How Organizations Engage in Scientific Discourse to Influence Stakeholders and Regulatory Policy

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Abstract

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A fundamental question in the non-market strategy literature is how firms attempt to shape the political environment to favor their interests. While prior literature has focused on how firms use informational, financial incentive, or constituency-building strategies to influence policymakers or public opinion, it has neglected how firms also attempt to influence scientists and scientific discourse. This omission is meaningful given that scientific discourse often underpins policymaking and shapes public perception of issue salience. In this dissertation, I conduct an empirical examination of when and how organizations contribute to scientific discourse in order to influence regulation. I follow these empirical studies with a theoretical exploration of how firms use empirical evidence to influence stakeholder perception of issue salience and demands on the firm. I use data from the nearly 30,000 comments submitted by organizations during the creation of the 2015-2020 Dietary Guidelines for Americans, as well as data from quarterly

lobbying reports, IRS Form 990s, Web of Science, and PubMed. In my first chapter, I ask: what is the relationship between scientific discourse and organizations' decisions to engage in political activity? I find patterns suggesting that organizations are more likely to lobby when they first attempt to influence scientific discourse but are dissatisfied with the results. My second chapter builds on the first to ask how industry-affiliated organizations contribute to scientific discourse. Specifically, I investigate whether industry-affiliated organizations contribute high quality or biased expertise. I find that whether industry-affiliated organizations contribute high quality or biased scientific expertise depends on the way in which they contribute. Simply citing studies is indicative of contributing high quality scientific expertise, whereas citing studies the industry-affiliated organization has funded itself is indicative of contributing biased expertise. Finally, I broaden my focus to theoretically explore how firms engage with empirical evidence to influence stakeholder perception of issue salience and demands on the firm. I develop a theoretical model where firms indirectly influence stakeholder demands by weakening issue salience for stakeholders. Stakeholders formulate demands on the firm based on the salience of an issue. Thus, firm efforts to weaken issue salience will also affect what, if any demands, stakeholders make on the firm. I introduce two empirically-based resistance strategies that act on issue salience and stakeholder demands: validity disputing and validity promoting. I describe how validity disputing is used to weaken issue salience and sow doubt on the justifications for stakeholder demands, while validity promoting is used to deter stakeholders from making demands on the firm.

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Introduction

A fundamental question in the non-market strategy literature is how firms attempt to shape the political environment to favor their interests (North, 1990). Hillman and Hitt (1999) propose a typology of political strategies, where corporate political activity (CPA) may take the form of an informational, financial incentive, or constituency-building strategy. Lobbying, political donations, and advocacy work are dominant tactics for each respective strategy, as well as the focus of extant empirical studies (Hadani et al., 2017; Hillman et al., 2004; Hillman & Hitt, 1999; Lux et al., 2011; Macher & Mayo, 2015; Schuler et al., 2002; Walker & Rea, 2014). Common to all of these strategies is that their target for influence is either policymakers, who may be legislators or regulators, or public opinion.

Yet, many politically salient issues also involve scientists, who have influence in the policymaking process (Barber & Diestre, 2019; Hiatt & Park, 2013; Jasanoff, 1994) and on public opinion (Bonardi & Keim, 2005). For example, many federal agencies convene scientific advisory boards and employ scientists to help craft regulations or give regulatory approval for the marketing of products (Barber & Diestre, 2019; Hiatt & Park, 2013; Jasanoff, 1994; Ozcan & Gurses, 2018; Polidoro & Theeke, 2012). Scientists also play key roles in identifying the existence, magnitude, causes, and effects of issues (Markowitz & Rosner, 2013; McGarity & Wagner, 2010; Michaels, 2008, 2020), and shaping public opinion on what, if anything, should be done to address the issue (Bonardi & Keim, 2005; Oreskes & Conway, 2011). Using scientists or scientific evidence to sow doubt on the environmental and public health impacts of a firm's activities is a classic example, and has been anecdotally documented in the tobacco (Brandt, 2009; Proctor, 2011; Yach & Bialous, 2001), fossil fuel (Oreskes & Conway, 2011), chemical

(Michaels, 2008, 2020), lead (Markowitz & Rosner, 2013), asbestos (McCulloch & Tweedale, 2008), opioid, alcohol (Michaels, 2020), and food (Nestle, 2018) industries.

Our understanding of how firms attempt to shape the political environment to suit their interests is thus incomplete without understanding how firms attempt to influence scientific discourse – a process in which scientific questions are posed and answers are shared and debated by scientists. In this dissertation, I conduct an empirical examination of when and how organizations contribute to scientific discourse in order to influence regulation. I follow these empirical studies with a theoretical exploration of how firms use empirical evidence to influence stakeholder perception of issue salience and demands on the firm. In doing so, I show that firms seek to shape their political environment not only through targeting policymakers and public opinion, but also through targeting scientists and influencing the scientific discourse that underpins policy decisions and preferences.

My empirical context is the creation of the 2015-2020 Dietary Guidelines for Americans (hereafter referred to as the Dietary Guidelines). This context is unique in that it allows for clearly distinguishing between scientific discourse and lobbying and, likewise, clearly distinguishing between organizational attempts to influence scientists and attempts to influence regulators and legislators. The process for creating the Dietary Guidelines is split into two distinct stages. In the first stage, a scientific advisory committee is convened to draft a report on the state of knowledge regarding diet and health outcomes. During this stage, organizations' attempts to influence scientific discourse can be observed through public comments they submit to the scientific advisory committee. In the second stage, two regulatory agencies, the U.S. Departments of Agriculture (USDA) and Health and Human Services (HHS), use the scientific advisory committee's scientific report to inform their drafting of the final Dietary Guidelines.

In my first chapter, I ask: what is the relationship between scientific discourse and organizations' decisions to engage in political activity? Using data from the nearly 30,000 public comments submitted during the drafting of the Dietary Guidelines, in combination with quarterly lobbying data, I find patterns suggesting that organizations are more likely to lobby when they first attempt to influence scientific discourse but are dissatisfied with the results. These organizations are also more likely to be industry-affiliated in that they are firms, agricultural or trade associations, or other non-profits with an industry affiliation. These findings reveal that organizations attempt to influence scientists and scientific discourse prior to attempting to influence regulators by lobbying. Whether they are satisfied with their ability to influence the scientific discourse, in turn affects their decision to engage in lobbying.

My second chapter builds on the first to ask how industry-affiliated organizations contribute to scientific discourse. Using references to scientific publications collected from the written comments submitted by organizations during creation of the Dietary Guidelines, I investigate whether industry-affiliated organizations contribute high quality or biased expertise. I assess quality and bias based on whether, compared to similar articles in PubMed, articles cited by industry-affiliated organizations were likely to be included in the scientific advisory committee's own systematic reviews or scientific report. I find that whether industry-affiliated organizations contribute high quality or biased scientific expertise depends on the way in which they contribute. Citing studies is indicative of contributing high quality scientific expertise, whereas citing studies the industry-affiliated organization has funded itself is indicative of contributing biased expertise.

Finally, I broaden my focus to theoretically explore how firms engage with empirical evidence to influence stakeholder perception of issue salience and demands on the firm. By

integrating the issue and stakeholder salience literatures, I develop a theoretical model where firms indirectly influence stakeholder demands by weakening issue salience for stakeholders. Stakeholders formulate demands on the firm based on the salience of an issue. Thus, firm efforts to weaken issue salience will also affect what, if any demands, stakeholders make on the firm. I introduce two empirically-based resistance strategies that act on issue salience and stakeholder demands: validity disputing and validity promoting. I describe how validity disputing is used to weaken issue salience and sow doubt on the justifications for stakeholder demands, while validity promoting is used to deter stakeholders from making demands on the firm.

Chapter 1: Scientific Discourse and Lobbying

INTRODUCTION

Regulation is known to play an important role in enabling or constraining firms' activities and determining winners and losers in markets (Stigler, 1971). Consequently, many firms engage in corporate political activity (CPA), such as lobbying regulators (Barber & Diestre, 2019; Diestre et al., 2020; J. M. de Figueiredo & Tiller, 2001; Schuler, 1996), to influence the rules of the game in their favor (Dorobantu et al., 2017; North, 1990). Indeed, the CPA literature has found that regulation and dependence on the government are key drivers of organizational engagement in CPA (Hansen & Mitchell, 2000; Hart, 2001; Schuler et al., 2002).

However, in focusing on engagement in CPA at the point of targeting regulators, the literature overlooks a potential channel of influence that precedes the targeting of regulators. Moreover, an organization's success in this earlier stage of influence may determine whether it decides to engage in CPA at all. This channel of influence is scientific discourse. I define scientific discourse as a process in which scientific questions are posed and answers are shared and debated by scientists. Scientific discourse is known to serve an important function in regulatory policymaking in particular (Jasanoff, 1994; Wagner & Steinzor, 2006). Many federal agencies emphasize that science is a fundamental input to their regulatory policymaking process (Hiatt & Park, 2013). For example, agencies commonly convene scientific advisory boards and employ scientists to help craft regulations or give regulatory approval for the marketing of products (Barber & Diestre, 2019; Hiatt & Park, 2013; Jasanoff, 1994; Ozcan & Gurses, 2018; Polidoro & Theeke, 2012).

Accordingly, a question of first-order importance is: what is the relationship between scientific discourse and organizational engagement in CPA? I focus on lobbying as a CPA tactic given that it is theorized as an information sharing mechanism (J. M. de Figueiredo & Richter, 2014; J. M. de Figueiredo, 2002; Hillman & Hitt, 1999), and it is thus conceivable that organizations lobby in order to contest or counteract the influence of scientific discourse on the regulatory process. Because there is little prior theoretical guidance about how to study the relationship between scientific discourse and lobbying, there is little foundation for formulating deductive predictions. I therefore take a question-driven, abductive approach (Graebner et al., 2022; Sætre & Van de Ven, 2021). I investigate patterns in organizations' engagement in scientific discourse and lobbying to understand whether there is a relationship between scientific discourse and lobbying. Based on the empirical findings, I then ask follow-on questions to better understand the nature of the relationship and what potential mechanisms may be behind it.

My empirical context is the creation of the 2015-2020 Dietary Guidelines for Americans (hereafter referred to as the Dietary Guidelines). This context is unique in that it allows for clearly distinguishing between scientific discourse and lobbying and, likewise, clearly distinguishing between organizational attempts to influence scientists and attempts to influence regulators and legislators. The process for creating the Dietary Guidelines is split into two distinct stages. In the first stage, a scientific advisory committee is convened to draft a report on the state of knowledge regarding diet and health outcomes (hereafter the scientific report). During this stage, organizations' attempts to influence scientific discourse can be observed through public comments they submit to the scientific advisory committee. In the second stage, two regulatory agencies, the U.S. Departments of Agriculture (USDA) and Health and Human Services (HHS), use the scientific advisory committee's scientific report to inform their drafting

of the final Dietary Guidelines. In this stage, organizations can submit public comments to the regulatory agencies expressing their reactions to the scientific report, and specifically, whether they were dissatisfied with the conclusions reached through scientific discourse. In addition to submitting a public comment, organizations may engage in lobbying at any point in the process. Importantly, organizations may only lobby the regulators or legislators; organizations may submit comments to, but not lobby the scientific advisory committee, thus allowing attempts to influence scientific discourse versus lobbying to be clearly distinguished.

I use data from the nearly 30,000 public comments submitted during the drafting of the Dietary Guidelines as windows on organizations' attempts to influence scientific discourse, alongside quarterly lobbying reports from the Secretary of the Senate, with specific focus on creation of the 2015-2020 Dietary Guidelines. First, I find patterns suggesting that lobbying occurs in reaction to scientific discourse. The timing of nonmonotonic spikes in lobbying activity suggests that lobbying does not occur randomly or constantly throughout the process, nor does it occur preemptively. Lobbying activity is lowest before and during the early part of the scientific advisory committee's meeting period. Lobbying activity increases towards the end of the scientific advisory committee's meeting period as conclusions from the committee's scientific discourse become more solidified. Lobbying activity then peaks directly after the scientific advisory committee publishes its scientific report, in the second stage when the USDA and HHS draft the Dietary Guidelines, and falls again following release of the final Dietary Guidelines.

To follow up on this finding, I examine whether the spike in lobbying activity reflects organizations reacting with dissatisfaction to the conclusions reached through scientific discourse. Using public comments on the scientific report, I code for whether organizations expressed disagreement with the report. Cross-sectionally, I find that the percentage of

organizations that commented in disagreement is significantly higher among organizations that engage in lobbying than among organizations that do not engage in lobbying. Temporally, I find that the spike in lobbying activity after publication of the scientific report occurred among organizations that commented in disagreement, but not among organizations that commented without expressing disagreement.

Given these findings, an additional question is why organizations are less likely to lobby pre-emptively, or why they are more likely to lobby following release of the scientific report. Since the conclusions of scientific discourse are somewhat uncertain, one possibility is that organizations wait to determine what they need to lobby on. However, organizations are not limited to waiting passively: they may also attempt to influence the scientific discourse. Rather than waiting to determine what they need to lobby on, organizations may attempt to influence scientific discourse to pre-empt the need to lobby at all. Accordingly, I consider whether organizations that lobby in response to dissatisfaction with the scientific report may have first attempted to influence scientific discourse before conclusions were reached. Using comments to the scientific advisory committee, I find that the spike in lobbying activity after publication of the scientific report, while significantly positive regardless of commenting to the committee, was statistically significantly greater in magnitude among organizations that submitted comments to the scientific advisory committee than among organizations that did not. This finding suggests that while lobbying activity generally occurs in response to dissatisfaction with scientific conclusions, it is even more likely to occur in response to failed attempts to influence the reaching of those conclusions.

Finally, in order to offer a more complete picture of the range of organizational decisions with regards to lobbying and scientific discourse, I also provide insights about organizations that

only engaged in lobbying on the Dietary Guidelines, but neither submitted a comment to the scientific advisory committee, nor submitted a comment in reaction to the scientific report. Among these lobby-only organizations, I observe a spike in lobbying activity after publication of the scientific report, just as I find for organizations that expressed disagreement with the scientific report. While these lobby-only organizations did not submit any comments that could be coded for disagreement, I offer some qualitative, anecdotal insights about the organizations in this category. The vast majority (85 percent) are firms and trade associations, rather than non-profits with no industry affiliation. Qualitatively, of the top five organizations in terms of most lobbying, four are alcohol firms, and one represents the vending machine industry.

Together, my findings suggest that lobbying is at least in part a function of scientific discourse. Specifically, my findings suggest that organizations engage in lobbying in response to dissatisfaction with scientific discourse, and in particular, in response to dissatisfaction with the results of earlier attempts to influence scientific discourse.

I contribute to the CPA literature in several ways. First, I introduce scientific discourse both as a channel of regulatory influence that is distinct from lobbying and as a unique class of antecedents to decisions about engaging in CPA. Second, given that organizations lobby in reaction to dissatisfaction with scientific discourse, my findings also help to shed indirect insights about what information organizations may be sharing through lobbying. What information is being conveyed remains a perennial question in the lobbying literature (Bombardini & Trebbi, 2020; J. M. de Figueiredo & Richter, 2014). My findings provide indirect insights that organizations use lobbying to express disagreement with scientific conclusions. Third, because attempts to influence scientific discourse involve attempts to influence a scientific advisory committee, my study contributes to understanding the different influence strategies that

organizations use in complex regulatory contexts where actors with divergent incentive structures are involved in the policymaking process (Bonardi et al., 2005; J. M. de Figueiredo & de Figueiredo, 2002; Hillman & Hitt, 1999; Holburn & Bergh, 2008; Ozcan & Gurses, 2018).

THEORETICAL DEVELOPMENT

Related literatures and theoretical mechanisms

Many federal agencies emphasize that science is a fundamental input to their policymaking process (Jasanoff, 1994; Wagner & Steinzor, 2006). For example, as Hiatt and Park (2013) note, "[t]he USDA's mission statement appears to reflect this emphasis on science… 'I provide leadership on food, agriculture, natural resources, and related issues based on sound public policy, the best available science, and efficient management,'" (p. 925). Agencies commonly convene scientific advisory boards and employ scientists to help craft regulations or give regulatory approval for the marketing of products (Barber & Diestre, 2019; Hiatt & Park, 2013; Jasanoff, 1994; Ozcan & Gurses, 2018; Polidoro & Theeke, 2012).

In addition to relying on scientific evidence to fulfill their responsibilities for managing social, environmental, and health risks, regulatory agencies also depend on science to legitimize and justify their policy choices when faced with competing stakeholder interests (Barber & Diestre, 2019; Hiatt & Park, 2013; Jasanoff, 1994). Because regulatory agencies are staffed by unelected civil servants, maintaining the agency's legitimacy is especially important to its ability to carry out policymaking activities and avoid disruptive challenges from stakeholders. Stakeholders have recourse to challenge decisions they view as illegitimate through the judicial review process (Bertrand et al., 2021; Jasanoff, 1994; Wagner & Steinzor, 2006), or through lobbying Congress members, who may subsequently threaten to withhold resources from the

agency (Bonardi et al., 2006). Consequently, regulatory agencies rely on the cultural authority science (Hiatt & Park, 2013) and perceptions of scientific evidence as being unbiased and apolitical (Jasanoff, 1994; Polidoro & Theeke, 2012) to justify their policy decisions.

I conceptualize scientific discourse as a process in which scientific questions are posed and answers are shared and debated among scientists. I focus on scientific discourse, and not simply scientific information, to make clearer the fact that answers to scientific questions are constantly shared and debated, particularly when used in policymaking processes (Wagner et al., 2018; Wagner & Steinzor, 2006). When non-scientists attempt to influence scientific discourse, they are attempting to influence scientists. For this reason, attempting to influence scientific discourse is conceptually distinct from other CPA tactics (Hillman & Hitt, 1999), such as lobbying, where actors share information in attempts to influence policymakers (J. M. de Figueiredo & Richter, 2014; J. M. de Figueiredo, 2002), as well as distinct from public relations or advocacy tactics, which attempt to influence public opinion (Walker & Rea, 2014).

Prior literature lends implicit support for this theoretical distinction. Hillman and Hitt (1999) propose a typology of political strategies, where CPA may take the form of an informational, financial incentive, or constituency-building strategy, with lobbying, political donations, and advocacy work being dominant tactics for each respective strategy. Notably, they include the funding of research studies as a distinct tactic from lobbying under their informational strategies category. Further, conclusions drawn by Bonardi and Keim (2005) in their theoretical examination of the effect of information cascades on issue salience would appear to suggest that engagement in scientific discourse is not only distinct from lobbying, but may also pre-empt the need to lobby. Specifically, they state that while many organizations believe that they can use lobbying to counteract public pressure once an issue becomes widely

salient, it is too late, and lobbying will have little impact. Rather, an organization must prevent an issue from becoming widely salient in the first place by manipulating the information environment through sponsoring research and influencing experts.

These theoretical conclusions, coupled with the importance of science as an input to regulatory policymaking, suggest that participation in scientific discourse is distinct from, and may occur prior to any engagement in CPA. Moreover, while the empirical literature on the antecedents to engagement in CPA has found that issue salience (Baumgartner et al., 2011; Baumgartner & Leech, 2001; Caldeira et al., 2000), competition on an issue (Hansen & Mitchell, 2000; Lux et al., 2011; Schuler et al., 2002), industry concentration (Grier et al., 1994; Masters & Keim, 1985; Schuler, 1996), dependence on the government, and regulation are key drivers of organizational engagement in CPA (Hansen & Mitchell, 2000; Hart, 2001; Schuler et al., 2002), it remains silent on both the role of scientific discourse and when CPA occurs in the regulatory policymaking process.

There is thus a need to empirically address the question of how scientific discourse and attempts to influence it, affect organizations' decisions to engage in CPA. I focus on lobbying as a CPA tactic given that it is theorized as an information sharing mechanism (J. M. de Figueiredo & Richter, 2014; J. M. D. Figueiredo, 2002; Hillman & Hitt, 1999), and it is conceivable that organizations lobby in order to either amplify or contest the influence of scientific discourse on the regulatory process. Accordingly, one theoretical possibility is that organizations are more likely to lobby when they are satisfied with the conclusions reached through scientific discourse. For example, I might expect satisfied organizations to engage in lobbying in order to amplify scientific conclusions that support their interests. Further, these organizations may assume that their odds of success are relatively high, given that they are merely amplifying scientists'

conclusions, and regulators privilege scientific information in their policymaking. Indeed, prior research on lobbying suggests that organizations are more likely to lobby when they believe that they will be successful (Bonardi et al., 2005; Hillman et al., 2004).

Another possibility, however, is that organizations may be less likely to lobby when they are satisfied with the conclusions reached through scientific discourse. Assuming that regulatory agencies do privilege scientific information in the policymaking process, if the consensus on a given scientific question is favorable to an organization's interests, the corresponding policy should be similarly favorable to an organization's interests. In this situation, the marginal benefit of lobbying may be low.

