peha, 2003). Increased interest worldwide in the practice of evidence-based policymaking (Cairney & Kwiatkowski, 2017) has only reinforced attention to this research area. The purpose of this study is to understand how legislative staff for members of the U.S. Congress assess credibility in considering scientific information. This highly politically polarized setting presents a unique context for the communication of information (Whiteman, 1995).

Scholars have sought to explain the constituents of credibility for thousands of years; Aristotle attributed a source's credibility, or *ethos*, to intelligence, character, and goodwill (Cooper, 1932). Yet, numerous methods and theoretical approaches have yet to successfully explicate the construct. McComas and Trumbo (2001) explained that, "an agreed-upon, generalized measure of credibility has yet proved elusive" (p. 468). A recent review found that little has changed since McComas and Trumbo's assessment, faulting researchers for poor attempts at operationalizing credibility for the purpose of theory-building (Hellmueller & Trilling, 2012). However, other scholars have argued that a generalized definition may not be achievable; what constitutes credibility is situationally dependent (Cash et al., 2002). For example, policy contexts generally involve factors at the group and/or institutional level operating within long timeframes (Lemos, Kirchhoff, & Ramprasad, 2012). The wealth of credibility literature from individual-level cross-sectional studies on communication is unlikely to capture these dimensions.

Societal tensions over whether scientific information is—or should be—free of social values adds an additional facet of complexity to its communication within political contexts. The authority of science rests upon perceived objectivity, which is complicated when science enters the realm of policy. Jasanoff (2012) explained that, "with science more and more being produced in the service of social ends, the possibility of bias is far more evident, and the grounds of expert authority correspondingly in greater need of rearticulation" (p. 154). Because disinterestedness is believed to be integral to perceptions of the authority of scientific expertise, it would be expected to serve as a criterion for scientific credibility. However, other literatures that have tried to describe information flow in the evolution of policy within and between coalitions point to advantages of information source *interestedness*—as opposed to disinterestedness—as long as the group and source share common values and policy preferences. Due to the role of perceived bias in relationship to the authority of science and the potential for conflict between coalitions as issue preferences mature, we look to understand perceptions of source bias by congressional staff members in their assessments of scientific information, and whether lack of objectivity has different effects depending on the state of development of an office's policy position.

Through interviews with congressional staff members (n=16), this study takes a qualitative, contextual approach to investigate how scientific credibility is perceived and assessed by legislative staff who work on the issues of energy, natural resources/environment, and science. We ask not only how congressional staff members evaluate the credibility of scientific sources and information, but what role perceived bias plays in their information use. Are "biased" sources considered less helpful as providers of scientific information? And does the status of the office's policy position on an issue affect preferences for sources? This research compares conceptualizations of credibility and bias from the fields of rhetoric, communication, and public policy, with the goal of reducing conceptual ambiguity in these constructs.

2. LITERATURE REVIEW

Across diverse literatures, perceptions of source credibility have emerged as key factors in communicating expert information. For example, the art of rhetoric is vital to the structure of policy debates (Condor, Tileagă, & Billig, 2013). Rhetoricians have pointed to authoritative proof based on the credentials of the source as a warrant for belief (Ehninger & Brockriede, 1978). Communication scholars have demonstrated that perceptions of source credibility lead to greater message receptivity and correspondingly higher levels of attitudinal and behavioral change (Pornpitakpan, 2004). And public policy and political science researchers claim that its effects lead all the way to policy change, and that it "has long been the assumed currency of scientists doing policy-relevant research" (Cash et al., 2003, p. 3). All of this evidence should be instructive, but what constitutes credibility, to whom, and under what circumstances varies across contexts, resulting in conceptual ambiguity and even occasionally contradictory results (Posner, McKenzie, & Ricketts, 2016).

2.1 Defining Credibility

Other authors have undertaken comprehensive efforts to review the breadth of literature on information and source credibility, its operationalization, and effects on opinion change in ways that are not possible here (Hellmueller & Trilling, 2012; Pornpitakpan, 2004; Wilson & Sherrell, 1993). For the purposes of informing this paper's research questions, we simply wish to point out inconsistencies in its definition across and within the literatures from rhetoric, communication, and public policy, and to draw attention to some similarities. While none of these fields have developed consistent measures of credibility, some dimensions of the construct appear in all three, such as expertise and trustworthiness.

Rhetoric. The question of how to most effectively make an argument based on expert authority has been an unresolved debate for at least 2,000 years, yet recommendations from rhetoricians in recent decades remain conflicting (Walton, 1997). In establishing the authority of an expert for the purposes of making a claim, Ehninger and Brockriede (1978) argue for three criteria: expertise in the field, access to the relevant information, and (reasonable) lack of bias. In distilling the rhetoric literature, Walton (1997) expands the set to six: expertise, relevance of the field, import of the opinion to the argument, trustworthiness, consistency with other experts, and supporting evidence. Notably the first set describes source characteristics while the second expands to include characteristics of both messenger and message.

Communication. One of the first problems in confronting the definition of credibility is credibility of what or whom—the message or the messenger? Attempts to distinguish between credibility judgements for sources versus their messages have found that these twin aspects of the construct are heavily intertwined (Hovland & Weiss, 1951; Slater & Rouner, 1996), to be deemed at times almost indistinguishable (Cronkhite & Liska, 1976). Communication scholars have often used factor analysis to deduce underlying dimensions of credibility (McCroskey & Teven, 1999; McCroskey & Young, 1981). Some authors have blamed the method—a mathematical means of categorizing measures according to similar respondent ratings—as one of the reasons that the study of credibility has been largely unproductive (Cronkhite & Liska, 1976). One of the most widely used measures of source credibility posits three dimensions: competence, goodwill, and trustworthiness (McCroskey & Teven, 1999). But the construct has also been operationalized along other dimensions, such as expertise and lack of bias (Slater & Rouner, 1996).