Organizations may therefore be more likely to lobby when they are dissatisfied with the conclusions reached through scientific discourse. An organization may be dissatisfied with scientific conclusions when they are in misalignment with its interests. In this scenario, scientific conclusions may introduce a novel regulatory threat and competition on the issue from other stakeholders (Bonardi & Keim, 2005), which an organization must defend against through lobbying. Classic examples of this include tobacco firms' public relations and lobbying campaigns to counter growing scientific consensus on the association between smoking and lung cancer (Brandt, 2009; Proctor, 2011), as well as fossil fuel firms' use of the same tactics to counter scientific evidence linking carbon emissions with climate change (Oreskes & Conway, 2011; Supran & Oreskes, 2017). Prior studies on the antecedents to lobbying lend support for this logic, finding that organizations are more likely to lobby when they are heavily regulated (Hansen & Mitchell, 2000; Hart, 2001; Schuler et al., 2002), on issues that are salient to them (Baumgartner et al., 2011; Baumgartner & Leech, 2001; Caldeira et al., 2000), or when faced with competition that threatens their interests on an issue (Baumgartner & Leech, 2001; Hansen

& Mitchell, 2000; Lux et al., 2011; Schuler et al., 2002). Thus, organizations may attempt to contest scientific information or share other types of information through lobbying, in order to counteract the effect of unfavorable scientific discourse on regulators' policymaking.

Because scientific discourse is a process through which scientific questions are answered, there may be ex-ante uncertainty as to what scientific conclusions will emerge. The preceding discussion implicitly assumes that organizations wait for any ex-ante uncertainty to be resolved before determining whether they are satisfied the conclusions, which subsequently informs their decision to lobby. However, organizations also have the option to lobby prior to the emergence of scientific conclusions, despite there being greater uncertainty as to what the conclusions will be. In this scenario, organizations may treat lobbying as insurance against scientific conclusions that run counter to the organization's interests. Alternatively, organizations may wait for scientific conclusions to emerge so that they have greater certainty as to whether lobbying is necessary, and if it is, which conclusions may be amplified or contested through lobbying.

In addition, just as organizations may lobby pre-emptively, organizations need not passively wait for the resolution of uncertainty around scientific conclusions. Because scientific discourse is a conversation where answers to scientific questions are shared and debated, organizations may perceive an opportunity to influence scientific discourse before scientists have settled on conclusions. Many case studies have documented the tactics organizations use to influence scientific discourse for political purposes, including sponsoring the production of peer-reviewed articles, grey literature, or books by consultants, academics, think tanks, or foundations (Brulle, 2014; Dunlap & Jacques, 2013; Farrell, 2016; Glenna & Bruce, 2021; Markowitz & Rosner, 2013; Michaels, 2020; Nestle, 2018; Oreskes & Conway, 2011). Organizations then use this sponsored research to sow doubt on unfavorable scientific discourse by contesting scientific

findings, drawing attention to alternative explanations, or emphasizing mixed results and uncertainty in the literature (McGarity & Wagner, 2010; Michaels, 2008; Proctor & Schiebinger, 2008).

If organizations are successful at influencing scientific discourse to their satisfaction, lobbying may become unnecessary and engagement in scientific discourse could be considered an alternative tactic to lobbying within a broader CPA information strategy (Hillman & Hitt, 1999). However, just as scientific discourse exhibits ex-ante uncertainty, there may likewise be ex-ante uncertainty about whether organizations will ultimately be successful. If organizations are unsuccessful at influencing scientific discourse to their satisfaction, they may subsequently be more likely to lobby. Accordingly, whether engagement in scientific discourse constitutes an alternative tactic or an antecedent to lobbying depends on the organization's success at influencing scientific discourse.

RESEARCH DESIGN

Because there is little prior theoretical guidance about how to study the relationship between scientific discourse and lobbying, I take a question-driven, abductive approach (Graebner et al., 2022; Sætre & Van de Ven, 2021). An abductive approach is best-suited to studying novel, causally complex phenomena where it is not possible to specify unambiguous, theoretically motivated hypotheses in advance (Graebner et al., 2022; Sætre & Van de Ven, 2021). The strengths of abductive studies lie in their ability to propose potential new stylized facts or generate new theory (Graebner et al., 2022; Helfat, 2007).

The Dietary Guidelines for Americans

My empirical context is the creation of the 2015-2020 Dietary Guidelines for Americans. The purpose of the Dietary Guidelines is to provide science-based recommendations to the American public on what and how much to eat, in order to prevent chronic disease (National Academies of Sciences, Engineering, and Medicine, 2017a). While an extensive body of evidence exists linking the under- and over-consumption of micronutrients to diseases such as type 2 diabetes, cardiovascular disease, and obesity, the relationship between dietary patterns and health outcomes remains complex (National Academies of Sciences, Engineering, and Medicine, 2017a). For this reason, Congress passed the National Nutrition Monitoring and Related Research Act of 1990, which mandates that the United States Department of Agriculture (USDA) and the Department of Health and Human Services (HHS) collaborate to produce an updated version of the Dietary Guidelines every five years. Each iteration of the Dietary Guidelines bases its updated nutrition and dietary recommendations on advancements in the scientific evidence (National Academies of Sciences, Engineering, and Medicine, 2017a).

In addition to their public health implications, the Dietary Guidelines have important policy and economic consequences; all federal policy and programs must be consistent with the recommendations in the Dietary Guidelines, including, for example, food choices for the National School Lunch Program (National Academies of Sciences, Engineering, and Medicine, 2017b). Through their recommendations on what and how much to eat, as well as their evaluation of which foods are healthier, the Dietary Guidelines have consequences for consumer purchasing decisions and ultimately, firms' market share. These consequences are well understood by firms and industry associations, as exemplified in a comment submitted by the Iowa Farm Bureau Federation on the drafting of the Dietary Guidelines:

> "I want to emphasize the importance of these guidelines and the direct impact they have on the development of policy, the delivery of existing programs, and the educational

> message directed toward American consumers with respect to food and nutrition issues. The influence of the dietary guidelines is pervasive, not only spanning a broad array of policy issues but also extending far into the future by shaping the lasting perceptions and attitudes of consumers toward the foods they eat." (Comment on the Dietary Guidelines, April 8, 2015).

Structure of the process

A unique aspect of this empirical context is the ability to separate scientific discourse from lobbying. This differs from most other empirical contexts, which encompass broader organizational efforts to influence not only the scientific community, but also policymakers and the general public (Farrell, 2016; Jacques et al., 2008; Michaels, 2008, 2020; Nestle, 2018; Oreskes & Conway, 2011). Such contexts lack distinct boundaries and temporal separation between attempts to influence scientific discourse versus regulatory policy. The process for creating the Dietary Guidelines includes structural features that create clear boundaries between engagement in scientific discourse versus lobbying, as well as temporal separation of attempts to influence scientific discourse and decisions to lobby.

These boundaries are evident in Figure 1, which depicts the Dietary Guidelines' two distinct stages. In the first stage (shaded light grey in the figure), a scientific advisory committee is convened to determine the state of knowledge on a variety of questions related to diets and health outcomes. The committee begins by selecting the topics and related questions to be addressed. Topic areas and their corresponding questions are then assigned to subcommittees, which are composed of members of the scientific advisory committee with the most expertise in a given topic. Each subcommittee proceeds to provide a plan for how they will answer each question. Depending on the question, answering it may involve conducting original analysis of government-compiled data, updating the knowledge base with findings from studies published since the last iteration of the Dietary Guidelines, or conducting new systematic reviews of the

literature. As depicted in Figure 1, the scientific advisory committee holds public meetings to present their findings and conclusions throughout their review process (Dietary Guidelines Advisory Committee, 2015).

All of the scientific advisory committee's work is then compiled into a final scientific report. This report is structured by topic, with answers to their corresponding research questions. For each research question, the committee presents the source of evidence, be it raw data or a systematic review, and provides their conclusion on the state and strength of the knowledge base. To reach a conclusion on the strength of the knowledge base, the committee takes a number of factors into consideration, such as risk of bias, number of studies and subjects, consistency of findings, evidence of causality, and magnitude of effects in the literature. The committee also discusses the implications of these findings for public health (Dietary Guidelines Advisory Committee, 2015).

In the second stage (shaded dark grey in Figure 1), the committee's scientific report is used to inform officials from the USDA and HHS, who are responsible for drafting the final Dietary Guidelines. The agencies first subject the committee's scientific report to peer review by their own science specialists, relevant experts at other agencies, and independent experts. The agencies then take information from the scientific report into consideration in their drafting of the Dietary Guidelines. While agency officials attempt to prioritize scientific information, they must also weigh the science-based implications against their own policy priorities and stakeholder interests in their drafting of the final Dietary Guidelines (National Academies of Sciences, Engineering, and Medicine, 2017b).

Opportunities for organizational influence: Public commenting

Where organizations may have influence, is in submitting public comments. Organizations are able to comment on the drafting of the Dietary Guidelines because of the Administrative Procedures Act (APA) of 1946. One way in which regulatory policymaking differs from legislative policymaking is in its formalized procedures for incorporating public comments. The APA pertains to any "agency statement of general or particular applicability and future effect designed to...interpret, or prescribe law or policy" [U.S.C. §551(4) (1994)]. It allows for public participation through its requirement that regulatory agencies notify the public of any regulatory activity covered by the APA and give the public an opportunity to comment on the proposed activity. This is known as the notice and comment process, which begins with publication of a Notice of Proposed Rulemaking (NPRM) in the Federal Register (Bertrand et al., 2021).

Importantly, anyone is free to submit a comment, whether they are an individual member of the public or an organization such as a firm, professional or trade association, political interest group, or non-profit organization. Further, submitting a comment is not legally considered a form of lobbying (Libgober, 2020), giving organizations without the administrative or financial resources to lobby a chance to participate (Jewell & Bero, 2007; Yackee, 2019).

The public comment process is taken seriously by regulatory agencies. Regulatory agencies are mandated to consider all public comments in their drafting of regulatory policy. Once the final rule or policy is drafted, it is again posted on the Federal Register. Accompanying the rule or policy is a Supplementary Information section, where the agency discusses how public comments were incorporated. All of the public comments received also become part of the official record and give commenters the ability to call for judicial review of the rule or policy

if they wish, providing another incentive for the agencies to consider public comments (Bertrand et al., 2021).

An important aspect of the Dietary Guidelines to clarify is that although they qualify as agency guidance, rather than a specific rule, they are still subject to the APA. This is also empirically and practically meaningful. Though virtually all of the administrative literature in political science focuses on rules (Yackee, 2019), regulatory agencies are also heavily engaged in the promulgation of guidance. For example, some agencies, such as the Food and Drug Administration, may produce more guidance than rules (Yackee, 2019). Whereas rules implement policy and have narrow, legally binding objectives, guidance informs policy and has non-legally binding effects on policies and programs. Thus, my focus on guidance is practically meaningful to the extent that the Dietary Guidelines' interpretation and presentation of scientific discourse goes on to influence not only a variety of policies, programs, and markets, but more fundamentally, the public's beliefs on what a healthy diet looks like.

Regarding creation of the Dietary Guidelines, various types of organizations submit public comments in the first, second, or both stages. These organizations include private and publicly traded firms; cooperatives; trade, agricultural, and professional associations; non-profits; and post-secondary institutions. This diversity in organizational participation encompasses a range of interests, from the economic to the ideological, scientific, and public interest.

In the first stage, organizations submit comments to the scientific advisory committee regarding the scientific evidence to be used in the scientific report. I consider organizational participation in this stage as attempting to influence scientific discourse. That organizations are able to do so is due to the Federal Advisory Committee Act (FACA) of 1972, which was passed

to extend the democratizing effects of the notice and comment process to the activities of scientific advisory committees (Jasanoff, 1994). FACA gives the public access to all committee meetings and records, as well as opportunities to make verbal or written comments on the committee's work. Organizations thus submit comments with their own suggestions for how the scientific questions should or should not be answered. For example, they may mention specific studies and findings supporting their suggested conclusions. Alternatively, if they argue that the question cannot be answered yet, they may contest the validity of specific studies or the body of evidence as a whole. The scientific advisory committee is required to take these comments into consideration as they draft their final scientific report.

In addition, the requirements of FACA allow for confidence that activity occurring in the first stage of the Dietary Guidelines is focused on scientific discourse and not politics, values, or opinions. First, FACA sets a high standard for ensuring that the scientific committee is independent and unbiased – in other words, that the committee is motivated to summarize the scientific discourse to the best of their ability and lacks any incentive to bias the scientific review process. In composing advisory committees, FACA requires a balance in the views and functions of committee members, where functions relate to the provision of relevant scientific, technical, social, or economic expertise (Jasanoff, 1994). FACA also requires that the scientific review process is publicly documented from end-to-end, including the selection criteria used in literature reviews, lists of articles that were included and excluded from systematic reviews, assessments of bias in the literature, and all meetings of the committee. These requirements for independence and transparency in the scientific review process further bolster the notion that this empirical context involves scientific discourse and that comments submitted to the scientific advisory committee aim to influence scientific discourse, rather than personal values or opinions. In

addition, the scientific advisory committee is composed of external academics, who do not receive financial compensation for serving on the committee.

In the second stage, a notice in the Federal Register asks organizations to submit comments to the USDA and HHS on the content of the final scientific report specifically. As such, organizations submit public comments expressing agreement or disagreement with the content of the final scientific report, alongside arguments for how it should or should not be used to create the final Dietary Guidelines.

All comments submitted by organizations during the drafting of the Dietary Guidelines are publicly available, and given requirements under the APA, had the potential to influence the creation of the final Dietary Guidelines. Unlike lobbying data, where it is virtually impossible to observe the type of information shared due to the limits of lobbying disclosure reports (Bertrand et al., 2021; J. M. de Figueiredo & Richter, 2014), comments are publicly available and contain fine-grained qualitative data.

Opportunities for organizational influence: Lobbying

In addition to submitting public comments, organizations may also lobby the USDA and HHS, as well as members of the House and Senate; organizations are not permitted to lobby members of the scientific advisory committee (i.e. have private communication with committee members). Organizations may choose to lobby at any stage of the process. For example, although an organization cannot lobby the scientific advisory committee in the first stage, it may still lobby the USDA or HHS. Further, because legislators use appropriations bills and budgets to check regulatory agency power, organizations may indirectly influence the process by lobbying members of Congress (Bonardi et al., 2006; Holburn & Bergh, 2004).

Sample and data

The sample is derived from two sources: 1) the organizations that engaged in lobbying on the 2015-2020 Dietary Guidelines for Americans, and 2) the 29,947 written comments submitted over the course of their creation. Data on organizations that lobbied on the 2015-2020 Dietary Guidelines was collected through searches of the Legislative Disclosure Act (LDA) Reports database hosted by the Secretary of the Senate. Quarterly lobbying reports for 2012 through 2016 that mentioned the Dietary Guidelines as an issue lobbied on were downloaded. This timeframe was chosen to capture any lobbying related to selection of the scientific advisory committee, which began its work in May 2013, as well as lobbying following release of the final Dietary Guidelines in January 2016. This timeframe should also exclude lobbying on the previous iteration of the Dietary Guidelines, which were released in 2010.

With respect to the public commenting data, the sample includes those comments submitted by individuals affiliated with verifiable organizations. The comment submission process allows for stating employment or membership in an organization. The sample thus excludes comments submitted by individuals with no stated organizational affiliation. I define the sample in these specific terms for several reasons. First, given the diversity in types of organizations represented, the nature of commenters' organizational affiliations can vary greatly. While some commenters are managers or directors who presumably have the authority to submit comments on behalf of their organizations, other commenters are volunteers, members, or employees of organizations, whose commenting authority is more ambiguous. However, these comments were still included in the sample, partly because it is not possible to directly observe commenting authority, and partly because a common phenomenon is for organizations to coordinate commenting campaigns and encourage their members to submit comments (Balla et

al., 2019; Potter, 2017). Applying this rule consistently results in the inclusion of comments from firms, industry associations, non-profits with and without industry affiliation, and post-secondary institutions.

Due to the diversity of organizations represented, manual web searches for each organization were required to verify that the organization existed. Organizations were considered to exist if a corresponding website or street address could be found. If the organization had a general name and it was not clear if any websites or street addresses corresponded to the commenting organization, it was treated as unverifiable and excluded from the sample.

Methods and variables

I use engagement at the organization-quarter level as my unit of analysis and look for patterns in if and when organizations chose to comment or lobby. I begin by demonstrating patterns in the raw data through a series of graphs. Patterns in the raw data are confirmed as statistically meaningful through the use of ordinary least squares (OLS) regressions at the organization-quarter level with organizational fixed effects and clustered errors at the organization-level. These OLS regressions predict the likelihood of lobbying based on time period for sub-samples of organizations, broken out by whether they commented to the scientific advisory committee and whether the organization did or did not express disagreement with the scientific advisory committee's report. I use the following key variables.

Engagement in lobbying. The dependent variable is organizational engagement in lobbying. Organizations that lobby must submit quarterly reports documenting their activity. These reports may either be submitted by the organization itself or by a lobbyist on their behalf. This dummy variable captures whether an organization lobbied in a given quarter.

Time period. The independent variables are comprised of time period dummy variables. These variables capture key stages in the process for creating the Dietary Guidelines: 1) Before May 2013 – prior to formation of the scientific advisory committee; 2) Scientific committee, May 2013-Feb 2015 – while the scientific advisory committee drafts its report; 3) USDA/HHS, Feb 2015-Jan 2016 – while the regulatory agencies draft the final Dietary Guidelines; and 4) After Jan 2016 – following release of the final Dietary Guidelines.

Commented to scientific committee. A dummy variable is created to indicate whether an organization submitted a comment to the scientific advisory committee in order to influence scientific discourse and the drafting of the scientific report.

Commented to USDA/HHS about scientific committee's report. I consider organizations' reactions to the scientific advisory committee's summary of the scientific discourse. This summary takes the form of a scientific report produced by the scientific advisory committee. I hand-coded the written content of comments submitted to the USDA/HHS regarding the scientific report. Specifically, these comments were coded for the expression of disagreement with aspects of the scientific report. I create several dummy variables denoting an organization's reaction to the scientific report: 1) No comment, 2) Disagreement, or 3) No disagreement.

RESULTS

Is attempting to influence scientific discourse distinct from lobbying?

Because scientific discourse is an input to the regulatory policymaking process, organizations may attempt to influence it before deciding whether to lobby. I begin by presenting patterns in the raw data that address my first question: is attempting to influence scientific

discourse distinct from lobbying? For scientific discourse to be distinct from lobbying, I would expect to see variation in the number of organizations attempting to influence scientific discourse as compared to lobbying. From Figure 2, it is apparent that organizations do not necessarily attempt to both influence scientific discourse and lobby. In fact, very few organizations engage in lobbying at all. From the lower panel, 70 distinct organizations engaged in lobbying, while 226 commented to the scientific advisory committee and 679 commented to the USDA/HHS on the scientific advisory committee's report. I consider commenting to the scientific advisory committee indicative of attempting to influence scientific discourse.

Further, in any given quarter during either of the two stages – commenting to the scientific committee or commenting on the scientific report to the USDA/HHS – more organizations engage in commenting than lobbying. The upper panel of graphs in Figure 2 bears this out. The light gray region represents the period when the scientific advisory committee was in the process of generating its scientific report. The dark gray region represents the period when the USDA and HHS were in the process of drafting the final Dietary Guidelines. Red bars show organizations that engaged in lobbying on the Dietary Guidelines, green bars show organizations that engaged in commenting to the scientific advisory committee, and blue bars show organizations that engaged in commenting on the scientific advisory committee's scientific report. The vertical axis shows the number of organizations that engaged in a given activity in a given quarter. The left panel shows only organizations that engaged in lobbying. The middle panel adds organizations that engaged in commenting to the scientific advisory committee, showing that on a quarterly basis, many more organizations commented to the scientific advisory committee (green bars) than lobbied (red bars). The right panel adds organizations that engaged in commenting on the scientific report. This panel highlights that organizational participation is

highest in the second stage (shaded dark grey), with many more organizations commenting on the scientific report (blue bars) than typically commented on a quarterly basis in the previous stage (shaded light grey). Accordingly, the number of organizations that commented on the scientific report (blue bars) dwarfs the number of organizations that lobbied per quarter (red bars). The patterns in the raw data point towards stark differences in organizational engagement, and given that fewer organizations lobby than comment, would appear to suggest that lobbying is distinct from attempting to influence scientific discourse.

How does scientific discourse relate to decisions to lobby?

I now turn towards my second question regarding the relationship between scientific discourse and decisions to lobby. Because the final Dietary Guidelines are informed by the scientific advisory committee's scientific report, which effectively summarizes the state of scientific discourse, it is possible that satisfaction with the conclusions that emerge from this process is a factor in organizations' decisions to lobby. For example, some organizations produce food or beverages for which there is scientific consensus that a negative relationship exists regarding consumption of these products and health outcomes. Yet for other organizations, there may be an abundance of scientific evidence suggesting that increased consumption of their products has positive health outcomes. Following from these stylized examples, it is conceivable that organizations may attempt to either counteract or amplify the influence of scientific discourse by lobbying the regulators who draft the final Dietary Guidelines.

Is satisfaction with the conclusions that emerge from scientific discourse a mechanism driving decisions to lobby?

To investigate whether satisfaction with the conclusions that emerge from scientific discourse is a mechanism driving decisions to lobby, I begin by comparing organizations that engaged in lobbying with those that did not in terms of the percentage of organizations in each group that disagreed with the scientific advisory committee's report. As the scientific advisory committee's report reflects the conclusions that emerged from scientific discourse, expressions of disagreement indicate that organizations are dissatisfied with these conclusions. Figure 3 provides initial evidence for satisfaction with scientific conclusions as driving lobbying. In this figure, the left panel shows organizations that did not lobby on the Dietary Guidelines (712 organizations), and the right panel shows organizations that did lobby on the Dietary Guidelines (70 organizations). Red bars show the percentage of organizations that did not comment to the USDA/HHS on the scientific report. Green bars show the percentage of organizations whose comments on the scientific report contained disagreement. Blue bars show the percentage of organizations whose comments on the scientific report did not contain disagreement. Within each panel, percentages add up to 100. From the panel on the left for organizations that did not lobby, roughly equal percentages of organizations did (green bar) and did not (blue bar) express disagreement with the scientific report. However, from the panel on the right for organizations that did lobby, over 50 percent of the organizations expressed disagreement with the scientific report (green bar). These findings suggest that dissatisfaction with the conclusions that emerged from scientific discourse may have spurred organizations to engage in lobbying.

Table 2 provides anecdotal support for this interpretation in the form of example commenting organizations that either lobbied and expressed disagreement with the scientific report, or did not lobby and did not express disagreement with the scientific report. In general, organizations that both lobbied and expressed disagreement with the scientific report were

purveyors of products considered to be less nutritious or healthy in the scientific report, such as soda, sugar, processed foods, beef, alcohol, or restaurants. Alternatively, organizations that neither lobbied nor expressed disagreement with the scientific report consisted of environmental non-profits, medical associations, universities, and purveyors of products considered to be more nutritious or healthy in the scientific report. Such products include dried fruit, pistachios, avocados, mushrooms, berries, fresh produce, yogurt, hummus, eggs, and water.

Is satisfaction with the conclusions that emerge from scientific discourse an antecedent to lobbying?

Next, given that there is ex-ante uncertainty associated with the conclusions that emerge from scientific discourse, and whether an organization will be satisfied with them, I explore the temporal aspects of these patterns to determine whether engagement in lobbying predominantly occurred in anticipation of or reaction to dissatisfaction with scientific conclusions. While it is theoretically possible for either anticipation or reaction to drive lobbying activity, lobbying in reaction to dissatisfaction with scientific conclusions would provide the clearest evidence that scientific discourse is an antecedent to lobbying. With respect to my empirical context, if engagement in lobbying is in reaction to dissatisfaction with scientific conclusions, I would expect that organizations lobby more in the second stage, following release of the scientific report, than they do in the first stage, prior to release of the scientific report. The upper panel of Figure 4 shows the number of all organizations that lobbied in a given quarter over the course of the Dietary Guidelines' creation. Red bars represent organizations that did not comment to the USDA/HHS on the scientific report. Green bars represent organizations whose comments on the scientific report contained disagreement. Blue bars represent organizations whose comments on the scientific report did not contain disagreement. I can see from the figure that there was a large

jump in the number of organizations lobbying in a given quarter following release of the scientific report (dark grey shaded area). Further, the greatest numbers of organizations that lobbied each quarter following release of the scientific report were those who expressed disagreement with it (green bars). These two pieces of evidence suggest that dissatisfaction with the conclusions that emerged from scientific discourse can be considered an antecedent to lobbying.

Does lobbying occur in reaction to attempts to influence scientific discourse?

In this process, however, dissatisfaction with the conclusions that emerge from scientific discourse may not be an antecedent to lobbying if organizations are able to pre-emptively influence the discourse so that conclusions are to their satisfaction. In other words, if organizations are successful at influencing scientific discourse such that they are satisfied with the conclusions that emerge, lobbying may become unnecessary.

It is conceivable that scientific discourse at odds with an organization's interests spurs it to comment to the scientific advisory committee. Scientific discourse in misalignment with an organization's interests may introduce a threat to the organization by persuading the agencies to recommend that Americans consume less of a given food or beverage. Further, organizations may face increased competition from other stakeholders who would similarly like to see recommendations for decreased consumption of a given food or beverage. These stakeholders may be active contributors to scientific discourse, sharing scientific findings that are at odds with the organization's interests. Organizations may thus comment to the scientific advisory committee and attempt to influence the scientific discourse to their satisfaction, or at a minimum, attenuate their dissatisfaction. However, given that the scientific advisory committee is

composed of independent academics who do not receive any compensation for their service, the committee has little incentive to cater to special interests in deciding what conclusions emerge from the scientific discourse. There is thus no guarantee that an organization will be successful in its attempts to influence scientific discourse. Given that the agencies draft the final Dietary Guidelines, it is possible that organizations react to failures to influence scientific discourse by engaging in lobbying.

To determine whether lobbying occurs in reaction to attempts to influence scientific discourse, I investigate whether organizations that commented to the scientific advisory committee subsequently disagreed with the scientific report and engaged in lobbying. If organizations engaged in this pattern of actions, the interpretation would be that lobbying occurred in response to a failed attempt at influencing scientific discourse to an organization's satisfaction. This interpretation is corroborated with findings from Figure 4. The lower panel in Figure 4 shows organizations that lobbied in a given quarter and whether or not they commented to the scientific advisory committee. The right panel focuses on lobbying organizations that commented to the scientific advisory committee and shows that not only did their lobbying activity spike following release of the scientific report, but that most lobbying organizations also disagreed with the scientific report (green bars).

The left panel of Figure 4 introduces another group of organizations facing similar conditions, but who do not attempt to influence scientific discourse. The left panel focuses on lobbying organizations that did not comment to the scientific advisory committee. While an obvious potential explanation for these organizations' pattern of engagement is that they consider scientific discourse irrelevant and would have lobbied regardless, two facts rule this out. First, for the organizations that only engaged in lobbying and did not submit any comments on the

Dietary Guidelines (red bars), their lobbying activity increased following release of the scientific report (the dark grey shaded area). If scientific discourse was irrelevant, I would expect to see similar levels of lobbying activity prior to release of the scientific report (the light grey shaded area). Second, for the organizations that did not comment to the scientific advisory committee but did comment to the USDA/HHS on the scientific report, the majority of these organizations expressed disagreement with the scientific report (green bars) and their lobbying activity likewise increased following release of the scientific report.

In sum, these results suggest that lobbying occurs in reaction to either dissatisfaction with the conclusions that emerge from scientific discourse or failed attempts to influence scientific discourse. I confirm that these results hold in statistical models in Table 2. This table reports the results of OLS regression models of lobbying with organization-quarter as the unit of analysis and fixed effects and clustered errors at the organization-level. Column labels in the first row indicate whether organizations in the sample did or did not comment to the scientific committee. Column labels in the second row indicate whether organizations in the sample that commented to the USDA/HHS on the scientific report did or did not express disagreement with the report or did not comment on the report at all. The first notable findings are depicted in model 6, where organizations that commented to the scientific advisory committee and expressed disagreement with the scientific report had the greatest likelihood of lobbying following release of the scientific report, in the time period denoted as USDA/HHS, Feb 2015-Jan 2016 (0.162, p-value=0.000). Further, model 6 shows that the likelihood that organizations engaged in lobbying was lower prior to release of the scientific report than following, and that this time period (Scientific committee, May 2013-Feb 2015) was not a significant predictor of engagement in lobbying (0.010, p-value=0.582). The interpretation corroborated by these findings is that

organizations may attempt to influence scientific discourse, and because it is unfavorable, they are more likely to fail at influencing scientific discourse, and consequently, more likely to lobby.

These results stand in contrast to those from models 5 and 7. The models show that for organizations who commented to the scientific committee but did not comment on the scientific report (model 5), their likelihood of lobbying was low following release of the scientific report (0.024, p-value=0.104), and for those that commented on the scientific report but did not express disagreement (model 7), their likelihood of lobbying was similarly low following release of the scientific report (0.040, p-value=0.120). These results are consistent with the explanation that organizations may engage in scientific discourse when it is favorable to their interests, and because it is favorable, they have no incentive to also engage in lobbying. The logic here is that if the underlying scientific discourse is already favorable to an organization's interests, the organization need only encourage the scientific advisory committee to emphasize it further in their report. If favorable scientific discourse is emphasized in the scientific advisory committee's report, recommendations in the final Dietary Guidelines are likely to be similarly favorable to the organization's interests. Consequently, an organization would have little incentive to also engage in lobbying on the Dietary Guidelines. In combination with the results from model 6, these findings provide support for the interpretation that it is not merely attempts to influence scientific discourse, but failed attempts to influence scientific discourse that drive an organization's decision to lobby.

Models 2 and 3 likewise confirm that lobbying occurs in reaction to the scientific conclusions that emerge from scientific discourse. The sample for these models is organizations that did not comment to the scientific advisory committee. Model 3 focuses on organizations that commented to the USDA/HHS expressing disagreement with the scientific report and finds that

organizations had a greater likelihood of lobbying following release of the scientific report (0.034, p-value=0.002) than prior to its release (0.003, p-value=0.475). The strongest effect is found in model 2, where organizations that did not comment at all on the Dietary Guidelines and only lobbied, had the highest likelihood of lobbying following release of the scientific report (0.595, p-value=0.000). Although these organizations did not comment on the scientific report, and hence I cannot observe whether they disagreed with it or not, it is telling that the negative relationship between the time period prior to release of the scientific report and engagement in lobbying (-0.001, p-value=0.971) flips to strongly positive following release of the scientific report (0.595, p-value=0.000), suggesting that they had a strong reaction to release of the scientific report.

Figure 5 provides additional qualitative support for the argument that organizations may choose not to comment and to only lobby when the underlying scientific discourse is at odds with their interests. This figure provides the names of these organizations and depicts their lobbying activity on a quarterly basis. Over half of these 20 lobby-only organizations are involved in industries for which it is a high bar to successfully challenge scientific findings linking consumption of these products to negative health outcomes. For example, 5 firms are in the alcohol business (e.g. Molson Coors, Brown-Forman Corporation, Beam Suntory, Anheuser-Busch, and Diageo North America) and 6 firms/trade associations are in the meat and processed foods businesses (e.g. National Automatic Merchandising Association, National Beef Packing Company, Smithfield Foods, Hormel Foods Corporation, Schwan's Company, and Campbell Soup Company).

Figure 6 provides a graphical summary of the results from Table 2. The left panel shows organizations that did not engage in commenting to the scientific advisory committee (columns

2-4). The right panel shows organizations that did engage in commenting to the scientific advisory committee (columns 5-7). In each panel, red bars represent organizations that did not comment to the USDA/HHS on the scientific report (columns 2 and 5), green bars represent organizations whose comments on the scientific report contained disagreement (columns 3 and 6), and blue bars represent organizations whose comments on the scientific report did not contain disagreement (columns 4 and 7). Error bars show 95 percent confidence intervals around coefficient estimates. Figure 6 clearly shows that scientific discourse is an antecedent to lobbying, and that there are two mechanisms through which scientific discourse affects decisions to engage in lobbying. The first mechanism relates organizational satisfaction with the conclusions that emerge from scientific discourse. From Figure 6, it is apparent that the likelihood of organizational engagement in lobbying is higher in reaction to release of the scientific report (left panel red bars) and when organizations disagree with the scientific report (right panel green bars). The second mechanism relates to organizational attempts to influence scientific discourse. The right panel shows that for organizations who attempted to influence scientific discourse, their likelihood of lobbying is greatest when they express disagreement with the scientific report (green bars). This finding suggests that it is not simply organizational attempts to influence scientific discourse, but rather failed attempts to influence scientific discourse, that drive decisions to lobby.

DISCUSSION

While prior research has considered a variety of firm-, industry-, and institutional-level antecedents to engagement in CPA (Hillman et al., 2004; Lux et al., 2011), it has neglected the role of scientific discourse, despite it being an important input to regulatory policymaking

(Jasanoff, 1994). Using data from nearly 30,000 public comments submitted during the drafting of the 2015-2020 Dietary Guidelines for Americans, in combination with quarterly lobbying report data from the Secretary of the Senate, I find that decisions to lobby are a function of scientific discourse. Specifically, there are two mechanisms through which scientific discourse affects engagement in lobbying: organizations' satisfaction with the scientific conclusions that emerge from scientific discourse and their attempts to influence scientific discourse. I find that the likelihood of organizational engagement in lobbying is higher in reaction to release of the scientific report and when organizations disagree with the content of this report. Further, for organizations who attempted to influence scientific discourse, their likelihood of lobbying is greatest when they express disagreement with the scientific report. The key findings of this study are that decisions to engage in lobbying are in part functions of dissatisfaction with the conclusions that emerge from scientific discourse and an organization's failed attempts to influence scientific discourse to its satisfaction. These findings suggest that attempts to influence scientific discourse occur prior to decisions to lobby, and that organizations engage in lobbying to contest or counteract the effect of scientific conclusions on the creation of regulatory policy.

My study makes several contributions to the CPA literature. First, I introduce scientific discourse as both distinct from lobbying and a unique class of antecedent to decisions to engage in CPA. I conceptualize scientific discourse as a process where questions are posed, and answers are shared and debated by scientists. As such, attempts to influence scientific discourse involve attempts to influence scientists, not policymakers or the general public as in the case of other CPA strategies like lobbying or public relations campaigns. I show that organizational dissatisfaction with the conclusions that emerge from scientific discourse – for example, a finding that consumption of an organization's product has negative health outcomes – may spur

organizations to lobby regulators and/or legislators, ostensibly to mitigate the influence this negative information has on the creation of regulatory policy. I further show that not only dissatisfaction with scientific conclusions, but also failed attempts to influence scientific discourse to an organization's satisfaction, drive lobbying. This finding provides additional evidence that organizations view lobbying as a means of counteracting the influence of scientific discourse, and raises important policy questions as to which source of information should be prioritized by regulators.

Second, my findings help to shed light on what information organizations share through lobbying. This remains a perennial question in the lobbying literature (Bombardini & Trebbi, 2020; J. M. de Figueiredo & Richter, 2014). While I similarly cannot directly observe what information is being shared through lobbying, I can observe information shared with the regulatory agencies for organizations that engage in both lobbying and public commenting. In addition, that lobbying is used in response to failed attempts at influencing scientific discourse to an organization's satisfaction, suggests that organizations are sharing more political, or values-based information that they then hope is prioritized over scientific information.

Third, as attempts to influence scientific discourse involve attempts to influence a scientific advisory committee, my study contributes to understanding the different influence strategies organizations use in complex regulatory contexts where actors with divergent incentive structures are involved in the policymaking process (Bonardi et al., 2005; J. M. de Figueiredo & de Figueiredo, 2002; Hillman & Hitt, 1999; Holburn & Bergh, 2008; Ozcan & Gurses, 2018). Independent academics who do not receive compensation for serving on the scientific advisory committee have little incentive to be persuaded by attempts to downplay scientific findings. Regulatory policymakers, on the other hand, must balance their own policy priorities with

stakeholder interests and pressure from legislators. Organizations must decide if it is worth dedicating resources to attempting to influence the scientific advisory committee, or if their efforts would be better spent focusing on policymakers only. I show that some organizations do attempt to influence the scientific advisory committee, while others focus their influence efforts on regulators and/or legislators only. I provide preliminary evidence suggesting that organizations target only policymakers when faced with scientific discourse in strong misalignment with their interests, however, future research could investigate this question more thoroughly.

A related extension of this research includes investigating whether organizations target their lobbying at the regulatory agencies, legislators, or both when scientific discourse misaligns with their interests. As regulatory agencies are composed of unelected officials and often have a mandate to incorporate scientific knowledge into their policymaking, use of lobbying to counteract scientific discourse may not be as effective on them as on legislators. Thus, scientific discourse may also be an unexplored antecedent to venue shopping, in this case by targeting the legislative, as opposed to the executive branch of government (Bonardi et al., 2005; J. M. de Figueiredo & de Figueiredo, 2002; Hillman & Hitt, 1999; Holburn & Bergh, 2008).

Additional lines of inquiry include how organizations attempt to influence scientific discourse to their satisfaction; and how organizations attempt to influence scientific discourse when targeting scientists versus regulators. For example, this stream of research could investigate whether organizations attempt to influence scientific discourse by discussing higher versus lower quality studies, or studies that are independently- versus industry-sponsored. Answering such questions could help determine whether organizations attempt to undermine the quality of scientific discourse when their interests are threatened. Comparing the quality of

organizations' contributions to scientific discourse when targeting scientists versus regulators would simultaneously contribute to understanding the incentives of different types of actors involved in the regulatory policymaking process.

Chapter 2: In good faith or ill will? How industry-affiliated organizations contribute to scientific discourse

INTRODUCTION

Firms have long engaged in scientific discourse – a process in which scientific questions are posed and answers are shared and debated by scientists – to advance their innovation objectives. Firms may employ scientists and maintain relationships with the scientific community to encourage bi-directional knowledge flows and produce peer-reviewed scientific publications (Cockburn & Henderson, 1998; Gambardella, 1992; Gittelman & Kogut, 2003; Rosenberg, 1990). These investments in scientific expertise are used to both develop new products and legitimize them among those evaluating their utility. For example, pharmaceutical firms use randomized controlled trials (RCTs) to aid in the development and testing of new products, as well as produce peer-reviewed scientific publications to lend greater legitimacy to novel drugs being evaluated by regulatory scientists and physicians. Such publications help firms to distinguish their products from competitors' and mitigate substitution threats (Polidoro & Theeke, 2012). Because firms rely on high quality scientific expertise to develop products that regulators will approve of and customers will demand, it might reasonably be expected that when firms contribute to scientific discourse, they do so by sharing high quality scientific expertise.

However, it is not clear that firms do consistently share high quality scientific expertise. Firms can also be incentivized to contribute biased scientific expertise to scientific discourse when faced with regulatory and stakeholder pressures. Indeed, case studies from numerous industries, including tobacco (Brandt, 2009; Proctor, 2011; Yach & Bialous, 2001), fossil fuels (Oreskes & Conway, 2011), chemicals (Michaels, 2008, 2020), lead (Markowitz & Rosner, 2013), asbestos (McCulloch & Tweedale, 2008), opioids, alcohol (Michaels, 2020), and food

(Nestle, 2018) have documented instances of firms contributing biased scientific expertise. Bias can take many different forms. For example, firms may selectively emphasize scientific findings that are favorable, and contest those that are unfavorable to their interests, when discussing how a scientific question should be answered (McGarity & Wagner, 2010; Michaels, 2008; Proctor & Schiebinger, 2008). Firms may also produce peer-reviewed scientific journal articles, which may be funded by the firm or industry members and written by firm scientists, consultants, or academics. These articles' findings may be biased in favor of firm interests through choices related to research design and methods or through the selective reporting and interpretation of results (Glenna & Bruce, 2021; Markowitz & Rosner, 2013; Michaels, 2020; Nestle, 2018; Oreskes & Conway, 2011). Such studies have been used to defend products in litigation and regulatory proceedings (Michaels, 2008; Wagner & Steinzor, 2006).

Given that firms may face competing incentives that drive them to leverage their scientific expertise in good faith or ill will, a deeper exploration of how firms contribute to scientific discourse is necessary. Specifically, I ask whether industry-affiliated organizations contribute to scientific discourse by sharing high quality or biased scientific expertise. I broaden my focus to industry-affiliated organizations, which includes firms, trade associations, and other industry-affiliated non-profits, as they are all active in scientific discourse and represent firms' interests. In addition, I consider this question in a regulatory context, where industry-affiliated organizations are subject to competing incentives. Understanding whether industry-affiliated organizations are more likely to contribute high quality or biased scientific expertise has important practical implications for regulators, who use science to inform and justify their decisions (Barber & Diestre, 2019; Hiatt & Park, 2013; Jasanoff, 1994; Ozcan & Gurses, 2018). While regulators may expect firms to share biased information when engaging in lobbying

(Bertrand et al., 2021; Bombardini & Trebbi, 2020), they may not expect the same with respect to scientific discourse, where norms around objectivity are meant to prevail (Popper, 1959) and firms often do contribute high quality scientific expertise (Polidoro & Theeke, 2012).

My empirical context is the creation of the 2015-2020 Dietary Guidelines for Americans (hereafter referred to as the Dietary Guidelines), whose purpose is to make recommendations on what and how much to eat to prevent chronic disease. The Dietary Guidelines are drafted every five years by the U.S. Departments of Agriculture (USDA) and Health and Human Services (HHS), based on a scientific report drafted by the Dietary Guidelines Advisory Committee (DGAC). The process for writing the DGAC report is highly structured and involves conducting multiple systematic reviews using the USDA's Nutrition Evidence Library (NEL). Where organizations may contribute to this process, is in submitting written comments on the literature to the DGAC as they draft their scientific report. While the DGAC draws heavily from the NEL systematic reviews in its drafting of the scientific report, it also considers literature discussed by commenting organizations. From these written comments submitted by organizations, I hand-collected all citations to peer-reviewed scientific publications and matched them with their identifier in the National Institute of Health's PubMed database. I then matched these commenter-cited articles with other articles most similar to them in the PubMed database. My sample is thus composed of articles cited by all commenting organizations and similar articles that were not cited by commenting organizations.

I find support for both intuitions in the prior literature: that industry-affiliated organizations may contribute either high quality or biased scientific expertise to scientific discourse. I find that industry-affiliated organizations contribute high quality scientific expertise through their selective citing and discussing of the literature. Studies that were cited by industry-

affiliated organizations were significantly more likely to be included in the NEL systematic reviews and the DGAC report compared to similar studies in PubMed. This suggests that industry-affiliated organizations selectively cite articles that are of high enough quality to meet the selection criteria for inclusion in the NEL systematic reviews, and which are perceived as unbiased by the DGAC. To follow up on this assessment, I find that compared to similar studies in PubMed, studies that were cited by industry-affiliated organizations were significantly more likely to be systematic syntheses, and compared to similar systematic synthesis articles in PubMed, they were significantly more likely to be included in the DGAC report. Relatedly, non-synthesis articles that were cited by industry-affiliated organizations were more (though not significantly) likely to be RCTs compared to similar non-synthesis articles in PubMed. Relative to similar RCT articles in PubMed, RCTs that were cited by industry-affiliated organizations were significantly more likely to be included in the NEL systematic reviews. Industry-affiliated organizations thus contribute high quality scientific expertise to scientific discourse through selectively citing higher quality studies that are less susceptible to bias.