Public policy. In a series of oft-cited case studies on the effects of science and technology on sustainable development, public policy and political science researchers found that credibility—along with legitimacy and salience—are the hallmarks of knowledge systems that promote sustainable development policies (Cash et al., 2003). Other researchers since have found no impact of the credibility of knowledge on policy within the domain of ecosystem services (Posner et al., 2016). Cash and colleagues (2002) defined credibility not only as informational qualities of plausibility and accuracy, but the nature of the source as trustworthy and believable. But the authors also recognized that credibility of information is hard to ascertain, that the people who produce the information often serve as a proxy for informational credibility, that perceptions of credibility are not static, but can evolve over time, and that they are not universal, but "involve actor-specific judgments using different criteria and standards" (Cash et al., 2002, p. 4). Though there can be cases of shared public evaluation, "salience, credibility, and legitimacy are perceived and judged differently by different audiences (e.g., the U.S. Congress, farmers in Zimbabwe, or fishers in Nova Scotia)" (p. 4). Work building upon this nuanced definition has since operationalized credibility in different ways. Other authors within this field have sought to distinguish source from information, creating discrete categories of informational credibility and source trust (Lemos et al., 2012), or derived narrow, context-specific interpretations of credibility, such as "data quality, calculations, visual display, and scientific validity" (White et al., 2010, p. 226).

> RQ_1: How do policymakers (congressional staff members) define the credibility of scientific sources and information?

2.2 Perceived Source Bias

Philosophers debate whether science can—or should—be values-free (Douglas, 2009). Jasanoff (2012) noted that "as long as scientists could claim objective access to nature's laws, on the basis of observations unbiased by personal or political interests, that alone was sufficient to underwrite their expertise" (p. 154). Disinterestedness, or objectivity and lack of bias, has been said to be one of the imperatives of science (Merton, 1973).

Like credibility itself, the role of perceived bias in credibility and trust appears across multiple disciplines, but inconsistently, and is not theoretically well-defined. Bias and objectivity were included in 25% and 4% of a sample of 68 measures of semantic dimensions of source credibility, respectively—less frequently than the semantic dimensions of "accurate" (50%), "believable" (35%), "fair" (35%), and "trustworthy" (60%) (Hellmueller & Trilling, 2012). Birnbaum and Stegner (1979) describe bias as "factors that are perceived to influence the algebraic difference between the source's report and the true state of nature" (p. 48). They use politics to illustrate an example: "a Republican might be a biased source of information about a Democrat who is running for office" (p. 48). Understandably, the range of those potential biasing factors could be quite broad. Moreover, the effects of bias on source credibility and persuasiveness can appear unpredictable.

Lack of bias. When bias is included as a dimension of source credibility, typically it is as lack of bias, in alignment with traditional norms about scientific objectivity. In an analysis of the mediating effects of message quality on source credibility and belief change, Slater and Rouner (1996) measured credibility as perceived source expertise and lack of bias: "It seems self evident that if a message originates with, for example, an expert and objective person, that message should influence audience beliefs more than the same message from an inexpert and biased person," the authors stated (p. 975). Eagly, Wood, and Chaiken (1978) tested two forms of bias on opinion change: bias derived from past experience, and bias in attempting to appeal to an audience's interests. When the expert with a pro-business background, or with a speaking engagement to a pro-business audience, made pro-environmental statements (presumably countering their bias), they were identified as more unbiased, and were more persuasive, than when the expert with a pro-environmental background or pro-environmental audience made the same arguments. The authors found that when speakers were believed to be shaping their arguments to fit the interests of the audience, they were viewed as manipulative. In a later study, they revealed a similar pattern between perceived lack of bias and opinion change (Wood & Eagly, 1981).

As noted above, bias also appears in the rhetorical literature. One of the six tests of Walton (1997) for expert opinion is "trustworthiness," which is then broken into source reliability: (lack of) bias, honesty, and conscientiousness (p. 217). Similarly, Ehninger and Brockriede (1978) include absence of bias in their criteria. But, interestingly, these authors qualify their inclusion of bias by saying that it should not necessarily disqualify an expert's opinion. "It is acceptable for an expert to have bias, but what raises a critical question of personal reliability is the kind of situation where this bias is a critically bad bias, an obstacle to honest and credible testimony for one side over another" (Walton, 1997, p. 216). Ehninger and Brockriede note that the more expert a source in their field, and higher levels of access they have to information, by definition, the less "disinterested" in the topic they become: "An ideal authority is someone whose expertise and knowledge is high and whose partisanship is reasonably restrained" (p. 86).

Direction of bias in relation to the judge. The cautionary notes from Cash and colleagues (2002) about the specificity of audiences in defining credibility raises the question of whether congressional staff members are unique in the ways that they consider scientific information. Advocacy organizations and lobbyists provide staff members with information to promote their preferred policies; information has recognized economic value that facilitates its transfer. This aspect of information sharing is documented by the theory of lobbying as legislative subsidy (Hall & Deardorff, 2006). The model explains the long-observed phenomenon that lobbyists work most frequently with the offices of members of Congress with whom they share support for policy goals—e.g. a shared interest and bias. An office's involvement in a policy issue costs it scarce time and other resources. Lobbyists can affect the budget line calculation by providing research and expertise that lowers the price tag of the office's efforts in achieving progress on an issue, potentially influencing which policy areas receive more attention.