On the other hand, industry-affiliated organizations contribute biased scientific expertise when they selectively cite and discuss studies that they funded themselves. Compared to similar articles in PubMed, studies that were cited and self-funded by industry-affiliated organizations were significantly less likely to be included in either the NEL systematic reviews or the DGAC report. The DGAC may have viewed these contributions as biased given their failure to meet the criteria for inclusion in the NEL systematic reviews. In terms of article quality, studies that were cited and self-funded by industry-affiliated organizations were less likely (though not significantly) to be systematic syntheses, but of those that were and compared to similar systematic synthesis articles in PubMed, they were significantly less likely to be included in the

DGAC report. Relatedly, compared to similar non-synthesis articles in PubMed, non-synthesis articles that were cited and self-funded by industry-affiliated organizations were significantly less likely to be RCTs, but of those that were RCTs, none were considered for inclusion in the NEL systematic reviews. Industry-affiliated organizations thus also contribute biased scientific expertise to scientific discourse through citing self-funded studies, which tend to employ lower quality research designs that are more susceptible to bias.

My study provides a more nuanced understanding of how firms contribute to scientific discourse. As much of the innovation literature takes the pharmaceutical industry as its empirical context (Cockburn & Henderson, 1998; Gambardella, 1992; Gittelman & Kogut, 2003; Rosenberg, 1990), where firms are incentivized to produce RCTs given their methodological rigor and ability to differentiate their product from a competitor's (Polidoro & Theeke, 2012), this literature overlooks the potential for firms to make biased contributions to scientific discourse. Conversely, while prior empirical research in the public health literature has focused on bias and found that relative to non-profit or government-funded studies, industry-funded studies are more likely to produce findings favorable to their interests, it has not found a statistically significant difference in study quality (Als-Nielsen et al., 2003; Chartres et al., 2016, 2020; Krimsky, 2013; Lundh et al., 2017; Mandrioli et al., 2016).

I bridge the gap between the innovation and public health literatures by showing that whether industry-affiliated organizations contribute high quality or biased scientific expertise depends on the way in which they contribute. The way in which they contribute not only includes the funding and production of peer-reviewed scientific publications, which has been studied in both literatures, but also whether they contribute to scientific discourse by selectively citing studies they have funded themselves, and the type of articles they cite. In other words,

merely considering whether a study is industry-funded is necessary but insufficient for understanding whether industry-affiliated organizations make biased contributions. I find that industry-affiliated organizations' citing of studies they have funded themselves is most indicative of contributing biased scientific expertise, and these studies are also less likely to be systematic reviews or RCTs.

I thus also contribute to the non-market strategy literature on corporate political activity by providing empirical evidence in support of the argument that industry-affiliated organizations attempt to influence regulation (Barber & Diestre, 2019; Diestre et al., 2020; J. M. D. Figueiredo, 2002; Hillman & Hitt, 1999) through making biased contributions to scientific discourse. While the lobbing literature acknowledges the possibility that firms contribute biased information in their efforts to influence legislators or regulators (Bertrand et al., 2021; Bombardini & Trebbi, 2020), it is silent on whether firms contribute biased scientific information to influence scientists involved in the regulatory process. In showing that self-funded studies cited by industry-affiliated organizations are indicative of biased contributions, my findings also have practical implications for how regulatory scientists and policymakers evaluate scientific evidence.

EMPIRICAL CONTEXT

My empirical context is the creation of the 2015-2020 Dietary Guidelines, whose purpose is to make recommendations on what and how much to eat to prevent chronic disease. This is an ideal context for examining my research question as a wide variety of industry-affiliated organizations, spanning multiple product markets, and facing different incentives, participate in the creation of the Dietary Guidelines. A key way in which they participate is through contributing to the scientific discourse underlying the Dietary Guidelines' recommendations. The

Dietary Guidelines are drafted every five years by the USDA and HHS, based off of a scientific report written by the DGAC. The DGAC is composed of independent scientists – largely academics – who serve voluntarily. The DGAC report is a summary of the state of scientific knowledge on a variety of questions related to diet and health outcomes.

The process for writing the DGAC report is highly structured and involves conducting multiple NEL systematic reviews. To be considered for inclusion in the NEL systematic reviews, articles must first match the literature review search terms. These considered articles are then screened against a set of criteria to determine whether they will be included in the NEL systematic review. Criteria for inclusion in the NEL systematic reviews accounted for aspects related to study relevance and quality, such as study date, design, setting, and duration; the number, dropout rate, and attributes of study subjects; and whether the study was peer-reviewed. Existing synthesis articles, such as systematic reviews and meta-analyses, are not included in the NEL systematic reviews but are used to determine if any relevant articles were overlooked in the literature search (*2015 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library Methodology*, 2015). These NEL systematic reviews are used by the DGAC to answer the questions posed in the DGAC report.

In parallel, the DGAC holds public meetings where it presents its progress in reviewing the literature and answering these scientific questions. Where organizations may contribute to this process, is in submitting written comments on the literature to the DGAC as they draft the DGAC report. A variety of organizations submit comments to the DGAC, including public and private firms, cooperatives, trade and agricultural associations, non-profits with or without industry affiliation, post-secondary institutions, and other informal organizations. While the DGAC draws heavily on studies included in the NEL systematic reviews to compile its report, it

has discretion to include studies cited by commenting organizations that are not necessarily in the NEL systematic reviews. The DGAC also considers existing synthesis articles for inclusion in the DGAC report. My analysis thus operates under the premise that decisions to include a reference in the DGAC report are subject to the DGAC's judgement, whereas decisions to include or exclude an article from the NEL systematic reviews are dictated by detailed criteria rather than judgement.

METHODS AND RESULTS

Data structure

I collect data on all publications cited in comments submitted by organizations to the DGAC. A commenter was considered an organization if it took the form of a firm, non-profit, or other type of organization. Other types of organizations included agricultural boards, coalitions, and citizens groups. An organization was coded as industry affiliated if it was a public or private firm or a cooperative. Some non-profit organizations were also coded as industry affiliated. All trade and agricultural associations, or non-profits with an IRS tax designation as either a 501(c)(6) or a 501(c)(5) were coded as industry affiliated. Other organizations and non-profits with IRS tax designations of 501(c)(3) or 501(c)(4) were coded as industry affiliated if, based on IRS Form 990s and web searches, they received any industry funding or if any members of their board or top management teams were employed by industry organizations. To construct my analysis data set, I begin by linking all commentor-cited publications to articles in the PubMed database. This results in 2,264 PubMed articles.

For each article, I then identify all articles that PubMed reports as being similar. The purpose of identifying similar articles is to construct a counterfactual. For each article that a

commenting organization cited, I would like to know what other articles on the same topics these organizations did not cite. PubMed computes an article's similarity to other articles based on an article's title, abstract, and Medical Subject Headings (MeSH) [1].

To construct a counterfactual that is meaningful for the time frame when comments were being submitted to the DGAC, I restrict the commenter-cited articles to articles published in or before 2015, and I likewise restrict the comparison set of similar articles to articles that were published in or before 2015. This results in 2,208 articles, a loss of only 56 articles (2.5 percent of the original sample).

The number of articles that PubMed reports as being similar to a given article varies. In my sample, the minimum is 18, the maximum is 13,702, and the median is 83. Because PubMed rank-orders similar articles by similarity score, I can check the robustness of results by restricting the comparison set to the most similar articles. In all analyses, I report results based on all similar articles as well as results based on the top 20, 10, 5, and 1 most similar articles.

In part of my analyses, I am able to construct an even more precise counterfactual. The Nutrition Evidence Library (NEL) conducted systematic reviews of evidence regarding specific questions posed by the DGAC. As part of the NEL's documentation of its systematic review process, the NEL reported not only the final set of articles that it deemed most relevant for inclusion in its reviews of evidence but also the broader consideration set of all articles that it found and considered when searching the literature on a given topic but may or may not have decided to include. To take advantage of this more precise counterfactual, I can restrict my sample of commenter articles and similar PubMed articles to only those that were in the NEL's consideration set of articles that the NEL either explicitly included or explicitly excluded.

[1] PubMed's method for computing article similarity is described here: https://pubmed.ncbi.nlm.nih.gov/help/#computation-of-similar-articles.

My analysis takes advantage of my data structure by comparing each commenter's article only with its counterfactual set of similar PubMed articles. All models include fixed-effects for each comparison group, which consists of a commenter article and its counterfactual set of similar PubMed articles. All models cluster standard errors at two levels: at the level of the comparison group and at the level of the article. This accounts for two forms of non-independence in my data structure. First, there is non-independence within the same comparison group because all counterfactual articles are similar to the same commenter article. Second, a given counterfactual article may enter the comparison sets of more than one commenter article. Additionally, as I describe further below, an article cited by a commenter may also appear in another article's comparison set of similar PubMed articles.

I use OLS to estimate linear probability models of my binary dependent variables. Linear regression is appropriate for binary dependent variables when estimating the effects of independent variables that are also binary, which avoids the functional form issues associated with continuous variables (Wooldridge, 2002). As compared to nonlinear models, linear probability models incorporate fixed effects in a more straightforward way, and coefficient estimates can be more directly interpreted.

Descriptive statistics

I begin by presenting univariate plots of my dependent variables of interest. In Figure 7, the first column shows articles cited by industry commenters (1,734 unique articles), the second column shows articles cited by non-industry commenters (589 unique articles), and the third column shows the comparison set of similar articles from PubMed (147,294 unique articles). These three categories are not mutually exclusive. There were 115 articles cited by both industry and non-industry commenters. Additionally, 1,936 articles cited by commenting organizations

also appear in PubMed comparison sets for other articles cited by commenting organizations. In multivariate regressions, I include dummies for articles cited by industry or non-industry commenters, so that their effects are estimated regardless of how they enter the analysis sample, and I cluster errors across articles to account for articles appearing in multiple comparison groups. For the purpose of providing simple descriptive statistics, all comparison sets of PubMed articles are pooled together in univariate plots. In my regression analyses, I compare each commenter-cited article to the comparison set of similar PubMed articles that is specific to that article.

In the top panel, the vertical axis shows the percentage of articles that were funded by industry. As this panel shows, articles cited by industry commenters are more likely to be funded by industry as compared to similar PubMed articles.

In the second panel from the top, the vertical axis shows the percentage of articles that were self-funded and cited by a commenting organization. I identified self-funded studies by collecting all studies funded by commenting organizations in Web of Science and matching them to articles cited in organizations' comments. As this panel shows, articles cited by industry commenters are more likely to be self-funded and self-cited by a commenting organization as compared to similar PubMed articles.

In the third panel from the top, the vertical axis shows the percentage of articles that were selected by the DGAC to be included in the DGAC report. As this panel shows, articles cited by industry commenters are more likely to be included in the DGAC report as compared to similar PubMed articles.

Finally, in the bottom panel, the vertical axis shows the percentage of articles that were selected by the NEL to be included in the NEL reviews. In this panel, the sample is restricted to

only articles that were examined by the NEL and either explicitly included or explicitly excluded. As this panel shows, articles cited by industry commenters are more likely to be included in the NEL reviews as compared to similar PubMed articles.

Regression results

Next, I examine whether these univariate patterns hold in regression models. Unlike my simple descriptive statistics, my regression models take advantage of my data structure by comparing each commenter's article only with its counterfactual set of similar PubMed articles. I include fixed-effects for each comparison group, which consists of a commenter-cited article and its counterfactual set of similar PubMed articles, and I cluster standard errors at two levels: at the level of the comparison group and at the level of the article.

Following the sequence of descriptive statistics, I first estimate models in which the dependent variable is a dummy indicating whether an article was funded by industry. In Table 3, columns 1 through 5 report estimates from these models. In column 1, the comparison set for each commenter-cited article consists of all similar PubMed articles. In columns 2 through 5, the comparison sets are restricted to only the top 20, 10, 5, and 1 most similar articles in PubMed. Across all comparison sets, the coefficient for articles cited by industry commenters is positive. It is most statistically significant in the comparison sets containing all similar PubMed articles ($p=0.000$) and the top 20 most similar PubMed articles ($p=0.018$). To facilitate interpretation, coefficient estimates and 95 percent confidence intervals are plotted in the top panel in Figure 8.

Next, I estimate models in which the dependent variable is a dummy indicating whether an article was self-funded and self-cited by a commenting organization. In Table 3, columns 6 through 10 report estimates from these models. Across all comparison sets, the coefficient for articles cited by industry commenters is positive and statistically significant ($p=0.000$).

Coefficient estimates and 95 percent confidence intervals are plotted in the second panel from the top in Figure 8.

Next, I estimate models in which the dependent variable is a dummy indicating whether an article was selected by the DGAC to be included in the DGAC report. In these models, I include dummies indicating articles that were cited by industry and non-industry commenters. I also add dummies indicating articles that were funded by industry and non-industry organizations, as well as dummies indicating articles that were self-funded and self-cited by industry organizations and by non-industry organizations.

Table 4 reports estimates from these models. Across all comparison sets, the coefficient for articles cited by industry commenters is positive and statistically significant (p=0.000). This suggests that, as compared to similar PubMed articles, articles cited by industry commenters are more likely to be selected by the DGAC for inclusion in the DGAC report. In contrast to articles that were only cited by industry commenters, articles that were self-funded and cited by industry commenters are less likely to be selected by the DGAC for inclusion in the DGAC report. Across all comparison sets, the coefficient for articles self-funded and cited by industry commenters is negative. The coefficient is statistically significant in the comparison sets containing all similar PubMed articles (p=0.000), as well as the top 20 (p=0.001), top 10 (p=0.002), and top 5 (p=0.007) most similar PubMed articles. Coefficient estimates and 95 percent confidence intervals are plotted in the third panel from the top in Figure 8.

Finally, I estimate a model in which the dependent variable is a dummy indicating whether an article was selected by the NEL to be included in the NEL's reviews. In this model, the sample is restricted to only articles that were examined by the NEL and either explicitly

included or explicitly excluded. This provides a significantly more precise counterfactual than is possible in my other analyses.

Table 5 reports estimates from this model. In this model, the coefficient for articles cited by industry commenters is positive and statistically significant (p=0.003). This suggests that, as compared to similar PubMed articles that were examined by the NEL and considered for possible inclusion, articles cited by industry commenters are more likely to be selected by the NEL for inclusion in the NEL's reviews. In contrast to articles that were only cited by industry commenters, articles that were self-funded and cited by industry commenters are less likely to be selected by the NEL for inclusion in the NEL's reviews. The coefficient for articles self-funded and cited by industry commenters is negative and statistically significant (p=0.001).

Interestingly, in this model, the coefficient for articles funded by industry is positive and significant (p=0.017). Taken together, the estimates from this model suggest that while articles that were self-funded and cited by industry commenters were less likely to be selected for inclusion in the NEL reviews, articles that were either only cited by or only funded by industry commenters were more likely to be selected for inclusion. Coefficient estimates and 95 percent confidence intervals are plotted in the bottom panel in Figure 8.

Follow-on analyses: Article types in the DGAC report

To further explore the preceding results, I examine whether the types of articles cited and/or funded by industry commenters differ systematically from similar PubMed articles on these topics, and whether these differences account for differences in probability of being selected for inclusion in the DGAC report and NEL reviews.

I begin by examining basic patterns in the types of articles that tend to be selected for inclusion in the DGAC report. The DGAC's mandate is to survey and summarize scientific

evidence regarding diet and health. I therefore begin by examining whether the DGAC report is more likely to include articles that synthesize prior evidence. PubMed includes MeSH codes for article type. In this part of my analysis, I utilize MeSH codes that indicate articles that are reviews, systematic reviews, or meta-analyses.

In Table 6, the dependent variable is a dummy indicating whether an article was selected by the DGAC to be included in the DGAC report. In columns 1 through 5, the variable of interest is a dummy that indicates whether an article is a synthesis article, which I define as a review, systematic review, or meta-analysis. Across all comparison sets, the coefficient for synthesis articles is positive. The coefficient is statistically significant in the comparison sets containing all similar PubMed articles ($p=0.034$), as well as the top 20 ($p=0.041$), and top 10 ($p=0.020$).

Next, I differentiate synthesis articles into two categories: systematic and not systematic. I consider an article to be a systematic synthesis of prior evidence if it is a systematic review or a meta-analysis, as opposed to simply a review. For systematic reviews and meta-analyses, there are methodological guidelines in medical and health sciences regarding how researchers should survey and select prior evidence for inclusion in an article and how researchers should synthesize and draw summary conclusions across prior evidence. In particular, researchers must report their methodological choices and adherence to these guidelines when attempting to publish articles that claim to be systematic reviews or meta-analyses rather than simply reviews.

In columns 6 through 10, I decompose the synthesis article dummy into dummies for systematic synthesis articles (systematic reviews or meta-analyses) and non-systematic synthesis articles (articles with the MeSH code for review but not for systematic review). The coefficients for the two dummies differ dramatically. Across all comparison sets, the coefficient for systematic synthesis articles is positive and statistically significant ($p=0.000$ for all similar

PubMed articles, p=0.001 for top 20, p=0.000 for the top 10, p=0.000 for the top 5, and p=0.019 for the top 1 most similar PubMed articles). In contrast, the coefficient for non-systematic synthesis articles is negative across all comparison sets and statistically significant in the comparison sets containing all PubMed articles (p=0.000), and the top 20 (p=0.001), top 10 (p=0.011), and top 5 (p=0.029) most similar PubMed articles. This suggests that the DGAC report is more likely to include articles that attempt to systematically synthesize prior evidence. Coefficient estimates and 95 percent confidence intervals are plotted in Figure 9.

Next, I next examine whether articles cited and/or funded by industry commenters are more or less likely to be synthesis articles as compared to similar PubMed articles. I estimate models in which the dependent variable is a dummy indicating whether an article is a synthesis (review, systematic review, or meta-analysis). In Table 7, columns 1 through 5 report results. Across all comparison sets, the coefficient for articles cited by industry commenters is positive. It is statistically significant in comparison sets containing the top 20 (p=0.039), top 10 (p=0.001), top 5 (p=0.000), and top 1 (p=0.000) most similar PubMed articles.

In contrast to articles that were only cited by industry commenters, articles that were self-funded and cited by industry commenters are less likely to be synthesis articles. Across all comparison sets, the coefficient for articles self-funded and cited by industry commenters is negative and statistically significant. Coefficient estimates and 95 percent confidence intervals are plotted in the top panel in Figure 10.

Next, I next examine whether synthesis articles cited and/or funded by industry commenters are more or less likely to be systematic as compared to similar PubMed synthesis articles. I estimate models in which the dependent variable is a dummy indicating whether an article is a systematic synthesis (systematic review or meta-analysis). In these models, the

sample is restricted to only synthesis articles (reviews, systematic reviews, or meta-analyses). In Table 7, columns 6 through 10 report results. Across all comparison sets, the coefficient for articles cited by industry commenters is positive. It is statistically significant in comparison sets containing all similar PubMed articles (p=0.001) and the top 5 (p=0.040) most similar PubMed articles. Across all comparison sets, the coefficient for articles self-funded and cited by industry commenters is negative but not statistically significant. Coefficient estimates and 95 percent confidence intervals are plotted in the middle panel in Figure 10.

Finally, I next examine whether systematic synthesis articles cited and/or funded by industry commenters are more or less likely to selected by the DGAC for inclusion in the DGAC report. In Table 7, columns 11 through 15 report results from models in which the dependent variable is a dummy indicating whether an article was included in the DGAC report. In these models, the sample is restricted to only systematic synthesis articles (systematic reviews or meta-analyses). Across all comparison sets, the coefficient for articles cited by industry commenters is positive. It is statistically significant in comparison sets containing all similar PubMed articles (p=0.001) and the top 20 (p=0.001), top 10 (p=0.001) and top 5 (p=0.000) most similar PubMed articles. This suggests that even when comparing within systematic synthesis articles, systematic synthesis articles cited by industry commenters are more likely to be included in the DGAC report than other similar systematic synthesis articles in PubMed that were not cited by industry commenters.

In contrast to systematic synthesis articles that were only cited by industry commenters, systematic synthesis articles that were self-funded and cited by industry commenters are less likely to be selected by the DGAC for inclusion in the DGAC report, as compared to other similar systematic synthesis articles in PubMed that were not self-funded and cited by industry

commenters. Across all comparison sets, the coefficient for articles self-funded and cited by industry commenters is negative and statistically significant.

Interestingly, in this model, the coefficient for articles funded by industry is positive across all comparison sets. It is statistically significant in comparison sets containing the top 5 ($p=0.038$) and top 1 ($p=0.022$) most similar PubMed articles. Taken together, the estimates from this model suggest that while systematic synthesis articles that were self-funded and cited by industry commenters were less likely to be selected for inclusion in the DGAC report, articles that were either only cited by or only funded by industry commenters were either just as likely or more likely to be selected for inclusion. Coefficient estimates and 95 percent confidence intervals are plotted in the bottom panel in Figure 10.