According to the Advocacy Coalition Framework (ACF) (Sabatier, 1988), issue coalitions are built on a set of shared beliefs and policy positions that hierarchically progress from those that are resolute to those that can be negotiated within policy discourses: deep core beliefs reflecting fundamental value systems, near core beliefs expressive of values relative to the policy area, and secondary aspects specific to the subsystem. One of the central hypotheses of the ACF is that learning occurs easily within coalitions with shared belief systems and policy biases, and with difficulty across systems with conflicting biases. Some authors have espoused conceptualizing deep core beliefs as a form of worldviews, as described by Cultural Theory (CT) (Jenkins-Smith, Nohrstedt, Weible, & Sabatier, 2014). Motivated reasoning and biased assimilation—theories used within CT—could also explain resistance to belief change found with coalitions.

Examples of bounded rationality in preferentially accepting—and using—information from sources with shared biases appear in a variety of theoretical areas and domains, even "blaps." When study participants were given a choice whether to receive information on shape-sorting into a randomly named category termed "blaps" from someone with politically similar views or someone who demonstrated expertise in sorting blaps, they chose the source with greater political similarity more frequently than the one with greater subject matter expertise (Marks, Copland, Loh, Sunstein, & Sharot, 2018). Both blap expertise and shared political bias affected opinion change, with accuracy in shape-sorting mediating the effect of perceived political similarity. The authors claimed the finding was the result of the halo effect, in which preferences for a source in one area spill over into unrelated areas.

The importance of assessing bias from the judge's point of view appears in other cases as well—from conflict mediation to used car sales. Disinterested mediators have been traditionally thought to be perceived as more effective. Using game theory, Kydd (2003) demonstrated that only those mediators who are known to be biased in favor of the party with which they are communicating will be successful in getting them to make concessions. In the case of used car prices, the expertise of the source and their bias factored into evaluations of value of the vehicle (Birnbaum & Stegner, 1979). Unbiased sources of great expertise carried the most weight, but the authors found the data to be suggestive of two other potentially systemic effects: 1) messages counter to expected biases increase the source's impact (similar to the studies described above); and 2) sources with the same biases as the judge are more effective messengers. They explained that the variable effects of bias, due to both its absolute value and valence, may be one of the reasons that it has not been well captured in the literature on opinion change.

> RQ_2: What sources of scientific information are seen by congressional staff members as unbiased, and how frequently are they considered helpful sources of usable information, compared to sources not identified as unbiased?

2.3 Bias and Information Use for Policy

Most studies of coalitions have been conducted with issues—and systems—that are mature, e.g. the actors have already formed allegiances around a preferred policy position (Ingold, Fischer, & Cairney, 2017). How coalitions form around evolving policy issues is much less clear (Ingold et al., 2017). In expanding the ACF to describe the way that scientific experts participate within policy subsystems, Weible, Pattison, and Sabatier (2010) described three types of subsystems in which these relationships would be expected to differ. In a unitary subsystem, experts are in agreement and serve as peripheral allies to the primary coalition; in collaborative systems, experts reconcile their scientific differences and serve peripherally as allies or opponents to coalitions; and in adversarial systems, experts disagree and take central roles as allies or opponents. While information flow between and within coalitions varies across each of these models, what remains consistent is that experts are expected to align with coalitions according to shared beliefs and policy preferences, e.g. biases. Ingold and Gschwend (2014) tested the hypotheses developed by Weible and colleagues (2010) for this typology and found that scientists could serve both as strategic political actors or as neutral brokers, but generally fell into the latter category, operating at the periphery of coalitions and/or subsystems with moderate ideological positions. To our knowledge, the specific role of scientists in emergent policy subsystems has yet to be studied. Initial research suggests the seeds of coalitions take the form of previous contacts (Ingold et al., 2017).

The present study looks for differences in scientific information use in two different cases: 1) when the policy position of a congressional office in an area of science, energy, or environment is indeterminate; and 2) and when it is established. This distinction can be thought of as a rough indicator of the lack of identification with a policy coalition: the office, if not necessarily the issue, is in a nascent stage of policy formulation and/or alignment. We employ a minimal threshold for use of science for policy based on the "interactive" meaning that Weiss (1979) gives for knowledge utilization: "It describes a familiar process by which decision makers inform themselves of the range of knowledge and opinion in a policy area" (p. 429). By that definition, when congressional staff members consume scientific information in the process of becoming—or staying—knowledgeable about an issue, science is being "used."

We adopt a typology for information use developed by Whiteman (1985) in his study of congressional communication (p. 298):

> Substantive – use of information to develop a policy position in the absence of a strong prior commitment;
> Elaborative – use of information to extend or refine a position;
> Strategic – use of information to advocate for or reconfirm a position which has already been defined.

Our study focuses on the two ends of this spectrum—substantive vs. strategic use—because of the similarities of the conditions under which elaborative and substantive use occur. In his analysis of use of information from the former Office of Technology Assessment (OTA) in committees, Whiteman (1985) found that 1) strategic use was most common in high-conflict issue areas; and 2) substantive and elaborative use occurred predominantly under low-conflict conditions. Regardless of the form of use, information producers and users may disagree about what makes science usable. Usability is described as "a function of both how science is produced (the push side) and how it is needed (the pull side) in different decision contexts" (Dilling & Lemos, 2011, p. 681).

Lemos and colleagues (Lemos et al., 2012) have summarized three main drivers of knowledge use: *fit*, or how users perceive knowledge would meet their needs; *interplay*, or how new knowledge intersects with existing decision routines (negatively and positively); and *interaction*, or how the collaboration between scientists and decision-makers in producing knowledge increases its use. The findings from the work of Lemos and colleagues, as well as ACF, suggest that the nature of interaction between scientists and policymakers is particularly important to the usability of scientific information for policy. What remains unclear is whether policymakers differentially preference biased scientific information sources depending on whether they are evaluating the landscape of a policy subsystem and or whether they are part of one.

> RQ_3: Does type of information use (strategic vs. substantive) affect the choices of staff members in selecting unbiased vs. biased sources?

3. METHODOLOGY

We conducted structured interviews with staff members (i.e. staffers) who are employed in the personal offices of members of Congress. The names of the staffers were obtained from their offices, which identified them as serving as the lead in covering a natural resources/environment, energy, or science committee on which the member of Congress sits.

3.1 Sampling

The House and Senate each have an energy, natural resources/environment, and science committee. The staff that support the work of the members of those committees served as the population for the study because of the relevance of science to their portfolios and to limit the range of potential issues addressed within the study. In order to include a broad range of offices, the study sample recruitment was stratified to achieve roughly equal proportions from four types: House Democrat, House Republican, Senate Democrat, and Senate Republican. The recruitment list within each of these groups was randomized; potential respondents were contacted systematically by phone and email until the quota of about 4 per group was achieved. The relatively small sample number was chosen for two reasons: 1) to conduct longer, more in-depth interviews to explore the full extent of the study's research questions; and 2) to restrict sampling of the limited study population in the qualitative stage of a two-step research design of a broader study of knowledge use in Congress. A second phase of this study (not included in this paper) will develop a wider survey of staffers to further explore our research questions.

3.2 Sample Characteristics

The study focuses on the use of science by policy staff who develop legislation and advise the members of Congress in their personal offices (e.g., not committee staff). All but one of the respondents contacted for interviews serve a member of Congress that sits on an energy, natural resources/environment, or science committee, but does not either chair the committee or serve as ranking member (in the latter cases, majority and minority committee staff are employed by, and represent, their respective member of Congress). Due to difficulty in recruiting Senate Republican offices during a busy legislative period following the new year, one of the Senate Republican staffers interviewed addresses science issues for their member of Congress, but the member does not sit on the relevant committee.

The final sample was 81% male. It included policy staffers of varying seniority: legislative correspondents/aides (3), legislative assistants and senior policy advisors (10), counsel (1), and legislative directors (2). The offices were equally split between party affiliation, and slightly more weighted toward the House (5 House Republican offices; 4 House Democratic offices; 3 Senate Republican offices; 4 Senate Democratic offices). The sample of offices was well-distributed across the ideological spectrum, including both highly liberal and highly conservative members of Congress (Appendix A).

3.3 Protocol

The recruitment materials invited staffers to "discuss how scientific information has—or has not—been helpful in the context of [their] work." The study protocol was approved by George Mason University Institutional Review Board [1150984-1]. Sixteen interviews were conducted between December 14, 2017 and March 12, 2018. They ranged in length from approximately 30 minutes to more than one hour. The interview script began with questions about the staffer's educational and professional background, and broad questions about science and its use in policy, then moved to a description of current policy issues in the staffer's portfolio that were relevant to the committee. The end of the interview addressed the staffer's use of science in regards to specific issues. Fourteen interviews were audiotaped and transcribed; additional notes from the interviews were entered into a database. Notes were taken for the other two interviews; they were not recorded.

3.4 Study Limitations

This study was conducted for the purposes of determining how congressional staff vet scientific information for use in policymaking. The small sample size is suitable for developing the range of likely difficulties in the use of science experienced by staffers, including across different use contexts, but cannot be generalized to all 535 member offices. While respondents do not appear to have selected into the study as a function of office political ideology, there may have been a selection bias towards staffers who felt more affiliation with science.

3.5 Measures

The interview protocol included the following closed- and open-ended measures to address the three research questions. Open-ended measures were coded in a process described below; the codebook for one of the measures is provided in the appendix.

[RQ_1] Capability of assessing scientific information. To what extent do you feel capable of assessing the credibility of scientific information? [Very little–to a great extent] *Approaches to assess scientist credibility.* What approaches in the past have you taken to assess the credibility of scientific information? [Codebook, Appendix B]

[RQ_2] Organizations perceived as unbiased. Which organizations come to mind within your portfolio on [X committee] as providing scientific information that is both non-partisan and politically ideologically unbiased? *Perceptions of scientist political bias.* Do you think of scientists as a politically conservative group, a politically liberal group, or as neither in particular? [Conservative, liberal, neither] *Preferences for scientist roles.* Using a categorization developed with natural resource scientists (Steel, Lach, List, & Shindler, 2001), we asked interviewees: Which of the five roles do you think is most helpful in informing policy processes? Why? [1) Scientists should only report scientific results and leave others to make policy decisions. 2) Scientists should report and then interpret the results for others who are involved in policy decisions. 3) Scientists should work closely with policymakers and others to integrate scientific results in policy decisions. 4) Scientists should actively advocate for specific and policies they prefer. 5) Scientists should be responsible for making decisions about policy.] *Types of organizations perceived as "most helpful."* Which people or organizations have been most helpful to you on the scientific aspects of this issue? [Categorized by the lead author]

[RQ_3] Strategic and substantive use of science. In the second portion of the study, congressional staffers were asked to identify which issues they were working on (What are the top 5 major problems that you and others on [X committee] are most occupied with these days?). They were asked to categorize them as whether the office policy position was already established (For each of these areas, did the office have a clear position on the issue at the start of the discussion?), and whether scientific information was relevant (For which—if any—of the major problems or project areas you just listed has scientific information come up in either your discussions or background reading of issue materials?). Only issues for which scientific information was relevant were categorized as "use of science"—these were further divided by whether the office had an established position (strategic use), or not (substantive use). In order to probe for longer-term policy research projects which might not be currently before the committee, staffers were also asked a follow-up question: Are there any additional projects that you are currently working on in which you are evaluating policy alternatives on which the office doesn't have a prior position? This response would also indicate examples of substantive

use.