Follow-on analyses: Article types in the NEL reviews

Following my analysis of article types in the DGAC report, I examine basic patterns in the types of articles that tend to be selected for inclusion in the NEL reviews. The NEL's mandate is different from the DGAC's in that the NEL is tasked with searching for, evaluating, and synthesizing original evidence for the purpose of producing its own systemic reviews of scientific evidence regarding diet and health. As I have shown, the DGAC searched for already published systematic reviews in academic journals to include in the DGAC report. In addition to this, the DGAC also requested that the NEL produce several new systematic reviews specifically for the purpose of answering certain questions posed by the DGAC, for which there may not have been suitable pre-existing systematic reviews published in academic journals.

To illustrate the difference between the DGAC's and NEL's objectives, I estimate models in which the dependent variable is a dummy indicating whether an article was selected by the NEL to be included in the NEL's reviews. In all models in this part of my analysis related to the

NEL, the sample is restricted to only articles that were examined by the NEL and either explicitly included or explicitly excluded.

In Table 8, the variable of interest in column 1 is a dummy that indicates whether an article is a synthesis article, which I define as a review, systematic review, or meta-analysis. The coefficient for synthesis articles is negative and statistically significant (p=0.000), in contrast to the coefficient of this same variable when the dependent variable is inclusion in the DGAC report. This suggests that synthesis articles are less likely to be selected for inclusion in NEL reviews, as compared to similar PubMed articles. Because the sample is restricted to articles that were examined by the NEL and either included or explicitly excluded, I am able to interpret this result as indicating that synthesis articles are more likely to be explicitly excluded by the NEL than similar non-synthesis PubMed articles.

Next, I differentiate non-synthesis articles into two categories: randomized, controlled trials (RCTs) and non-RCTs. RCTs are considered the 'gold standard' of scientific evidence in medical and health sciences because they provide stronger evidence of causal effects. Much of the scientific evidence on the relationship between diet and health outcomes is observational. In this part of my analysis, I utilize the MeSH code that indicates articles that are RCTs.

In Table 8, column 2, I include two dummies: for non-synthesis articles that are RCTs and for non-synthesis articles that are not RCTs. Both variables have positive coefficients and are statistically significant (p=0.000). However, the coefficient for RCTs is more than double the size of the coefficient for non-RCT articles. Coefficient estimates and 95 percent confidence intervals are plotted in Figure 11. The 95 confidence intervals for RCTs and non-RCT articles do not overlap, suggesting that the difference between their coefficients is statistically significant.

Next, I examine whether articles cited and/or funded by industry commenters are more or less likely to be RCTs as compared to similar PubMed articles. I estimate a model in which the dependent variable is a dummy indicating whether an article is a RCT. In this model, the sample is restricted to non-synthesis articles (articles that are not reviews, systematic reviews, or meta-analyses). In Table 9, column 1 reports results. The coefficient for articles cited by industry commenters is not statistically significant. The coefficient for articles self-funded and cited by industry commenters is negative and statistically significant (p=0.007). This suggests that while articles cited by industry commenters are just as likely to be RCTs as similar PubMed articles, articles that were self-funded and cited by industry commenters are less likely to be RCTs.

Finally, I next examine whether RCTs cited and/or funded by industry commenters are more or less likely to selected for inclusion in the NEL reviews. In Table 9, column 2, the dependent variable is a dummy indicating whether an article was included in the NEL reviews. In this model, the sample is restricted to only RCTs. The coefficient for articles cited by industry commenters is positive and statistically significant (p=0.046). This suggests that even when comparing within RCTs, RCTs cited by industry commenters are more likely to be included in the NEL reviews, as compared to other similar RCTs in PubMed that were also explicitly examined and considered by the NEL but were not cited by industry commenters. Interestingly, in this model, the coefficient for articles funded by industry is also positive and statistically significant (p=0.004). This suggests that when comparing within RCTs, RCTs funded by industry are more likely to be included in the NEL reviews, as compared to other similar RCTs in PubMed that were also explicitly examined and considered by the NEL but were not funded by industry. Coefficient estimates and 95 percent confidence intervals are plotted in Figure 12.

DISCUSSION

My study provides a more nuanced understanding of how firms contribute to scientific discourse. Within the field of strategic management, firm engagement in scientific discourse has primarily been studied in the innovation literature, which has focused on firms' incentives for acquiring and producing high quality scientific expertise (Cockburn & Henderson, 1998; Gambardella, 1992; Gittelman & Kogut, 2003; Polidoro & Theeke, 2012; Rosenberg, 1990). However, there is a rich literature in public health related to how firms engage in scientific discourse for non-market purposes. This literature suggests that when faced with regulatory or stakeholder pressures, firms may be incentivized to contribute biased scientific expertise (Glenna & Bruce, 2021; Markowitz & Rosner, 2013; Michaels, 2020; Nestle, 2018; Oreskes & Conway, 2011). I bridge the gap between these two literatures to show that whether industry-affiliated organizations contribute high quality or biased scientific expertise depends on the way in which they contribute. By distinguishing between studies that are selectively cited and those that are self-funded and cited by industry-affiliated organizations, I am able to separate high quality from biased contributions to scientific discourse.

I also highlight the importance of considering whether an article is a non-systematic review, systematic review, or RCT. Because much of the innovation literature takes the pharmaceutical industry as its empirical context (Cockburn & Henderson, 1998; Gambardella, 1992; Gittelman & Kogut, 2003; Rosenberg, 1990), where firms are incentivized to produce RCTs given their methodological rigor and ability to differentiate their product from a competitor's (Polidoro & Theeke, 2012), this literature may not account for why firms would fund less rigorous studies. Conversely, while prior empirical research in the public health

literature on the potential for firms to make biased contributions to scientific discourse has found that relative to non-profit or government-funded studies, industry-funded studies are more likely to produce findings favorable to their interests, it has not found a statistically significant difference in study quality (Als-Nielsen et al., 2003; Chartres et al., 2016, 2020; Krimsky, 2013; Lundh et al., 2017; Mandrioli et al., 2016). I find that industry funding is necessary, but insufficient for understanding biased contributions. Rather, it is necessary to consider both how a study is used and what type of study it is. I find that industry-affiliated organizations' citing of self-funded studies is most indicative of contributing biased scientific expertise, and these studies are also less likely to be high quality in that they are less likely to be systematic reviews or RCTs. One explanation for this is that less rigorous study designs make it easier to produce biased findings, and these organizations seek to cherry pick favorable results rather than emphasize the body of knowledge as a whole (McGarity & Wagner, 2010).

I thus also contribute to the non-market strategy literature on corporate political activity by providing empirical evidence in support of the argument that industry-affiliated organizations attempt to influence regulation (Barber & Diestre, 2019; Diestre et al., 2020; J. M. D. Figueiredo, 2002; Hillman & Hitt, 1999) through making biased contributions to scientific discourse. While the lobbing literature acknowledges the possibility that firms contribute biased information in their efforts to influence legislators or regulators (Bertrand et al., 2021; Bombardini & Trebbi, 2020), it is silent on whether firms contribute biased scientific information to influence scientists involved in the regulatory process. In showing that industry affiliated organizations' self-funded and cited studies are unlikely to be higher quality and indicative of biased contributions, my findings also have practical implications for how regulatory scientists and policymakers evaluate scientific evidence.

Future research may explore the conditions under which an industry-affiliated organization would choose to make a high quality versus a biased contribution to scientific discourse. These conditions may relate to the nature of the industry or product, or degree of pressure the organization is facing from stakeholders and regulators. For example, much of the innovation literature suggesting that firms make high quality contributions to scientific discourse is based on the pharmaceutical industry, where regulatory oversight is high, RCTs are the norm, and firms would face steep litigation penalties for producing biased science on the safety and efficacy of their products. Conversely, much of the literature in public health suggesting that firms make biased contributions to scientific discourse is based on industries and products which have more indirect and delayed effects on consumers, society, or the environment. These indirect effects may be more difficult or unethical to study using RCTs, leading to use of less rigorous research designs with more room for bias. The effects may also take an extended amount of time to appear, further complicating efforts to isolate the cause from intervening factors, and making it easier to pass biased studies off as legitimate. Finally, firms may have greater incentives to make biased contributions to scientific discourse when faced with pressure from stakeholders or regulators. Firms may use biased studies to defend their product against claims that it is generating negative externalities.

Chapter 3: How firms avoid conceding to stakeholder demands: Empirically-based resistance strategies

INTRODUCTION

Firm responsiveness to stakeholder demands is a critical topic in stakeholder theory. Accordingly, the literature has considered whether firms respond to stakeholder demands (Eesley & Lenox, 2006; King, 2008; Lenox & Eesley, 2009), which stakeholders they respond to (Mitchell et al., 1997), and how they respond (Bundy et al., 2013; Durand et al., 2019; Hiatt et al., 2015; Ingram et al., 2010; Pacheco & Dean, 2015; Waldron et al., 2013). Common to each of these streams of research, is the presumption that prolonged conflict with any type of stakeholder, whether one the firm depends on for its survival or one that can claim to affect or be affected by the firm (Clarkson, 1995; Freeman, 1984), is costly in terms of firm resources and legitimacy (Bundy et al., 2018; Eesley & Lenox, 2006; McDonnell, 2016). As such, studies have focused on the conditions under which firms concede to stakeholder demands, and whether concessions are symbolic or substantive in nature (Ashforth & Gibbs, 1990; Bundy et al., 2013; Crilly et al., 2012; Durand et al., 2019; Hiatt et al., 2015; Waldron et al., 2013).

This emphasis on concessions may stem from a focus on the instrumental and values-based aspects of issues (Bundy et al., 2013; Durand et al., 2019), which imply unequal distributions of gains and losses (Lange et al., 2022), as well as resonance with stakeholders' deeply held convictions (Giorgi et al., 2015) and sense of belonging in a social group (Ashforth & Mael, 1989). Viewed through this lens, it is difficult for a firm to resist making concessions when stakeholders form their demands on issues of instrumental or values-based importance. Indeed, resisting stakeholder demands by denying or challenging stakeholders' instrumental or

values-based concerns (Oliver, 1991), could jeopardize the firm's relationships with its stakeholders (Pache & Santos, 2010).

However, this view overlooks the agency firms have in shaping stakeholders' demands, and a key source of this agency: empirical evidence. For many issues, empirical evidence plays an important role in providing observable, measurable evidence of the existence and magnitude of both the issue, and its causes and effects. Moreover, empirical evidence is external to individuals and open to debate (Okasha, 2002; Popper, 1959), creating opportunities for a firm to challenge the validity of an issue's empirical aspects without contesting the instrumental and values-based aspects of issues that stakeholders hold dear.

I investigate the possibility that firms use empirically-based resistance strategies to influence stakeholder demands by integrating the stakeholder and issue salience literatures. Building on Eesley and Lenox's (2006) view that stakeholder requests arise from issues, I view stakeholder demands as flowing from issues that are salient to stakeholders. Following Odziemkowska and Henisz (2021), I suggest that the three attributes for stakeholder salience – power, legitimacy, and urgency (Mitchell et al., 1997) – may be transposed to the issue-level, and extend this theory by describing how empirical evidence reinforces each of these attributes. While Odziemkowska and Henisz (2021) focus on stakeholder interactions as shaping issue salience, I suggest that firms may also have a role in shaping issue salience. Specifically, I argue that firms may employ tactics to weaken issue salience for stakeholders. By weakening issue salience for stakeholders, firms can influence what, if any demands, stakeholders make on the firm.

I introduce two empirically-based resistance strategies through which firms influence issue salience, as well as stakeholder demands: validity disputing and validity promoting.

Validity disputing acts on both issues and demands, whereas validity promoting acts on demands only. Indeed, that either of these strategies may be deployed to directly influence stakeholder demands further differentiates them from previously studied strategies. Starting with issues, firms can use validity disputing to weaken issue salience by sowing doubt on the existence and magnitude of the issue and its causes and effects. Validity disputing can also be used on demands by sowing doubt on the evidence stakeholders use to justify their demands on the firm. Validity promoting, in turn, complements these efforts by using empirical evidence to support and promote the firm's preferred means of addressing the issue. Cumulatively, these strategies serve to foster uncertainty and disagreement among stakeholders on what demands to make on the firm, if not deter them from making any demands at all. In this way, the firm is able to avoid conceding to stakeholder demands without harming their relationships with stakeholders.

My theoretical treatment of empirically-based resistance strategies makes one primary and one secondary contribution to the stakeholder theory literature. First, I propose consideration of how empirical evidence relates to issues and facilitates a wider range of responses to stakeholders than has typically been considered in the prior literature. I delineate the differences between empirical, instrumental, and values-based aspects of issues and how focusing on the empirical aspects creates opportunities for the use of resistance, as opposed to conforming responses (Oliver, 1991). This culminates in the identification of two empirically-based resistance strategies – validity disputing and validity promoting – that allow firms to avoid conceding to stakeholder demands without harming their relationships with them.

Second, by clarifying the relationships between stakeholders, issues, and demands, I construct the theoretical scaffolding for challenging the assumption that concession to stakeholder demands is required. The prior literature has focused on issue salience from the

firm's perspective and how it influences the firm's response to issues (Bundy et al., 2013; Durand et al., 2019; Odziemkowska & Henisz, 2021; Waldron et al., 2013). Literature on stakeholder salience has likewise suggested that firms respond to stakeholders they view as being salient (Mitchell et al., 1997). By integrating the issue and stakeholder salience literatures, and taking a stakeholder-centric, as opposed to a firm-centric view, I develop theory on where stakeholder demands come from and what firms are truly responding to. I argue that firms respond to stakeholder demands, and stakeholders make demands based on issues salient to them (Eesley & Lenox, 2006; Odziemkowska & Henisz, 2021). Yet, firms need not take stakeholder demands for granted. There will be variance in whether issues are salient to a given stakeholder, and even if an issue is salient, it is not guaranteed that the stakeholder will make a demand on that issue (Rowley & Moldoveanu, 2003). By focusing on what makes an issue salient to a stakeholder, and not what makes the issue or stakeholder salient to the firm, a firm may shape issue salience for the stakeholder and their demands on the firm in turn.

FOUNDATIONAL ASSUMPTIONS

Stakeholders, issues, and demands

An extensive body of research has explored the relationships between a firm and its stakeholders – the actors that can affect or are affected by the firm's activities (Freeman, 1984). One area of this broad literature focuses on how firms respond to stakeholders (Crilly et al., 2012; David et al., 2007; Donaldson & Preston, 1995; Eesley & Lenox, 2006; Freeman, 1984), with the general premise being that a lack of responsiveness will almost assuredly have a negative impact on the firm. A lack of responsiveness resulting in prolonged conflict with any type of stakeholder is costly in terms of firm resources and legitimacy (Pache & Santos, 2010).

As firms rely on primary stakeholders for their survival (Clarkson, 1995), incompatibilities between their respective values and needs are not sustainable (Bundy et al., 2018). Even ongoing contestation from secondary stakeholders, such as social activists, poses a threat to firms' reputations, legitimacy, and financial performance (McDonnell, 2016).

The idea that firms must respond to stakeholders is a central tenet of the stakeholder salience literature. Mitchell et al. (1997) argued that while it is not possible for a firm to respond to all stakeholders, it should respond to its most salient stakeholders – those possessing power, legitimacy, and urgency. That these three attributes predict stakeholder salience and firm responses has been validated in the proceeding literature (Agle et al., 1999; Magness, 2008; Parent & Deephouse, 2007).

However, this work is fairly ambiguous with respect to what the firm is responding to. Though the stakeholder salience literature operates at the stakeholder-level, a firm is likely not responding to a stakeholder per se, but rather to a demand related to issues that concern the stakeholder (Eesley & Lenox, 2006). In fact, advances in stakeholder theories have been brought forth by moving beyond stakeholder salience (Mitchell et al., 1997) to a focus on issue salience (Bundy et al., 2013; Durand et al., 2019; Odziemkowska & Henisz, 2021; Waldron et al., 2013). Bundy et al. (2013) define issue salience as "the degree to which a stakeholder issue resonates with and is prioritized by management," (p. 353) and suggest that it is primarily driven by how the issue relates to the firm's core values and strategic goals.

Yet, there remains a lack of clarity on what firms are responding to. The firm-centric view taken in the issue salience literature is that firms are responding to issues based on their own perceptions as to whether an issue is salient or not (Bundy et al., 2013; Durand et al., 2019; Odziemkowska & Henisz, 2021; Waldron et al., 2013). However, it is more likely the case that

firms respond to specific demands on the firm made by stakeholders, and stakeholder demands flow from issues salient to stakeholders – issues which do not necessarily bear a relation to the firm's core values and strategic goals.

Moreover, the stakeholder literature has been inconsistent in its conceptualization of stakeholder demands or their equivalents, variously referring to requests (Eesley & Lenox, 2006), demands (Pache & Santos, 2010; Waldron et al., 2013), or pressures on the firm (Crilly et al., 2012; Durand et al., 2019; Oliver, 1991). I summarily refer to these as stakeholder demands, where demands ask the firm to substantively change its activities in order to address the issue. Such demands are different from stakeholder claims (Donaldson & Preston, 1995; McGahan, 2021; Mitchell et al., 1997), which predominantly refer to claiming value (McGahan, 2021). A stakeholder's claim on value does not necessarily imply that the firm must make substantive changes to its activities. Rather, demands are more likely to arise from risks to stakeholders associated with a firm's activities (Clarkson, 1995) and the unequal distribution of these risks across the firm and stakeholders (McGahan, 2021). Further, demands differ from institutional pressures, which include broader pressures emanating from the general institutional environment towards all actors in that environment (Durand et al., 2019; Oliver, 1991).

In addition to clarifying the concept of stakeholder demands, it is necessary to state that issues and demands are not interchangeable. Whereas an issue refers to the identification of a problem and its causes, a demand proposes a specific means of addressing the issue – one that best suites the specific stakeholder making the demand (Benford, 1993; Benford & Snow, 2000). Thus, even if multiple stakeholders agree on an issue, they need not agree on what demands to make, and this holds true within a stakeholder group as well. Furthermore, it is quite possible for

stakeholders to be concerned about an issue, but not make any demands on the firm (Rowley & Moldoveanu, 2003).

Emphasizing that firms respond to specific stakeholder demands, and stakeholders make demands based on issues salient to them, may seem obvious. However, doing so introduces the possibility that firms have more agency in responding to stakeholder demands than has previously been theorized. Firms may engage with stakeholders on the issue, their demands, or both. Furthermore, firm engagement with stakeholders on the issue may indirectly influence the demands stakeholders decide to make on the firm. Importantly, rather than taking issue salience from the stakeholder's perspective for granted and considering how the firm decides which issues to engage on (Bundy et al., 2013; Durand et al., 2019), this logic suggests taking a step back: firms can first attempt to influence issue salience for stakeholders to prevent the issue from becoming salient to them (Bonardi & Keim, 2005). Similarly, firms need not only respond to demands as defined by stakeholders: firms may promote a preferred means of addressing the issue that is external to the firm or has minimal substantive impact on the firm's activities. By promoting an alternative that is compelling to at least some stakeholders, firms may influence stakeholder demands by fostering disagreement on what, if any, demands to make on the firm.

EMPIRICALLY-BASED RESISTANCE STRATEGIES

Empirical versus values-based aspects of issues

A key source of this underappreciated agency that firms have in responding to stakeholder issues and demands lies with empirical evidence. Issues and demands may be defined and supported by empirical evidence, which I consider to be a set of observations arising from experiment or experience. Empirical evidence plays an important role in providing

observable, measurable evidence of the existence and magnitude of both the issue, and its causes and effects. For example, it is virtually impossible to know if instances of cancer are caused by exposure to toxic chemicals or other factors without scientific studies on the matter. Empirical evidence may also be used to support arguments for how to address the issue, or what demands to make and on whom. This is exemplified by the Oil, Chemical, and Atomic Workers Union petitioning the Occupational Health and Safety Administration to regulate use of 13 chemicals. The union filed the petition after the empirical evidence mounted showing a relationship between worker exposure to chemicals used in dyes production and bladder cancer (Michaels, 2008).

These empirical aspects of issues stand in contrast to how issues have previously been described, as "socially constructed disruptions of an institutional order that structure purposeful exchanges between actors," (Lamertz et al., 2003, p. 82). Indeed, emphasis has been placed on the socially constructed, or values-based aspects of issues. This is evident in the prior literature, which suggests that stakeholder issue salience is based on how the issue relates to the stakeholder's identity, cultural (Jones et al., 2007; Rowley & Moldoveanu, 2003; Waldron et al., 2013), and emotional concerns (Bansal & Roth, 2000; Klein & Amis, 2021; McAdam, 2017). Though emphasized to a lesser extent, the literature has also acknowledged the instrumental aspects of issues – or those relating to a stakeholder's economic self-interest. Instrumental aspects become salient for stakeholders when exchange between actors is disrupted such that there is an unequal distribution of gains and losses among stakeholders (Lange et al., 2022).