3.6 Content Analysis

The variable constructs were coded by 3 people using a codebook developed both from previous literature and a close reading of the texts. Coders obtained a Krippendorff's α of 0.8 or greater across all variables, measured using a program for intercoder reliability analysis developed by Hayes and Krippendorff (2007) (see Appendix B). To ensure consistent interpretability across studies, reliabilities of $\alpha \geq 0.800$ have been recommended (Krippendorff, 2004).

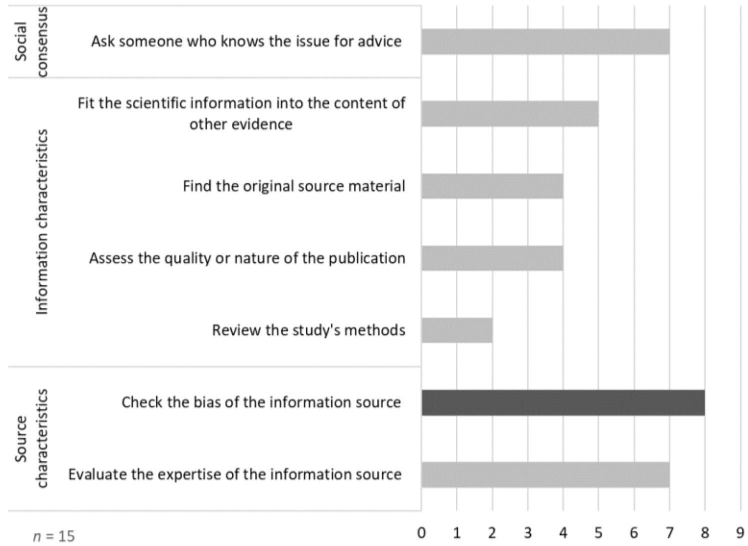
4. RESULTS

4.1 How do policymakers (congressional staff members) evaluate the credibility of scientific sources and information? [RQ_1]

Almost all of the interviewed staffers—14 of 15 who answered the question—said they felt somewhat or to a great extent capable of assessing the credibility of scientific information. (*To what extent do you feel capable of assessing the credibility of scientific information?)*. The responses ranged from very little (1), to somewhat (8), and to a great extent (6).

In a follow-up, they were asked *how* they assessed the credibility of information (*What approaches in the past have you taken to assess the credibility of scientific information?*). The congressional staffers said that they took three types of approaches to vetting scientific information (Figure 1, codebook and reliability statistics located in Appendix B). They called someone for advice (7 respondents), they looked at the characteristics of the information itself (10), and/or they assessed the source of the information (11). Aspects of the social reputation of the source—through recommendations from others (7), and assessing their bias (8) and expertise (7)—were cited more frequently than checking the way the study was conducted (information characteristics/methods, 2). The staff members said that in looking at the information itself, they sought to place the information in context: figure out where it stood in comparison to other studies (7), locate the original sources of information (4), and assess the nature or status of the publication (4).

Figure 1. Strategies to assess the credibility of scientific information



4.2 What sources of scientific information are seen as unbiased, and how frequently are they considered helpful sources of usable information versus biased sources [RQ_2]

When asked to identify non-partisan and politically ideologically unbiased sources available to them in staffing energy, natural resources, and science committees for their offices, the respondents were hard-pressed to name organizations that fit those qualifications. On average they specified roughly three, and even acknowledged that some of those sources were biased. Approximately a third of respondents (5) directly stated that there are few—if any—unbiased sources of scientific information available to them (Appendix, Table 1).

Half of the respondents (8) cited federal agencies as sources of unbiased scientific information; just under half named the Congressional Research Service (7); roughly a third (5) universities or colleges; and one-quarter the National Academies of Sciences, Engineering, and Medicine (4). All of the respondents who named Congressional Research Service as an unbiased source of information said they used it frequently. Federal agencies, universities and colleges, and the National Academies were used more inconsistently.

Other organizations that were mentioned by just one or two respondents included: health and environmental interest groups, science organizations, think tanks, industry associations, congressional committees, the Government Accountability Office (a legislative support agency), trade press, and academic journal publications.

For organizations that were named infrequently as unbiased sources—such as think tanks and interest groups—the interviewees acknowledged their bias, but that they calculated it into their interpretation of the information. As one respondent explained:

> For example, I would just say, if you're hearing from the Brookings organization, they're obviously a think tank, they have an agenda. They are dealing with a level of policy expertise that is credible. But you obviously have to provide a little filter on it in a way that you don't have to as much with for example, a National Academy of Sciences study, where you know it has gone through a process of academic experts who have reached a conclusion.

Some staffers said they tried to balance opposing sources as a strategy to address source bias:

> Some will have a certain leaning one way, and some will have a certain leaning the other way, but it's good to get both sides, because you know what counter-arguments might be, or arguments to help your side, so I think those are what I get most of my scientific research off of.