Just as the prior literature has concentrated on the values-based aspects of issues, it has similarly focused on responses addressing stakeholders' cultural, identity, and emotional concerns – otherwise known as symbolic responses in the literature (Ashforth & Gibbs, 1990; Schnackenberg et al., 2019). Various typologies of responses to stakeholder concerns have been

proposed, emphasizing conformity to normative pressures. The most commonly used and adapted typology characterizes responses as either substantive or symbolic (Ashforth & Gibbs, 1990; Bromley & Powell, 2012; Bundy et al., 2013; Crilly et al., 2012; Delmas & Montes-Sancho, 2010; Durand et al., 2019; Waldron et al., 2013). Substantive responses involve making costly, material changes to policies and practices, and have been captured in the form of concessions to stakeholder demands (Hiatt et al., 2015; Ingram et al., 2010; King, 2008; Lenox & Eesley, 2009). Symbolic responses entail the mere signaling of compliance with stakeholder demands, while continuing to pursue the firm's instrumental goals (Ashforth & Gibbs, 1990; Bundy et al., 2013). Various forms of symbolic responses have been identified in the literature, including decoupling, impression management, and partnerships or affiliations (Bromley & Powell, 2012; Crilly et al., 2012; Elsbach, 1994; McDonnell, 2016). Symbolic responses are viewed as useful for mitigating conflict between the firm and its stakeholders, particularly when stakeholders have competing interests and demands (Crilly et al., 2012).

Two theoretical perspectives have been combined with the substantive-symbolic typology to further develop the range of firm responses to stakeholder demands. The first draws from the impression management literature (Dutton & Jackson, 1987; Elsbach & Kramer, 1996) and adds accommodative, negotiation, or defensive dimensions to substantive versus symbolic responses (Bundy et al., 2013). The second builds on Oliver's (1991) typology of organizational responses to institutional pressures and adds compliance or conformity as dimensions to substantive versus symbolic responses (Durand et al., 2019). Here, compliance is considered to be abiding by formal rules, such as laws and regulations, and conformity is considered to be acting in accordance with informal rules, like norms and values.

However, while Durand et al. (2019) focus on Oliver's (1991) conforming responses – which she denotes as acquiescence, compromise, and avoidance – Oliver also included a set of resistance responses: defiance and manipulation. She describes defiance as the rejection of institutional norms and expectations, and lists dismissing, challenging, and attacking as defiance tactics. Manipulation is yet a more extreme response and may be defined as "the purposeful and opportunistic attempt to co-opt, influence, or control institutional pressures and evaluations," (Oliver, 1991, p. 157). Although Bundy et al. (2013) similarly consider the potential for defensive responses, their categorization lacks suggestion of the active provocation of conflict and agentic influence, which are present in Oliver's resistance responses.

If issues are conceived of in either purely instrumental or values-based terms, it is logical that firm responses would not encompass Oliver's (1991) resistance responses. Firm resistance on the instrumental aspects of issues or demands may cause stakeholders to perceive that they are in a zero-sum game with the firm (Lange et al., 2022), heightening conflict. Firm use of a resistance response on a salient values-based aspect of an issue or demand would likely have similarly negative repercussions for the firm's relationship with the stakeholder. Attempts to dismiss or challenge the values-based aspects of issues would be perceived as an attack on a stakeholder's understanding of the world and their place in it. This is because values-based aspects of issues relate to the meaning a stakeholder derives from an issue (Schnackenberg et al., 2019), especially with respect to a stakeholder's culture and identity (Jones et al., 2007; Rowley & Moldoveanu, 2003; Waldron et al., 2013). Culture and identity, in turn, imply a connection to the stakeholder's deeply held beliefs and morals (Giorgi et al., 2015; Patterson, 2014) and sense of belonging in a social group (Ashforth & Mael, 1989). Thus, salient values-based aspects of

issues ultimately relate to a stakeholder's worldview, or relatively stable, consciously held beliefs and values on the proper ordering of society and relationships (Lange et al., 2022).

The same cannot be said for firm use of resistance responses on the empirical aspects of issues. Firms have more latitude in their responses on the empirical aspects of issues and demands precisely because empirical aspects focus on what is observable and external to the individual. Indeed, since positivism became the dominant paradigm in the natural and physical sciences, observation and falsifiability have been prioritized over individual opinion and mysticism (Ball, 2006; Hardy et al., 2020). Debate, skepticism, and disagreement on the validity of empirical evidence are intrinsic to the process of scientific inquiry, through which empirical evidence is constantly being questioned, refuted, and refined (Popper, 1959). Consequently, it is normal for empirical evidence to be contested and to change over time as ideas and methods evolve (Kuhn, 1962). Firm responses that involve dismissing or challenging empirical evidence supporting an issue or demand would thus be viewed as aligning with the norms of scientific discourse.

Furthermore, these efforts to dismiss or challenge empirical evidence are unlikely to be taken as an attack on personal convictions. This is because empirical evidence is external to the stakeholder and based on multiple observations over time, rather than individual opinion or interpretation of meaning. If anything, efforts to dismiss or challenge empirical evidence serve to de-escalate tension between a firm and its stakeholders. Such de-escalation occurs by sowing doubt, uncertainty, and confusion among stakeholders on their own understanding of the issue and how it should be addressed. Accordingly, this line of reasoning suggests that a firm is able to contest empirical evidence without provoking conflict or harming its relationships with stakeholders.

P1a) A firm can use a resistance response without harming its relationships with stakeholders when it focuses on the empirical (instead of the instrumental or values-based) aspects of issues.

P1b) A firm can use a resistance response without harming its relationships with stakeholders when it focuses on the empirical (instead of the instrumental or values-based) aspects of demands.

Attributes of issue salience and the role of empirical evidence

Resistance responses work on issues through influencing the salience of the issue for stakeholders, and as shown in Figure 13, are specifically targeted at the empirical aspects of issues. As stakeholders have limited attention (Ocasio, 1997) and resources (McCarthy & Zald, 1977; Rowley & Moldoveanu, 2003), stakeholders prioritize issues, from which their demands flow, based on the salience of the issue to them. I extend Odziemkowska and Henisz's (2021) theory of issue salience by further elaborating how empirical evidence contributes to each of Mitchell et al.'s (1997) salience attributes.

Mitchell et al. (1997) state that a stakeholder has urgency "(1) when a relationship or claim is of a time-sensitive nature and (2) when that relationship or claim is important or critical to the stakeholder," (p. 867). Shifting to the issue-level, an issue may similarly be urgent when it is important to at least some stakeholders and time is a factor in its potential risk to stakeholders. Risk implies the likelihood of experiencing a negative outcome and is quantified through a combination of empirical evidence and statistical modeling (Hardy et al., 2020). For example, as empirical evidence mounted in support of community spread of Covid-19, lowering the risk of infection in the workplace became an urgent issue. Many stakeholders perceived any delay by their firms in the enactment of new policies and practices as significantly increasing the risk of harm to themselves and others. For these stakeholders, the issue was important and urgent enough that immediate action needed to be taken by their firms to address the issue. Empirical

evidence has a distinct contribution through quantifying the risk to stakeholders of not addressing the issue quickly (Hardy et al., 2020).

Turning to power, its level of analysis can be shifted from applying to the relationship between two actors to the relationship between an issue and multiple actors. A paraphrased definition of power is the ability to make someone do something they would not otherwise do (Mitchell et al., 1997; Pfeffer, 1981). An issue can be thought of as having power when it mobilizes interest and demands on the firm from stakeholders who would not otherwise make those demands. Stakeholders face a plethora of issues and must choose which ones to prioritize (Rowley & Moldoveanu, 2003). Because attention is a limited resource and stakeholders remain rationally ignorant of many issues (Ocasio, 1997), powerful issues may not only draw stakeholder attention, but may be prioritized over competing issues (Bonardi & Keim, 2005). This is the key difference between an issue's power and urgency. An urgent issue is viewed as important and time-sensitive within a subset of stakeholders, whereas a powerful issue can attract interest across subsets of stakeholders.

The bases for power may similarly be adapted to the relationship between an issue and multiple actors. Adopting Etzioni's (1964) typology of power in organizations, Mitchell et al. (1997) describe three bases for stakeholder power: coercive, utilitarian, and normative. Per Etzioni (1964): An actor may have coercive power if they are able to threaten or inflict physical harm on another actor; utilitarian power is derived from material or financial resources used as rewards or means of control; and normative power is a product of symbolic resources, such as status and acceptance. An issue may have analogous bases of power in terms of its implications for stakeholders. That is, an issue may have coercive power over stakeholders if the consequences of not addressing an issue involve physical harm to stakeholders. This could be the

case for issues related to workplace safety, industrial contamination of drinking water, or addictive products (Michaels, 2008). Stakeholders may not view these issues as important until they bear the risk themselves (Hardy et al., 2020). An issue may also have utilitarian power if addressing it involves an unequal distribution of material or financial costs and benefits. Depending on where the stakeholder falls in terms of the distribution of financial costs and benefits, the stakeholder may form strong preferences for or against addressing the issue (Allingham, 2002). Lastly, an issue may have normative power, and indeed this has been the focus of prior stakeholder literature on issue salience. Some issues may resonate more deeply than others with stakeholders' worldviews, beliefs, values, emotions, and identity (Bundy et al., 2013; Jones et al., 2007; Klein & Amis, 2021; Rowley & Moldoveanu, 2003; Waldron et al., 2013).

Empirical evidence may contribute to an issue's power through providing observable, measurable evidence of the existence and magnitude of the issue. In this way, an issue's power is derived through the fact that it is not merely socially constructed (Lamertz et al., 2003), but is objectively observable and measurable. Stakeholders unpersuaded of the importance of an issue may reconsider when presented with objective evidence of its existence and magnitude (Hardy et al., 2020). Indeed, studies have shown that when presented with new factual information, some individuals will change their preferences on how issues should be addressed (Hochschild & Einstein, 2015; Kiley & Vaisey, 2020).

The third and final attribute of stakeholder salience is legitimacy. Mitchell et al. (1997) apply the concept of legitimacy to a stakeholder's claims on the firm. They use Suchman's (1995) definition of legitimacy as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms,

values, beliefs, and definitions," (p. 574). They argue that although imprecise, this definition is broad enough to encompass the various ways of thinking about stakeholder legitimacy in the normative stakeholder theory literature. This literature suggests that a stakeholder has a legitimate claim on the firm when it bears disproportionate risks from a firm's activities, has contracts with the firm, or has property rights or moral claims on the firm (Donaldson & Preston, 1995; McGahan, 2021; Mitchell et al., 1997).

It is a straightforward shift from considering the legitimacy of a stakeholder's claims to the legitimacy of an issue. A stakeholder makes a claim (or demand) on a firm in relation to a specific issue. For an issue to be legitimate, it must also have some relationship to the firm and to the stakeholder. The issue may arise in part from the firm's activities and put the stakeholder at risk in some way (Hardy et al., 2020; McGahan, 2021). In other words, the firm's activities may contribute to causing the issue, and the effects of the issue may be felt by stakeholders.

Empirical evidence can lend legitimacy to an issue through providing objective evidence of its existence, magnitude, causes, and effects. For example, climate change is a longstanding issue with diffuse causes and effects. The existence and magnitude of climate change is generally agreed upon as a legitimate issue in the scientific community (Cook et al., 2016), but given its diffuse causes and effects, not all firms are equal contributors and not all stakeholders are equally affected. Take the following hypothetical comparison: employees of an oil and gas company may view climate change as a more legitimate issue than employees of a quick service hamburger chain. As climate change is directly caused by the burning of fossil fuels, oil and gas firms' activities have an empirically quantifiable contribution to the issue (Heede, 2014), and employees' livelihoods depend on how the firm chooses to address the issue. Beef production is also a substantial contributor to climate change, albeit through more indirect pathways related to

deforestation, the use of chemical fertilizers, and animal waste products (Lazarus et al., 2021). However, employees of a quick service hamburger chain may view the relationship between their employer and the issue of climate change as being less legitimate given difficulties in quantifying multiple indirect causes and effects along the supply chain.

Following Mitchell et al.'s (1997) conclusion that the most salient stakeholders possess all three attributes, I similarly propose that issues are most salient to stakeholders when they possess all three attributes and empirical evidence reinforces each attribute. For example, for an issue to be salient, it must at a minimum be urgent in that it is important and time sensitive for a subset of stakeholders. Empirical evidence reinforces this urgency through helping to quantify the risk to the stakeholder of not addressing the issue quickly. An issue's salience increases if it is also powerful, or able to attract interest and spur demands across subsets of stakeholders who would not otherwise be interested or make demands. Empirical evidence bolsters the issue's power through providing observable, measurable evidence of the existence and magnitude of the issue. Finally, an issue is most salient if it is urgent, powerful, and legitimate based on its relationship to the firm and to the stakeholder. The issue is legitimate if it arises at least in part from the firm's activities, which in turn have effects on stakeholders. Empirical evidence validates the issue's legitimacy by providing evidence of associations or causal relations between the firm's activities and their effects on stakeholders.

Though empirical evidence enhances overall issue salience, this is not necessarily the case for all stakeholders. A longstanding debate in the science communication literature is around what leads to ongoing conflict between the public and scientists on what is known about how to address societal risks (Campbell & Kay, 2014; Jasanoff, 2016; Kahan, 2015). A dominant theory focuses on cultural cognitive influences, where empirical evidence is filtered through the

shared beliefs, values, and norms in one's social group, and favorable facts are accepted while unfavorable facts are disputed or rejected (Kahan, 2015). In essence, there is a tension between what implications empirical evidence has for an issue, and how an individual thinks about an issue based on their worldview (Campbell & Kay, 2014). For many, though not all individuals, this tension is resolved in favor of their worldview (Campbell & Kay, 2014; Kahan, 2015). While some individuals experience changes in their worldviews through active updating upon receiving new information, most individuals' worldviews remain stable over time (Kiley & Vaisey, 2020).

As worldviews relate to the values-based aspects of issues, it is likely that stakeholders will weigh the importance of empirical evidence against the values-based aspects of issues (Hornsey et al., 2016; Hornsey & Fielding, 2017; Kahan et al., 2011). Given heterogeneity in stakeholder worldviews (Lange et al., 2022), stakeholders will also likely weigh empirical and values-based aspects differently (Gauchat, 2012; Kahan, 2013). However, despite these differences, empirical evidence may only serve to increase issue salience. Stakeholders whose worldviews conflict with empirical evidence will merely prioritize the values-based aspects of issues and avoid or ignore the empirical evidence (Hornsey et al., 2016; Hornsey & Fielding, 2017; Sweeny et al., 2010). Empirical evidence will not weaken issue salience for them as they consider it irrelevant (Hornsey et al., 2016). In contrast, for stakeholders whose worldviews align with the empirical evidence, support from empirical evidence will only strengthen issue salience for them (Hornsey et al., 2016). Empirical evidence may serve to make them aware of the existence, magnitude, causes and effects of the issue, or provide more substantive rationalization for prioritizing it over other issues. They may also use empirical evidence to formulate and justify demands on the firm to address the issue.

P2a) Issues are most salient to stakeholders when they possess urgency, power, and legitimacy and each attribute is supported by empirical evidence.

P2b) The potency of stakeholder demands is greater when issue salience is supported by empirical evidence.

Firm use of empirically-based resistance strategies to influence issue salience

Firm use of validity disputing. Firms may engage with empirical evidence in specific ways to influence the salience of an issue for stakeholders. I introduce validity disputing as a means of influencing stakeholder issue salience. As shown in Table 1, validity disputing can be considered a resistance strategy, encompassing both defiance and manipulation tactics (Oliver, 1991). In terms of defiance tactics, validity disputing involves dismissing, challenging, and attacking the validity of empirical evidence. Its purpose is to misalign empirical evidence with a set of arguments, which it does through sowing doubt and fostering confusion and disagreement on the validity of empirical evidence. Firms do this by emphasizing any uncertainty associated with the empirical evidence and extrapolating this to the body of knowledge as a whole (Proctor & Schiebinger, 2008; Stocking & Holstein, 1993; Wagner & Steinzor, 2006). For example, firms may highlight study limitations or weaknesses, mixed results, conflicting studies, null findings, or alternative explanations to cast doubt on the empirical evidence (McGarity & Wagner, 2010). Rather than focus on what is known, firms emphasize what is unknown and call for more empirical evidence to be collected (Michaels, 2008; Stocking & Holstein, 1993).

However, validity disputing is not limited to rhetorical tactics or critiques of existing evidence; firms may also manipulate empirical evidence itself. Firms do this through coopting, influencing, or controlling (Oliver, 1991) the production of empirical evidence favorable to their interests. For example, firms and trade associations have hired consultants (Michaels, 2008) and

funded academics (Markowitz & Rosner, 2013; Nestle, 2018; Oreskes & Conway, 2011) to produce ghost-written studies (Glenna & Bruce, 2021) published in peer-reviewed journals with findings contradicting those of independent scientific studies (Michaels, 2008; Nestle, 2018). When directly contradicting independent scientific studies is not feasible, firms have funded streams of research promoting alternative causes of the issue that are unrelated to the firm's activities (McGarity & Wagner, 2010; Michaels, 2020; Proctor & Schiebinger, 2008). In other cases, they have funded the production of lower quality counter-evidence in the form of non-peer-reviewed studies and books from think tanks and foundations (Brulle, 2014; Dunlap & Jacques, 2013; Farrell, 2016). What is more, these tactics are not anomalies; they have been documented across a range of industries, including fossil fuels (Oreskes & Conway, 2011), chemicals (Michaels, 2008, 2020), lead (Markowitz & Rosner, 2013), asbestos (McCulloch & Tweedale, 2008), opioids (Macy, 2018; Michaels, 2020), tobacco (Brandt, 2009; Proctor, 2011; Yach & Bialous, 2001), alcohol (Michaels, 2020; Savell et al., 2016), and food (Nestle, 2018). Classification of these tactics with examples from the literature are presented in Table 10.

As a resistance strategy, firms use validity disputing when they seek to weaken issue salience for stakeholders. Validity disputing serves to weaken issue salience by acting on the empirical evidence reinforcing the urgency, power, or legitimacy of an issue. As previously discussed, issues are most salient to stakeholders when they possess urgency, power, and legitimacy. Therefore, it is only necessary to weaken one of these attributes in order to weaken issue salience overall.

Weakening issue urgency. A firm could begin by focusing on the urgency of the issue. To weaken urgency, the firm does not need to deny that the issue exists, nor that it is important to stakeholders; it merely needs to dispute that the issue is time sensitive. To do this, the firm can

dispute the validity of empirical evidence that substantiates a risk to stakeholders if immediate action is not taken on the issue. It can similarly provide counter-evidence that the overall risk of harm is smaller, or that the risk associated with delaying action is lower than other evidence suggests. This tactic has been used by the chemical industry in claims that workers' risk of cancer and mortality is lower relative to the general population, which are based on studies that fail to select an appropriate sample and misclassify workers' level of exposure to carcinogens in the workplace (Michaels, 2008).

Weakening issue power. The bar is higher for weakening the power of an issue. Issues derive their power partly through empirical evidence substantiating the existence of the issue and the magnitude of its effects. Stakeholders who are unpersuaded by purely symbolic arguments may be persuaded to take an interest or action on an issue supported by empirical evidence (Hochschild & Einstein, 2015; Page & Shapiro, 1992). The aims of validity disputing are thus to deny the existence of the issue or minimize the scale and importance of its effects. Such efforts have been extensively documented in the fossil fuel industry, where firms or affiliated think tanks and trade associations (Brulle, 2014; Dunlap & McCright, 2010; Farrell, 2016) published books (Dunlap & Jacques, 2013) and advertorials (Supran & Oreskes, 2017) or hired scientists (Oreskes & Conway, 2011) to first deny that climate change existed, then deny that the effects of burning fossil fuels would be greater than natural sources of climate variability (Supran & Oreskes, 2017).

However, applying validity disputing directly to the focal issue may be challenging when empirical evidence is derived from stakeholders' personal experience with the issue. In this case, a firm can also attempt to divert attention to other issues in order to weaken the focal issue's power. Firms can home in on the bases of power for issues to promote the prioritization of

competing issues. For instance, issues have coercive power to the extent that the issue has the potential to physically harm stakeholders in some way (Etzioni, 1964). A firm could provide evidence demonstrating that stakeholders are less likely to experience physical harm related to the focal issue than physical harm from competing issues. The asbestos industry, for example, has argued that worker cancer is more likely to be caused by smoking than exposure to asbestos (Michaels, 2020).

Instead of physical harm, a firm could focus on financial harm, or the utilitarian basis of power for an issue. Employees and shareholders are low hanging fruit for this tactic. As employees and shareholders are financially dependent on the firm, it can easily provide evidence showing that the costs of addressing the issue would outweigh the benefits, and employees and shareholders would disproportionately bear these costs. The asbestos industry did just this, hiring scientists to argue that asbestos posed a minimal risk to human health and regulating it would cost jobs (McCulloch & Tweedale, 2008). Drawing attention to the financial harm employees and shareholders would suffer incentivizes them to prioritize competing issues.

Lastly, a firm can focus on the normative basis of power for an issue and emphasize its tension with the empirical evidence. This tactic was used by tobacco companies when they leveraged Americans' reverence for personal freedom to argue that believing the empirical evidence linking smoking to cancer would necessitate restricting individuals' right to make their own choices (Brandt, 2009). Further, a firm can suggest competing issues to prioritize based on their alignment with beliefs and values that do not infringe upon the firm's interests.

Weakening issue legitimacy. The final way in which a firm can use validity disputing is with respect to the legitimacy of the issue. For the issue to be legitimate, there must be evidence demonstrating that the firm's activities are associated with effects on stakeholders. Validity

disputing seeks to refute this relationship to weaken legitimacy of the issue. One specific tactic firms use is focusing on causation as opposed to association (Michaels, 2008). Establishing causation is a higher bar to clear than establishing association. Firms use defiance tactics to dispute the existence of causality. Such defiance tactics include emphasizing any mixed results or null associations. Firms may also argue that the only evidence that can be considered valid comes from randomized controlled trials (RCTs). As most evidence does not come from RCTs, this argument seeks to exclude and discredit less rigorous, though likely still valid, sources of evidence (McGarity & Wagner, 2010). Indeed, this line of argumentation was used by the vinyl chloride industry to argue that animal studies are not equivalent to human studies, and because it is unethical to conduct toxicity experiments on human participants, there can be no definitive proof that exposure to vinyl chloride causes cancer (Markowitz & Rosner, 2013).