Most of the interview respondents (10 out of 15) said that they perceive scientists themselves to be politically liberal. The other 5 respondents said "neither" or both. Respondents were asked the same question used in the Pew Research Center public surveys from 2009 and 2014 (Kennedy & Funk, 2015; Pew Research Center for People and the Press, 2009): *Do you think of scientists as a politically conservative group, a politically liberal group, or as neither in particular?*

In follow-up comments to the questions, respondents voiced that 1) science itself should be objective; and 2) that the political ideology of scientists—or at least the perception of it—had changed in recent decades, becoming more liberal (Appendix D, Table 2). A couple of interviewees also discussed perceptions of scientist political ideology within the context of the political polarization of universities.

We asked interviewees how scientists could be most useful to policymakers. "*Which of the five roles do you think is most helpful in informing policy processes?*" and "*Why?*" All but one staff member supported more active roles in policy for scientists than just reporting their research findings. Respondents (*n*=15) were most supportive of scientists working closely with policymakers to integrate scientific results in policy decisions (10), followed by reporting and then interpreting the results for policymakers (9), and advocating for specific policies (7). We asked the staffers to pick one role as more helpful than others, but most (9 of 15) choose more than one of the five roles as most helpful, with four saying that all of the roles were appropriate. Staffers were generally supportive of scientists playing a wide array of roles in policy decisions, but they were divided on whether there were costs in scientists becoming issue advocates, e.g. promoting specific policies (Appendix E, Table 3), and acknowledged the limitations of the use of scientific information in policy.

Interview respondents discussed two policy issues in depth—one in which the office position was already decided (strategic use, *n*=15), and one in which it was not (substantive use, *n*=13). We asked them "*Which people or organizations have been most helpful to you on the scientific aspects of this issue?*" Some of the same organizations the interviewees said were unbiased sources of information were also repeatedly cited as most helpful—federal agencies (12 agency mentions by 5 respondents), and universities and colleges (7 mentions by 6 respondents) (Figure 2). Other sources of perceived unbiased scientific information—the National Academies and Congressional Research Service—were brought up infrequently as helpful (once and twice, respectively).

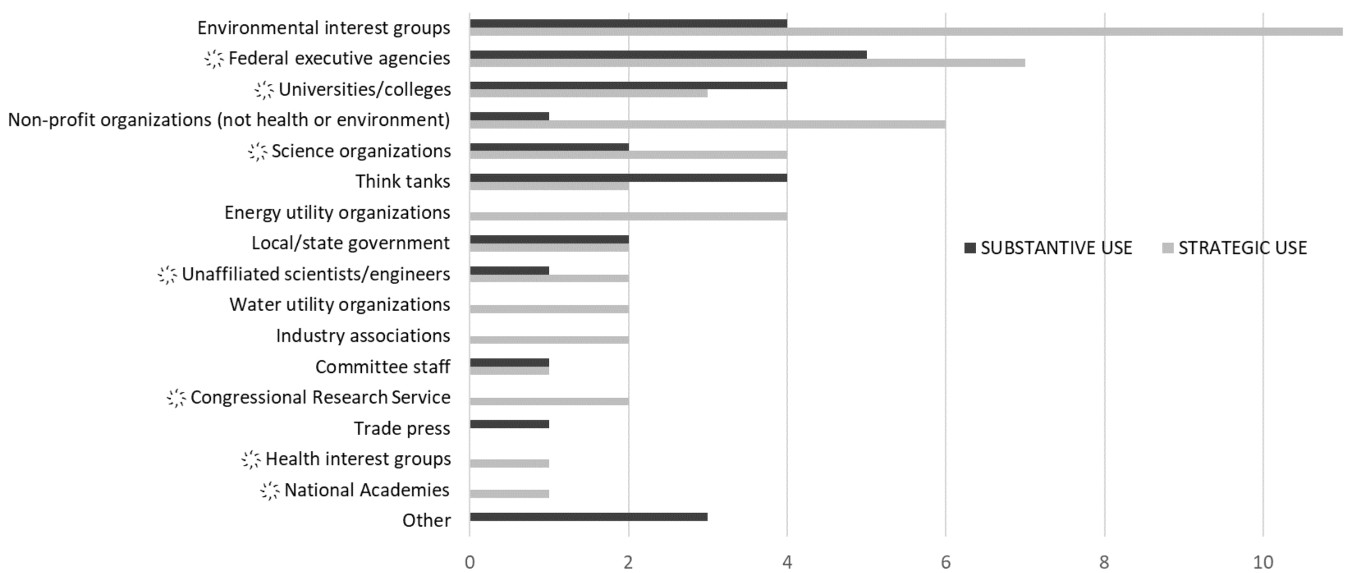
Environmental interest groups stood out as the most cited helpful organizations, with 15 mentions by 7 respondents, including across both political parties. In the discussion of non-partisan sources, two respondents cited environmental interest groups as good sources of scientific information but qualified them as partisan leaning and more biased than sources like the Congressional Research Service. One of these interviewees stated:

> There are some [environmental groups] that I think provide great scientific information, but through a partisan lens, and I would put the Union of Concerned Scientists in that group. I find that they rely only on credible science, but they very clearly have partisan leanings. They would say that their leanings are largely dictated by the science, but I don't think that they're as good as presenting their findings

objectively. I would say Environmental Working Group probably falls in the same bin of scientifically rigorous yet partisan.

4.3 Does type of information use (strategic vs. substantive) affect the choices of staff members in selecting unbiased vs. biased sources? [RQ_3]

Among the 97 policy issues cited by the respondents (*n*=16) as currently occupying their time, energy appeared the most frequently, followed by executive agency oversight, public lands management, climate change, and communication and technology. Science use occurred in each of the policy issue areas. An average of 6.1 committee issues and research projects were listed by the respondents—an average of 3.1 examples of strategic use, 1.8 substantive, and 1.1 in which scientific information had not been discussed or read. More substantive use occurred in long-term policy research than for issues that were currently of interest to the committee. Of the 29 total cases of substantive use, 18 were in this exploratory stage (62%). Overall, 52% of cited policy issues involved strategic use of science, 30% substantive, and 19% in which scientific information was not relevant.



n=78 mentions of organizations, 50 strategic, 28 substantive, by 15 respondents; ⁂ = groups identifed as "unbiased"

Figure 2. Mentions of "helpful" organizations in providing scientific information in cases where the office does (strategic use)—or does not (substantive)—already have an established policy position.

The subset of important issues—one strategic and one substantive—discussed in-depth with each interviewee closely resembled the distribution of the larger list of policy areas that they detailed at the start of the interview as currently of interest to the committee and their work. At the top were energy (4 cases of strategic use; 3 of substantive use), climate change (2 strategic; 2 substantive), and oversight (3 strategic; 0 substantive). Most of the mentions of helpful organizations for these important issues occurred in instances of strategic use of science, e.g. office policy was already decided. Indeed, 50 of the 78 times that respondents cited groups who were useful to them were within the context of strategic use. But strategic and substantive use do not appear to be correlated with certain types of sources (Figure 2). Both strategic and substantive use of scientific information occurred within the majority of categories of sources, including those most frequently seen as having a bias, such as environmental interest groups.

5. DISCUSSION

In this study, we use a content analysis of in-depth interviews with staffers (*n*=16) who support their member of Congress's work on House and Senate science, energy, and natural resource committees to illustrate the characteristics of scientific information sources—as credible and/or biased—that promote information exchange and use, including in different stages of policy adoption.

Assessing source credibility (RQ_1). We find that in assessing source credibility, congressional staff members look to the expertise and bias of the authority, which closely follows the advice of rhetorical scholars in evaluating the claims of experts (Ehninger & Brockriede, 1978). Few respondents report trying to directly assess the methods by which the scientific information was obtained. Most look to someone for advice, try to judge the credibility of the source, or place the information into wider context.

Sources seen as biased/unbiased and helpful provision of scientific information (RQ_2). Similarly following the rhetorical literature, staff members do not necessarily see bias—once assessed and understood—as a necessary impediment to credibility. This stands in opposition to some of the persuasion literature that defines absence of bias as a prerequisite for credibility (Slater & Rouner, 1996), or that ignores its role altogether in the evaluation of credibility (McCroskey & Teven, 1999). Staff members can name few sources of scientific information in their portfolios (environment/natural resources, energy, science) that they consider unbiased. Indeed, about a third said that there were few if any unbiased sources, arguing that everyone has a bias when it comes to policy. This hyperawareness—and relative comfort—with information source bias illustrates what would be expected from actors who are used to working within coalitions of like-minded individuals and organizations, often against groups with opposing sets of biases.

Scientists do not escape being painted with this brush. While scientists are not perceived by the public to be politically biased (Kennedy & Funk, 2015), most of the respondents believed them as a group to be politically liberal. Even so, the staff members stated that scientists should take active roles in policy, up to and including, advocacy. Indeed, some of the most helpful sources, such as environmental organizations, are those that staff members acknowledge to have a policy or political bias.

Relationship of type of information use to source bias (RQ_3). Most of the helpful sources of scientific information identified by respondents were on issues in which the offices already had established policy positions. This follows from the theory of legislative subsidy, in which lobbyists seek to provide information to offices with shared interests to increase their effectiveness. Issues on which an office does not have a position are less likely to be highly politicized and at the heart of an adversarial policy subsystem, either because the issue is new, or because it has not traditionally been prioritized within a partisan agenda. In these cases, one might expect that scientific information sources that are perceived as unbiased would be preferred. But if previous contacts serve as the basis for information for offices that are exploring nascent issues—at least for them—shared bias might remain the coin of the realm

(Ingold et al., 2017). Instead, we find no clear pattern between use of sources by perceptions of bias across issues in which offices are developing policy positions, and those in which they already have staked ground. One explanation for this might be found in the ways that staff members employ scientific information with different audiences. As the field of rhetoric notes, expert authority is useful because of its ability to make warranted claims in support of a position. Staff members use scientific information to do so, on behalf of their offices, for broad audiences that do not necessarily share their political or policy biases. At the same time, they must work closely with individuals and organizations that share their policy goals in order to successfully promote the interests of the Congress member and their constituents. Information sources that are widely perceived as unbiased by a broad public serve the purpose of the former, while information sources that share common values and policy preferences serve the latter.

6. CONCLUSION

Within the specific context of Congress, bias appears to play an important role in the way that the credibility of scientific information and its source is ascertained, based on this small qualitative study. This may represent a contextual aberration from other persuasive communication environments because of the nature of coalitions in promoting policies, based on shared values, beliefs, and preferences. Yet, it also may demonstrate the difficulty of capturing a variable that has effects that are both absolute (degree of bias), and valenced (direction of bias in relationship to the judge), within traditional factor analysis techniques (Birnbaum & Stegner, 1979). While there are many challenges in bringing together the varied literatures that address credibility, doing so may help elucidate whether indeed it is time to give up on standardized measures of trust and credibility after thousands of years, or whether it is indeed possible to finally make some headway.