Manipulation tactics are also used to weaken the legitimacy of an issue. These tactics serve to draw attention to alternative causes and argue that it is uncertain what the cause is. Tactics focus on the possibility that there are multiple causes of the issue and fund research stating as much (Michaels, 2008; Proctor & Schiebinger, 2008). This firm-funded research argues that it is unclear which causal factors account for the most variation, have the largest effects, or have the most significant effects. The tobacco industry pioneered these tactics by publishing articles highlighting alternative causes of lung cancer and arguing that without running RCTs on smoking with human participants, it would be impossible to prove that smoking causes cancer (Proctor, 2011; Proctor & Schiebinger, 2008). The sugar industry has used similar tactics, lobbying the National Institute of Dental Research to fund studies on various causes of tooth decay – except for sugar – and funding studies contesting the association between sugar consumption and heart disease (Nestle, 2018).

If a firm is successful in creating uncertainty as to whether there is a clear relationship between the firm's activities and effects on stakeholders, legitimacy of the issue can also be weakened by focusing on the fairness of imposing constraints on the firm. A firm could argue that the issue is illegitimate if it involves singling the firm's activities out for regulation without similarly imposing constraints on other causal forces. This is the argument made by the asbestos industry, who claimed that the risk of cancer from exposure to asbestos was minimal compared to substitutes (McCulloch & Tweedale, 2008). The firm can strengthen this argument by providing evidence showing that other factors, whether individually or cumulatively, have stronger or more significant effects on stakeholders than the firm's activities. Constraining the firm's activities would thus impose illegitimate costs on the firm, without meaningfully addressing the more substantial causes (Savell et al., 2016). In essence, firms can weaken the legitimacy of the issue by describing a lose-lose situation where stakeholders would continue to suffer the issue's effects while firms are illegitimately penalized.

P3) Firms use validity disputing to weaken issue salience for stakeholders.

Firm use of empirically-based resistance strategies to influence stakeholder demands

Firm use of validity disputing. Just as validity disputing is used on issues, it may also be used on stakeholder demands. Validity disputing can be used with respect to stakeholder demands by sowing doubt on the empirical evidence stakeholders use to support the efficacy and efficiency of their proposed solutions. For example, stakeholders may propose means of addressing the issue that are costly to the firm. Stakeholders may use empirical evidence to support their arguments as to why their preferred solutions should be implemented. The firm, in turn, would wish to refute stakeholders' arguments that their proposed solutions are effective and

efficient. The firm may refute stakeholders' arguments by applying defiance tactics (Oliver, 1991): dismissing, challenging, or attacking the validity of stakeholders' empirical evidence. Such tactics have been used by the alcohol industry to contest the efficacy of proposed regulations on the marketing of alcohol (Savell et al., 2016). A firm could further provide its own empirical evidence contradicting the findings of stakeholders' empirical evidence (Nestle, 2018). This counter-empirical evidence would fall under validity disputing if the firm coopted, manipulated, or controlled its production (Oliver, 1991). Whether the firm deploys validity disputing in the form of defiance or manipulation tactics, the outcome is sowing doubt on the empirical evidence stakeholders use to justify their demands.

P4) Firms use validity disputing to cast doubt on the justification for stakeholders' demands.

Firm use of validity promoting. While it is necessary to cast doubt on the ability of stakeholders' proposed solutions to address the issue, this is insufficient for mitigating stakeholders' demands on the firm. Thus, in addition to validity disputing, a firm can use validity promoting. Validity promoting involves asserting the validity of empirical evidence and aligning an argument with empirical evidence. Specifically, it aligns arguments on how to address the issue with empirical evidence justifying the arguments as the best course of action. Unlike validity disputing, and as shown in Table 2, it does not involve the use of defiance tactics (Oliver, 1991). Nevertheless, it can still be considered a resistance strategy in the form of manipulation tactics. Manipulation tactics seek to coopt, influence, or exert control over institutional forces and social evaluations (Oliver, 1991). The ultimate aim of validity promoting is to discourage stakeholders from making any demands on the firm, or at the very least, to make

demands the firm can address without making substantive changes to its activities. A comparison of validity disputing and promoting may be found in Table 11.

Validity promoting operates on the premise that even if stakeholders agree that an issue is salient, they will not necessarily agree on how the issue should be addressed (Campbell & Kay, 2014). This is more so the case if the firm has been successful at disputing the validity of stakeholders' proposed solutions. As empirical evidence bolsters an issue's salience, stakeholders for whom the issue is salient are likely open to considering the empirical evidence when evaluating options for addressing the issue. When stakeholders are faced with multiple competing arguments for how an issue should be addressed, empirical evidence may tip the balance in favor of whichever argument appears more certain to effectively and efficiently address the issue.

These conditions create an opportunity for firms to put forth their preferred means of addressing the issue and to substantiate the efficacy and efficiency of this solution with empirical evidence. Firms promote the validity of this empirical evidence and emphasize its certainty through highlighting the rigor with which it was produced, who produced it, and who believes that it is valid (McGarity & Wagner, 2010; Michaels, 2008). In the best-case scenario for a firm, its preferred means of addressing the issue need not relate to the firm's activities at all. A firm may argue in favor of changes to individual or competitor behavior, or regulation that would not constrain a firm's activities. For example, shifting responsibility from the firm to individuals has been used by the fossil fuel, alcohol, opioid, and soft drink industries (Macy, 2018; Nestle, 2018; Savell et al., 2016; Supran & Oreskes, 2021). Fossil fuel firms have argued that because individuals continue to demand and rely on fossil fuels, it is up to individuals to change their energy consumption behavior (Supran & Oreskes, 2021). Similarly, the soft drink industry has

funded academic research arguing that obesity is unrelated to soda consumption, but that in general, obesity can be prevented through individuals engaging in more exercise (Nestle, 2018).

Despite the firm's best efforts to promote the validity of its preferred solution, it is likely that some stakeholders will be persuaded by the empirical evidence while others will not be. However, persuading some stakeholders to buy into the firm's preferred solution may be sufficient to delay having to take any action. Through convincing a subset of stakeholders that the firm's preferred solution is the best course of action, the firm deters these stakeholders from making any demands on the firm and fosters increased disagreement among stakeholders over how the issue should be addressed. When there is disagreement among stakeholders on what demands, if any, to make on the firm, firms may successfully respond through taking symbolic actions (Crilly et al., 2012). Thus, regardless of whether the firm persuades most stakeholders to adopt its preferred solution, it can avoid making costly substantive concessions to stakeholder demands.

P5) Firms use validity promoting to deter stakeholders from making demands on the firm.

DISCUSSION

I contribute to the under-developed view that it is possible for firms to avoid conceding to stakeholder demands without harming their relationships with stakeholders. Prior work has generally focused on whether or not firms respond to stakeholder demands, with responses treated as either a substantive or symbolic concession (Ashforth & Gibbs, 1990; Crilly et al., 2012; Durand et al., 2019; Waldron et al., 2013). In contrast, a small stream of research acknowledges the possibility that firms may respond to stakeholder demands with resistance, though this literature does not suggest that doing so is without consequences for the firm's

relationships with its stakeholders (Bundy et al., 2013; Oliver, 1991; Pache & Santos, 2010). Indeed, Pache and Santos (2010) argue that the long-term consequences of using resistance to address competing stakeholder demands include the potential for organizational breakup. The theory I develop shows how firms can resist conceding to stakeholder demands without intensifying conflict or severing relationships with the majority of their stakeholders. I suggest that this outcome can be explained through a novel mechanism: engagement on the empirical aspects of issues.

I begin by challenging assumptions in the extant literature and making a theoretical distinction between stakeholders, issues, and demands in order to promote greater clarity around what firms are responding to. The literature has taken a firm-centric view, where firms are thought to respond to their most salient stakeholders or to issues most salient to the firm. However, I argue that this view overlooks where salient stakeholders and issues come from and takes for granted the agency firms have over this process. Consequently, I integrate the stakeholder and issue salience literatures to propose considering issue salience from the perspective of stakeholders. I do this by extending Odziemkowska and Henisz's (2021) transposition of Mitchell et al.'s (1997) attributes of salient stakeholders to issues. In particular, I discuss how empirical evidence contributes to the urgency, power, and legitimacy of an issue. I then draw a theoretical distinction between issues and demands. Under this logic, some issues are more salient to stakeholders than others, and stakeholders make demands on the firm based on issues most salient to them. I draw on Oliver's (1991) defiance and manipulation resistance responses to suggest that firms may use resistance strategies to weaken issue salience for stakeholders, indirectly influencing what demands, if any, stakeholders make on the firm. Further, by separating stakeholders, issues, and demands, this logic also allows for the reality

that even if an issue is highly salient to a stakeholder, they will not necessarily make any demands on the firm (Rowley & Moldoveanu, 2003). Moreover, if stakeholders do make demands on the firm, they will not necessarily agree on what demands to make. As such, firms may also use resistance strategies to directly influence what demands, if any, stakeholders make on the firm.

Of course, firms cannot use just any type of resistance strategy; I argue that resistance responses are possible when firms use empirically-based resistance strategies in particular. I show how both issues and demands may be defined and justified through the use of empirical evidence. For example, empirical evidence plays a role in identifying the existence, magnitude, and causes and effects of many issues; it is also used to support the efficacy and efficiency of proposed means of addressing issues. I then introduce two empirically-based resistance strategies that firms can use: validity disputing and validity promoting. While validity disputing acts on both issues and demands, validity promoting acts on demands only. Firms can first use validity disputing to weaken issue salience through sowing doubt on the existence and magnitude of the issue and its causes and effects. By weakening issue salience, the firm indirectly influences whether stakeholders will choose to make demands on the firm. This strategy can be followed by directly influencing stakeholder demands. Here, the firm can again use validity disputing, this time to sow doubt on the efficacy and efficiency of stakeholders' proposed means of addressing the issue and their resultant demands on the firm. By doing so, firms aim to foster disagreement among stakeholders on how the issue can best be addressed and call into question stakeholders' justifications for making demands on the firm. In turn, validity promoting complements these efforts by using empirical evidence to support and promote the firm's preferred means of addressing the issue, which ideally are unrelated to the firm's activities. In this way, a firm

attempts to deter stakeholders from making demands on the firm. In sum, these strategies serve to foster uncertainty and disagreement among stakeholders on what demands to make on the firm, if not deter them from making any demands at all.

A key contribution of my theory lies in distinguishing empirical from instrumental and values-based aspects of issues and demands. The prior literature has emphasized the instrumental and values-based aspects of issues in its suggestion that issue salience is driven by instrumental, identity, cultural (Jones et al., 2007; Rowley & Moldoveanu, 2003; Waldron et al., 2013), and emotional concerns (Klein & Amis, 2021; McAdam, 2017). As instrumental aspects relate to stakeholders' expected gains or losses (Lange et al., 2022), and values-based aspects relate to their stable, deeply held beliefs (Giorgi et al., 2015) and sense of belonging in a social group (Ashforth & Mael, 1989), it is intuitive that firms would avoid using resistance strategies for fear of harming their relationships with stakeholders. Yet there are many examples of firms resisting stakeholder demands to address issues, even when the firm is responsible for causing the issue and its own stakeholders are put at risk for harm. These examples include tobacco companies and various chemical manufacturers, who denied that there was an association between exposure to their products and cancer, and actively sought to manipulate the evidence to sow further doubt on the risks of their products (Michaels, 2008; Oreskes & Conway, 2011).

My theory contributes an understanding of the mechanisms behind these counter-intuitive examples by identifying the empirical aspects of issues and demands and suggesting that they are distinct from the instrumental and values-based aspects. The key to this distinction lies with the norms and expectations around empirical evidence and its impersonal nature. For instance, empirical evidence is meant to arise through objective observation, and because it is subject to skepticism, debate, and falsifiability, it may also change over time (Okasha, 2002; Popper,

1959). It is thus acceptable to contest the validity of empirical evidence, and this may be done without simultaneously challenging the highly personal instrumental and values-based aspects of issues and demands. I show how firms do so by using validity disputing and validity promoting.

There are several important theoretical and practical implications that result from this theory. First, by taking a stakeholder-centric approach and theoretically differentiating between stakeholders, issues, and demands, I open a new line of inquiry into how stakeholder demands arise. Whereas prior theory takes stakeholder demands for granted and focuses on whether firms respond, how they respond, and who they respond to, I propose considering how firms may influence what demands stakeholders make on the firm and whether they make any at all. In doing so, I suggest that firms not only use influence strategies on policymakers, as is well-established in the lobbying literature (J. M. de Figueiredo & Richter, 2014; Dorobantu et al., 2017), but also use influence strategies on their own stakeholders.

The second major implication of this theory is that firms can influence stakeholder demands without harming their relationships with stakeholders. As stakeholder influence occurs through the use of resistance strategies, that firms may choose to use these strategies challenges assumptions in the extant literature around how firms preserve their relationships with stakeholders. For example, relationship preservation and avoidance of costly conflict is generally thought to depend on the firm's willingness to make either symbolic or substantive concessions to stakeholder demands. By introducing the use of empirically-based resistance strategies, I show that these assumptions on the need to concede do not always hold.

On a practical level, this theory has implications for understanding the broader phenomenon of how there can be widespread public disagreement on answers to scientific questions and the nature of social and environmental risks, despite scientific consensus on the

same (Kahan et al., 2011). Perhaps two of the starkest examples of this phenomenon include the persistence of climate change denial (Hornsey et al., 2016) and proliferation of anti-vaccine messaging on social media (Kalichman et al., 2022). Though anecdotal and case-based research outside of management has long recognized the role that firms play in fanning public disagreement over science to advance their economic interests (McGarity & Wagner, 2010; Michaels, 2008; Oreskes & Conway, 2011; Proctor & Schiebinger, 2008; Stocking & Holstein, 1993), management scholars have yet to contribute their expertise in organizations and strategy. This article aspires to catalyze this conversation by drawing from descriptive examples in the public health and environmental policy literature to elaborate higher-level strategies used by firms and their mechanisms of influence. In this way, I move beyond simple description of the empirically-based tactics that firms use, to propose a theory of how firms systematically deploy these tactics to influence stakeholders' views on the salience of issues, and how they should – or should not – be addressed.

These theoretical and practical implications introduce several avenues for future research. By outlining a more general theory of issue salience and arguing that firms have more agency in influencing stakeholders than previously recognized, this article opens the door for research on other ways in which firms can influence issue salience for stakeholders. Though this article focuses on the empirically-based strategies that firms use to weaken issue salience for stakeholders, it is also possible that firms use strategies targeting the instrumental or values-based aspects of issues to strengthen their salience. Future research can explore the conditions under which firms choose to use empirically- versus non-empirically-based influence strategies. This stream can further investigate the conditions under which firms choose to strengthen or weaken issue salience and if certain strategies may be used to do one, the other, or both.

A second avenue for future research can consider whether there are other means through which firms can undermine empirical evidence. While this article focuses on how firms use empirically-based strategies to undermine and discredit empirical evidence, firms might also be able to use values-based strategies to do so. This line of inquiry could draw from research in political psychology and cultural cognition that shows how political ideology and social identity shape individuals' perceptions of facts. For example, studies have shown that individuals are more likely to accept facts that align with their ideology, identity, and worldviews and to disbelieve facts that do not (Hornsey et al., 2016; Hornsey & Fielding, 2017; Kahan et al., 2011; McCright et al., 2013). In essence, individuals are motivated to select and accept empirical evidence that supports the values-based aspects of issues, and to reject the validity of empirical evidence that contradicts their values. Given this, it may be more effective for the firm to undermine empirical evidence by emphasizing its incongruence with the values-based aspects of an issue, rather than attacking the empirical evidence directly.

Future research can thus explore when and why firms might choose to undermine empirical evidence using empirically- versus values-based strategies. For instance, is it the case that there is a temporal pattern, where firms begin by undermining empirical evidence using empirically-based strategies, then later transition to using values-based strategies? This is a plausible scenario if the aim is to directly undermine empirical evidence while it is still nascent, and such challenges are commonplace even in the scientific community. However, this strategy may become less effective as consensus emerges in the scientific community and the legitimacy of direct attacks on the empirical evidence declines. At this point, a values-based strategy that indirectly undermines empirical evidence may become more effective.

These temporal elements introduce further questions as to which stakeholders the firm attempts to influence with empirically-based strategies. Are firms hoping to influence the scientific community's beliefs when they use empirically-based strategies to undermine empirical evidence? Or is their primary goal to influence the beliefs of non-scientist stakeholders, who are less capable of detecting illegitimate challenges to and manipulation of the evidence? Moreover, do firms employ different empirically-based tactics in their attempts to influence different types of stakeholders? For example, do firms focus on emphasizing methodological weaknesses when targeting the scientific community, and null associations generated by firm-funded studies when targeting non-scientist stakeholders? Such questions demonstrate the potential for sophisticated strategies that seek to influence stakeholders with varying degrees of science literacy.

A final line of inquiry with broader public policy importance could investigate the public politics implications of influencing stakeholder beliefs. This article has focused on private politics in the form of stakeholder demands on the firm and how the firm responds to those demands. Subsequent studies can go a step further to ask how influencing stakeholder views on means of addressing issues affects public politics, or stakeholder demands for government intervention to address the issue. Indeed, climate change denial is a case in point, where firms' efforts to undermine empirical evidence successfully mitigated the threat of legislation and regulation (Brulle, 2014).

References

USDA. (2015). *2015 Dietary Guidelines Advisory Committee (DGAC) Nutrition Evidence Library Methodology*. USDA Nutrition Evidence Library.

Agle, B. R., Mitchell, R. K., & Sonnenfeld, J. A. (1999). Who matters to CEOs? An investigation of stakeholder attributes and salience, corporate performance, and CEO values. *Academy of Management Journal, 42*(5), 507–525. https://doi.org/10.2307/256973

Allingham, M. (2002). *Choice theory: A very short introduction*. Oxford University Press.

Als-Nielsen, B., Chen, W., Gluud, C., & Kjaergard, L. L. (2003). Association of funding and conclusions in randomized drug trials: A reflection of treatment effect or adverse events? *JAMA*, *290*(7), 921–928. https://doi.org/10.1001/jama.290.7.921

Ashforth, B. E., & Gibbs, B. W. (1990). The double-edge of organizational legitimation. *Organization Science, 1*(2), 177–194. https://doi.org/10.1287/orsc.1.2.177

Ashforth, B. E., & Mael, F. (1989). Social identity theory and the organization. *Academy of Management Review, 14*(1), 20–39. https://doi.org/10.2307/258189

Ball, P. (2006). *Critical mass: How one thing leads to another*. Farrar, Straus and Giroux.

Balla, S. J., Beck, A. R., Cubbison, W. C., & Prasad, A. (2019). Where's the spam? Interest groups and mass comment campaigns in agency rulemaking. *Policy & Internet*, *11*(4), 460–479. https://doi.org/10.1002/poi3.224

Bansal, P., & Roth, K. (2000). Why companies go green: A model of ecological responsiveness. *Academy of Management Journal, 43*(4), 717–736. https://doi.org/10.2307/1556363

Barber, B., & Diestre, L. (2019). Pushing for speed or scope? Pharmaceutical lobbying and Food and Drug Administration drug review. *Strategic Management Journal*, *40*(8), 1194–1218. https://doi.org/10.1002/smj.3021

Baumgartner, F. R., & Leech, B. L. (2001). Interest niches and policy bandwagons: Patterns of interest group involvement in national politics. *The Journal of Politics*, *63*(4), 1191–1213. https://doi.org/10.1111/0022-3816.00106

Baumgartner, F. R., Larsen-Price, H. A., Leech, B. L., & Rutledge, P. (2011). Congressional and presidential effects on the demand for lobbying. *Political Research Quarterly*, *64*(1), 3–16. https://doi.org/10.1177/1065912909343578

Benford, R. D. (1993). "You could be the hundredth monkey": Collective action frames and vocabularies of motive within the nuclear disarmament movement. *The Sociological Quarterly, 34*(2), 195–216. https://doi.org/10.1111/j.1533-8525.1993.tb00387.x

Benford, R. D., & Snow, D. A. (2000). Framing processes and social movements: An overview and assessment. *Annual Review of Sociology, 26*(1), 611–639. https://doi.org/10.1146/annurev.soc.26.1.611

Bertrand, M., Bombardini, M., Fisman, R., Hackinen, B., & Trebbi, F. (2021). Hall of mirrors: Corporate philanthropy and strategic advocacy. *The Quarterly Journal of Economics*, *136*(4), 2413–2465. https://doi.org/10.1093/qje/qjab023

Bombardini, M., & Trebbi, F. (2020). Empirical models of lobbying. *Annual Review of Economics*, *12*(1), 391–413. https://doi.org/10.1146/annurev-economics-082019-024350

Bonardi, J.-P., & Keim, G. D. (2005). Corporate political strategies for widely salient issues. *Academy of Management Review*, *30*(3), 555–576. https://doi.org/10.2307/20159144

Bonardi, J.-P., Hillman, A. J., & Keim, G. D. (2005). The attractiveness of political markets: Implications for firm strategy. *Academy of Management Review*, *30*(2), 397–413. https://doi.org/10.2307/20159126

Bonardi, J.-P., Holburn, G. L., & Bergh, R. G. V. (2006). Nonmarket strategy performance: Evidence from US electric utilities. *Academy of Management Journal*, *49*(6), 1209–1228. https://doi.org/10.5465/amj.2006.23478676

Brandt, A. M. (2009). *The cigarette century: The rise, fall, and deadly persistence of the product that defined America.* Basic Books.