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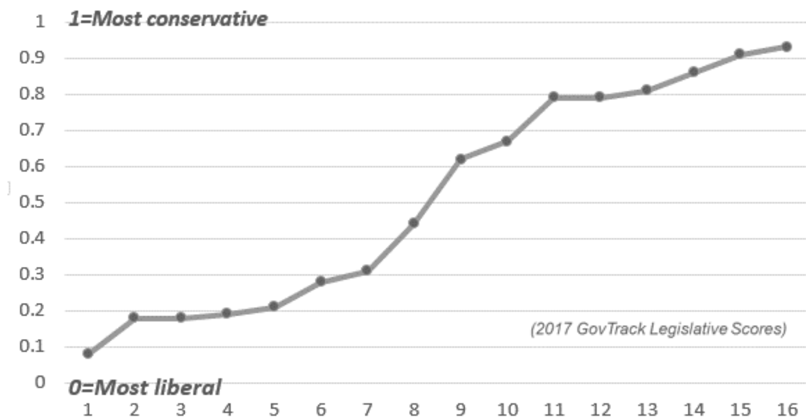
Appendix A

Office political ideology scores



Appendix B

Codebook for assessing credibility

Ƙ-α*	
	1. Look at the source (person/organization)
	Source characteristics
1.00	a. Look at the source (person/organization), but no additional information
0.88	b. Expertise *(credentials, intelligence, training, body of work, academic background)*
	c. Bias *(agenda, motivation, purpose, or interests)* key word = bias
0.82	1. Industry bias
0.82	2. Policy bias *(looking for policy outcome motivation, or stance on policy issues)*
1.00	3. Political bias *(political affiliation)*
0.88	4. Funding bias *(who commissioned report)*
	2. Look at the information (study, report, article)
	Information characteristics
1.00	a. Methods *(data collection and analysis within the study)*
0.86	b. Publication *(nature of journal/report publication; quality of journals)*
0.84	c. Check original source of information
1.00	d. Fit information within the context of other evidence *(look at other sources)*
1.00	*3. Get recommendations from others*

* Three graduate student coders conducted the reliability analyses.

Appendix C

Table 1. Respondents perceive few sources of unbiased scientific information.

- "You said politically and ideologically unbiased. I mean there is an argument to be made that nobody approaches their work on social issues in a truly unbiased fashion."
- "I think it's hard to find scientific information that's not being pushed by a non-profit group that clearly has some sort of agenda, whether or not it aligns with yours or not, basically."
- "I think everyone has a bias. That's generally the way I look at all research and all information. I don't think that there are truly any, there are very few unbiased sources."
- "Congressional Research Service is probably the one only that has zero politically sort of bias."
- "Everybody who comes in here has an agenda. Whether it's simply to want more money for the type of research that they're doing, or to get us to use the work that they're doing as a basis for a different policy decision, or to reinforce a policy decision that we've already made. … As our nation becomes more and more partisan, as our policymaking bodies become more and more partisan, people have to pick a side. Otherwise, nobody trusts you. If it's us versus them, whose side are you on? You have to pick a side. Otherwise, you have no access to anyone."

Appendix D

Table 2. Respondents say science should be objective, but scientists are perceived as liberal.

Science	• "Science is objective, right? So I hope that scientists are objective." • "I guess neither. I mean, I don't think science can be political if done correctly." • "I think when scientists come in and meet with us, it's not as sometimes people think it's science is super liberal. It's not. It's just science."
Scientists	• "I think of scientists as usually being progressive … . Mostly in the last 10, 20 years, I think. I don't think it was always that way, 50 years ago our scientists would have been more conservative … ." • "I hope neither, but I think unfortunately politically liberal sometimes. I think a lot of times universities are more pushed into the politically liberal category, so a lot of science is being done at really great universities, but then maybe the scientists themselves aren't actually ... have any ideology one way or another on certain things, but maybe they're being lumped in with the broader positions of the university."

Appendix E

Table 3. Interviewees expressed different opinions on the costs and benefits of advocacy.

Scientist advocacy	Quote
Crossing the advocacy line diminishes the authority of science	• "[Scientists should say …] here's what the facts say. Leave it to somebody else to determine what does that mean and how should we respond to that. It kind of keeps it above the political fray… and doesn't risk lumping the outcomes of the research in with the more partisan happenings here and how that should be addressed. If I'm just a scientist and I've done a ton of climate change research and suddenly I'm here advocating for this policy, I have a lot of credibility because of that, but there's a risk that maybe my thoughts on other issues or even my policy work here, and the tactics I choose to address that, might drown out some of the efficacy of the work I've done." • "A side effect of having scientists being the ones lobbying is that science then loses its allure as unpolitical. Science is already politicized enough. Policymakers need to have better access to scientific research in formats that are access(ible), but I don't necessarily think that every scientist needs to be a lobbyist or an advocate, too."
Everyone lobbying the Hill has a policy bias; scientists should also be advocates	• "… I certainly would prefer for them to be advocates for positions. I think that's more helpful because ... I mean regardless of who they are and what the basis is for their decision ... I know that everybody has a position on a policy, and I would rather that somebody state their position or their organization's position, and tell me whose position it is and why, than for them to attempt to maintain some degree of objectivity. .. when I said earlier that I spent a lot of time trying to assess the credibility of information, part of that is looking at who's providing the information and looking at what perspective they're coming from. And so I'm gonna be doing that anyway and so I think it gets to be more complicated if somebody is trying to mask their perspective and providing what they perceive to be objectivity." • "The good [lobbyists] are the one who say, 'I'm here today on behalf of this client, let me also bring you some information, that isn't entirely consistent with their position.' That is how you build huge amounts of credibility. It is perfectly acceptable to me, and I would welcome if I knew the scientist well enough to have him advocate for a policy position. Because to say, here is the evidence, let me help you do the work of sorting through these issues, because we are not staffed as we used to be to develop the in-house expertise. I'm stretched way too thin to do that, so it would be helpful."