Bromley, P., & Powell, W. W. (2012). From smoke and mirrors to walking the talk: Decoupling in the contemporary world. *Academy of Management Annals, 6*(1), 483–530. https://doi.org/10.1080/19416520.2012.684462

Brulle, R. J. (2014). Institutionalizing delay: Foundation funding and the creation of U.S. climate change counter-movement organizations. *Climatic Change*, *122*(4), 681–694. https://doi.org/10.1007/s10584-013-1018-7

Bundy, J., Shropshire, C., & Buchholtz, A. K. (2013). Strategic cognition and issue salience: Toward an explanation of firm responsiveness to stakeholder concerns. *Academy of Management Review, 38*(3), 352–376. https://doi.org/10.5465/amr.2011.0179

Bundy, J., Vogel, R. M., & Zachary, M. A. (2018). Organization–stakeholder fit: A dynamic theory of cooperation, compromise, and conflict between an organization and its stakeholders. *Strategic Management Journal, 39*(2), 476–501. https://doi.org/10.1002/smj.2736

Caldeira, G. A., Hojnacki, M., & Wright, J. R. (2000). The lobbying activities of organized interests in federal judicial nominations. *The Journal of Politics*, *62*(1), 51–69. https://doi.org/10.1111/0022-3816.00003

Campbell, T. H., & Kay, A. C. (2014). Solution aversion: On the relation between ideology and motivated disbelief. *Journal of Personality and Social Psychology, 107*(5), 809–824. https://doi.org/10.1037/a0037963

Chartres, N., Fabbri, A., & Bero, L. A. (2016). Association of industry sponsorship with outcomes of nutrition studies: A systematic review and meta-analysis. *JAMA Internal Medicine*, *176*(12), 1769–1777. https://doi.org/10.1001/jamainternmed.2016.6721

Chartres, N., Fabbri, A., McDonald, S., Diong, J., McKenzie, J. E., & Bero, L. (2020). Association of food industry ties with findings of studies examining the effect of dairy food intake on cardiovascular disease and mortality: Systematic review and meta-analysis. *BMJ Open*, *10*(12). https://doi.org/10.1136/bmjopen-2020-039036

Clarkson, M. E. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of Management Review, 20*(1), 92–117. https://doi.org/10.5465/amr.1995.9503271994

Cockburn, I. M., & Henderson, R. M. (1998). Absorptive capacity, coauthoring behavior, and the organization of research in drug discovery. *The Journal of Industrial Economics*, *46*(2), 157–182. https://doi.org/10.1111/1467-6451.00067

Cook, J., Oreskes, N., Doran, P. T., Anderegg, W. R. L., Verheggen, B., Maibach, E. W., Carlton, J. S., Lewandowsky, S., Skuce, A. G., Green, S. A., Nuccitelli, D., Jacobs, P., Richardson, M., Winkler, B., Painting, R., & Rice, K. (2016). Consensus on consensus: A synthesis of consensus estimates on human-caused global warming. *Environmental Research Letters, 11*(4), 048002. https://doi.org/10.1088/1748-9326/11/4/048002

Crilly, D., Zollo, M., & Hansen, M. (2012). Faking it or muddling through? Understanding decoupling in response to stakeholder pressures. *Academy of Management Journal, 55*(6), 1429–1448. https://doi.org/10.5465/amj.2010.0697

David, P., Bloom, M., & Hillman, A. J. (2007). Investor activism, managerial responsiveness, and corporate social performance. *Strategic Management Journal, 28*(1), 91–100. https://doi.org/10.1002/smj.571

de Figueiredo, J. M., & de Figueiredo, R. J. P. (2002). The allocation of resources by interest groups: Lobbying, litigation and administrative regulation. Business and Politics, 4(2), 161–181. https://doi.org/10.1080/1369525022000015603

de Figueiredo, J. M., & Richter, B. K. (2014). Advancing the empirical research on lobbying. *Annual Review of Political Science*, *17*(1), 163–185. https://doi.org/10.1146/annurev-polisci-100711-135308

Delmas, M. A., & Montes-Sancho, M. J. (2010). Voluntary agreements to improve environmental quality: Symbolic and substantive cooperation. *Strategic Management Journal, 31*(6), 575–601. https://doi.org/10.1002/smj.826

Diestre, L., Barber, B., & Santaló, J. (2020). The Friday effect: Firm lobbying, the timing of drug safety alerts, and drug side effects. *Management Science*, *66*(8), 3677–3698. https://doi.org/10.1287/mnsc.2019.3386

Dietary Guidelines Advisory Committee. (2015). *Scientific Report of the 2015 Dietary Guidelines Advisory Committee: Advisory Report to the Secretary of Health and Human Services and the Secretary of Agriculture*. U.S. Department of Agriculture, Agricultural Research Service.

Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of Management Review, 20*(1), 65–91. https://doi.org/10.5465/amr.1995.9503271992

Dorobantu, S., Kaul, A., & Zelner, B. (2017). Nonmarket strategy research through the lens of new institutional economics: An integrative review and future directions. *Strategic Management Journal*, *38*(1), 114–140. https://doi.org/10.1002/smj.2590

Dunlap, R. E., & Jacques, P. J. (2013). Climate change denial books and conservative think tanks: Exploring the connection. *American Behavioral Scientist*, *57*(6), 699–731. https://doi.org/10.1177/0002764213477096

Dunlap, R. E., & McCright, A. M. (2010). Climate change denial: Sources, actors and strategies. In C. Lever-Tracy (Ed.), *Routledge Handbook of Climate Change and Society* (pp. 240–259). Routledge. https://doi.org/10.4324/9780203876213

Durand, R., Hawn, O., & Ioannou, I. (2019). Willing and able: A general model of organizational responses to normative pressures. *Academy of Management Review, 44*(2), 299–320. https://doi.org/10.5465/amr.2016.0107

Dutton, J. E., & Jackson, S. E. (1987). Categorizing strategic issues: Links to organizational action. *Academy of Management Review, 12*(1), 76–90. https://doi.org/10.2307/257995

Eesley, C., & Lenox, M. J. (2006). Firm responses to secondary stakeholder action. *Strategic Management Journal, 27*(8), 765–781. https://doi.org/10.1002/smj.536

Elsbach, K. D. (1994). Managing organizational legitimacy in the California cattle industry: The construction and effectiveness of verbal accounts. *Administrative Science Quarterly, 39*(1), 57–88. https://doi.org/10.2307/2393494

Elsbach, K. D., & Kramer, R. M. (1996). Members' responses to organizational identity threats: Encountering and countering the Business Week Rankings. *Administrative Science Quarterly, 41*(3), 442–476. https://doi.org/10.2307/2393938

Etzioni, A. (1964). *Modern organizations*. Prentice-Hall.

Farrell, J. (2016). Corporate funding and ideological polarization about climate change. *Proceedings of the National Academy of Sciences*, *113*(1), 92–97. https://doi.org/10.1073/pnas.1509433112

de Figueiredo, J. M. (2002). Lobbying and information in politics. *Business and Politics, 4*(2), 125–129. https://doi.org/10.2202/1469-3569.1033

Figueiredo, J. M. de, & Tiller, E. H. (2001). The structure and conduct of corporate lobbying: How firms lobby the Federal Communications Commission. *Journal of Economics & Management Strategy*, *10*(1), 91–122. https://doi.org/10.1111/j.1430-9134.2001.00091.x

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

Gambardella, A. (1992). Competitive advantages from in-house scientific research: The US pharmaceutical industry in the 1980s. *Research Policy*, *21*(5), 391–407. https://doi.org/10.1016/0048-7333(92)90001-K

Gauchat, G. (2012). Politicization of science in the public sphere. *American Sociological Review, 77*(2), 167–187. https://doi.org/10.1177/0003122412438225

Giorgi, S., Lockwood, C., & Glynn, M. A. (2015). The many faces of culture: Making sense of 30 years of research on culture in organization studies. *Academy of Management Annals, 9*(1), 1–54. https://doi.org/10.1080/19416520.2015.1007645

Gittelman, M., & Kogut, B. (2003). Does good science lead to valuable knowledge? Biotechnology firms and the evolutionary logic of citation patterns. *Management Science*, *49*(4), 366–382. https://doi.org/10.1287/mnsc.49.4.366.14420

Glenna, L., & Bruce, A. (2021). Suborning science for profit: Monsanto, glyphosate, and private science research misconduct. *Research Policy*, *50*(7), 104290. https://doi.org/10.1016/j.respol.2021.104290

Graebner, M. E., Knott, A. M., Lieberman, M. B., & Mitchell, W. (2022). Empirical inquiry without hypotheses: A question-driven, phenomenon-based approach to strategic management research. *Strategic Management Journal*, 1–8. https://doi.org/10.1002/smj.3393

Hansen, W. L., & Mitchell, N. J. (2000). Disaggregating and explaining corporate political activity: Domestic and foreign corporations in national politics. *The American Political Science Review*, *94*(4), 891–903. https://doi.org/10.2307/2586214

Hardy, C., Maguire, S., Power, M., & Tsoukas, H. (2020). Organizing risk: Organization and management theory for the risk society. *Academy of Management Annals, 14*(2), 1032–1066. https://doi.org/10.5465/annals.2018.0110

Hart, D. M. (2001). Why do some firms give? Why do some give a lot?: High-tech PACs, 1977-1996. *The Journal of Politics*, *63*(4), 1230–1249.

Heede, R. (2014). Tracing anthropogenic carbon dioxide and methane emissions to fossil fuel and cement producers, 1854–2010. *Climatic Change, 122*(1–2), 229–241. https://doi.org/10.1007/s10584-013-0986-y

Helfat, C. E. (2007). Stylized facts, empirical research and theory development in management. *Strategic Organization*, *5*(2), 185–192. https://doi.org/10.1177/1476127007077559

Hiatt, S. R., & Park, S. (2013). Lords of the harvest: Third-party influence and regulatory approval of genetically modified organisms. *Academy of Management Journal*, *56*(4), 923–944. https://doi.org/10.5465/amj.2011.0128

Hiatt, S. R., Grandy, J. B., & Lee, B. H. (2015). Organizational responses to public and private politics: An analysis of climate change activists and U.S. oil and gas firms. *Organization Science, 26*(6), 1769–1786. https://doi.org/10.4337/9781849807630.00024

Hillman, A. J., & Hitt, M. A. (1999). Corporate political strategy formulation: A model of approach, participation, and strategy decisions. *Academy of Management Review*, *24*(4), 825–842. https://doi.org/10.5465/AMR.1999.2553256

Hillman, A. J., Keim, G. D., & Schuler, D. (2004). Corporate political activity: A review and research agenda. *Journal of Management*, *30*(6), 837–857. https://doi.org/10.1016/j.jm.2004.06.003

Hochschild, J. L., & Einstein, K. L. (2015). *Do facts matter? Information and misinformation in American politics*. University of Oklahoma Press.

Holburn, G. L. F., & Bergh, R. G. V. (2004). Influencing agencies through pivotal political institutions. *Journal of Law, Economics, & Organization*, *20*(2), 458–483. https://doi.org/10.1093/jleo/ewh042

Holburn, G. L. F., & Bergh, R. G. V. (2008). Making friends in hostile environments: Political strategy in regulated industries. *Academy of Management Review*, *33*(2), 521–540. https://doi.org/10.2307/20159411

Hornsey, M. J., & Fielding, K. S. (2017). Attitude roots and Jiu Jitsu persuasion: Understanding and overcoming the motivated rejection of science. *American Psychologist, 72*(5), 459–473. https://doi.org/10.1037/a0040437

Hornsey, M. J., Harris, E. A., Bain, P. G., & Fielding, K. S. (2016). Meta-analyses of the determinants and outcomes of belief in climate change. *Nature Climate Change, 6*(6), 622–626. https://doi.org/10.1038/nclimate2943

Ingram, P., Yue, L. Q., & Rao, H. (2010). Trouble in store: Probes, protests, and store openings by Wal-Mart, 1998–2007. *American Journal of Sociology, 116*(1), 53–92. https://doi.org/10.1086/653596

Jacques, P. J., Dunlap, R. E., & Freeman, M. (2008). The organisation of denial: Conservative think tanks and environmental scepticism. *Environmental Politics*, *17*(3), 349–385. https://doi.org/10.1080/09644010802055576

Jasanoff, S. (1994). *The fifth branch: Science advisers as policymakers*. Harvard University Press.

Jasanoff, S. (2016). Science and democracy. In U. Felt, S. Milojevic, R. Fouché, C. A. Miller, & L. Smith-Doerr (Eds.), *The Handbook of Science and Technology Studies* (pp. 259–287). MIT Press.

Jewell, C., & Bero, L. (2007). Public participation and claimsmaking: Evidence utilization and divergent policy frames in California's ergonomics rulemaking. *Journal of Public Administration Research & Theory*, *17*(4), 625–650. https://doi.org/10.1093/jopart/mul023

Jones, T. M., Felps, W., & Bigley, G. A. (2007). Ethical theory and stakeholder-related decisions: The role of stakeholder culture. *Academy of Management Review, 32*(1), 137–155. https://doi.org/10.5465/amr.2007.23463924

Kahan, D. M. (2013). Ideology, motivated reasoning, and cognitive reflection. *Judgment & Decision Making, 8*(4), 407–424. https://doi.org/10.1017/s1930297500005271

Kahan, D. M. (2015). What is the "science of science communication"? *Journal of Science Communication, 14*(3), 1–10. https://doi.org/10.22323/2.14030404

Kahan, D. M., Jenkins-Smith, H., & Braman, D. (2011). Cultural cognition of scientific consensus. *Journal of Risk Research, 14*(2), 147–174. https://doi.org/10.1080/13669877.2010.511246

Kalichman, S. C., Eaton, L. A., Earnshaw, V. A., & Brousseau, N. (2022). Faster than warp speed: Early attention to COVD-19 by anti-vaccine groups on Facebook. *Journal of Public Health, 44*(1), e96–e105. https://doi.org/10.1093/pubmed/fdab093

Kiley, K., & Vaisey, S. (2020). Measuring stability and change in personal culture using panel data. *American Sociological Review, 85*(3), 477–506. https://doi.org/10.1177/0003122420921538

King, B. G. (2008). A political mediation model of corporate response to social movement activism. *Administrative Science Quarterly, 53*(3), 395–421. https://doi.org/10.2189/asqu.53.3.395

Klein, J., & Amis, J. M. (2021). The dynamics of framing: Image, emotion, and the European migration crisis. *Academy of Management Journal, 64*(5), 1324–1354. https://doi.org/10.5465/amj.2017.0510

Krimsky, S. (2013). Do financial conflicts of interest bias research?: An inquiry into the "Funding Effect" hypothesis. *Science, Technology, & Human Values*, *38*(4), 566–587. https://doi.org/10.1177/0162243912456271

Kuhn, T. S. (1962). *The structure of scientific revolutions*. University of Chicago Press.

Lamertz, K., Martens, M. L., & Heugens, P. P. M. A. R. (2003). Issue evolution: A symbolic interactionist perspective. *Corporate Reputation Review, 6*(1), 82. https://doi.org/10.1057/palgrave.crr.1540192

Lange, D., Bundy, J., & Park, E. (2022). The social nature of stakeholder utility. *Academy of Management Review, 47*(1), 9–30. https://doi.org/10.5465/amr.2018.0456

Lazarus, O., McDermid, S., & Jacquet, J. (2021). The climate responsibilities of industrial meat and dairy producers. *Climatic Change, 165*(1), 30. https://doi.org/10.1007/s10584-021-03047-7

Lenox, M. J., & Eesley, C. E. (2009). Private environmental activism and the selection and response of firm targets. *Journal of Economics & Management Strategy, 18*(1), 45–73. https://doi.org/10.1111/j.1530-9134.2009.00207.x

Libgober, B. D. (2020). Strategic proposals, endogenous comments, and bias in rulemaking. *The Journal of Politics*, *82*(2), 642–656. https://doi.org/10.1086/706891

Lundh, A., Lexchin, J., Mintzes, B., Schroll, J. B., & Bero, L. (2017). Industry sponsorship and research outcome. *Cochrane Database of Systematic Reviews*, *2*. https://doi.org/10.1002/14651858.MR000033.pub3

Lux, S., Crook, T. R., & Woehr, D. J. (2011). Mixing business with politics: A meta-analysis of the antecedents and outcomes of corporate political activity. *Journal of Management*, *37*(1), 223–247. https://doi.org/10.1177/0149206310392233

Lyon, T. P., & Maxwell, J. W. (2004). Astroturf: Interest group lobbying and corporate strategy. *Journal of Economics & Management Strategy*, *13*(4), 561–597. https://doi.org/10.1111/j.1430-9134.2004.00023.x

Macy, B. (2018). *Dopesick: Dealers, doctors, and the drug company that addicted America*. Little, Brown and Company.

Magness, V. (2008). Who are the stakeholders now? An empirical examination of the

Mitchell, Agle, and Wood theory of stakeholder salience. *Journal of Business Ethics, 83*(2), 177–192. https://doi.org/10.1007/s10551-007-9610-2

Mandrioli, D., Kearns, C. E., & Bero, L. A. (2016). Relationship between research outcomes and risk of bias, study sponsorship, and author financial conflicts of interest in reviews of the effects of artificially sweetened beverages on weight outcomes: A Systematic review of reviews. *PLOS ONE*, *11*(9), e0162198. https://doi.org/10.1371/journal.pone.0162198

Markowitz, G. E., & Rosner, D. (2013). *Deceit and denial the deadly politics of industrial pollution*. University of California Press.

McAdam, D. (2017). Social movement theory and the prospects for climate change activism in the United States. *Annual Review of Political Science, 20*(1), 189–208. https://doi.org/10.1146/annurev-polisci-052615-025801

McCarthy, J. D., & Zald, M. N. (1977). Resource mobilization and social movements: A partial theory. *American Journal of Sociology, 82*(6), 1212–1241. https://doi.org/10.4324/9781315129648-1

McCright, A. M., Dentzman, K., Charters, M., & Dietz, T. (2013). The influence of political ideology on trust in science. *Environmental Research Letters, 8*(4), 044029. https://doi.org/10.1088/1748-9326/8/4/044029

McCulloch, J., & Tweedale, G. (2008). *Defending the indefensible: The global asbestos industry and its fight for survival.* OUP Oxford.

McDonnell, M.-H. (2016). Radical repertoires: The incidence and impact of corporate-sponsored social activism. *Organization Science, 27*(1), 53–71. https://doi.org/10.1287/orsc.2015.1017

McGahan, A. M. (2021). Integrating insights from the Resource-based View of the firm into the New Stakeholder Theory. *Journal of Management, 47*(7), 1734–1756. https://doi.org/10.1177/0149206320987282

McGarity, T. O., & Wagner, W. (2010). *Bending science: How special interests corrupt public health research*. Harvard University Press.

Michaels, D. (2008). *Doubt is their product: How industry's assault on science threatens your health*. Oxford University Press.

Michaels, D. (2020). *The triumph of doubt: Dark money and the science of deception*. Oxford University Press.

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of Management Review, 22*(4), 853–886. https://doi.org/10.5465/AMR.1997.9711022105

National Academies of Sciences, Engineering, and Medicine. (2017a). *Optimizing the process for establishing the Dietary Guidelines for Americans: The selection process*. The National Academies Press. https://doi.org/10.17226/24637

National Academies of Sciences, Engineering, and Medicine. (2017b). *Redesigning the process for establishing the Dietary Guidelines for Americans*. The National Academies Press. https://doi.org/10.17226/24883

Nestle, M. (2018). *Unsavory truth: How food companies skew the science of what we eat*. Basic Books.

North, D. C. (1990). *Institutions, institutional change, and economic performance*. Cambridge University Press.

Ocasio, W. (1997). Towards an attention-based view of the firm. *Strategic Management Journal, 18*, 187–206. https://doi.org/10.1002/(SICI)1097-0266(199707)18:1+<187::AID-SMJ936>3.0.CO;2-K

Odziemkowska, K., & Henisz, W. J. (2021). Webs of influence: Secondary stakeholder actions and cross-national corporate social performance. *Organization Science, 32*(1), 233–255. https://doi.org/10.1287/orsc.2020.1380

Okasha, S. (2002). *Philosophy of science: A very short introduction*. Oxford University Press.

Oliver, C. (1991). Strategic responses to institutional processes. *Academy of Management Review, 16*(1), 145–179. https://doi.org/10.2307/258610

Oreskes, N., & Conway, E. M. (2011). *Merchants of doubt: How a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. Bloomsbury Press.

Ozcan, P., & Gurses, K. (2018). Playing cat and mouse: Contests over regulatory categorization of dietary supplements in the United States. *Academy of Management Journal*, *61*(5), 1789–1820. https://doi.org/10.5465/amj.2015.1221

Pache, A.-C., & Santos, F. (2010). When worlds collide: The internal dynamics of organizational responses to conflicting institutional demands. *Academy of Management Review, 35*(3), 455–476. https://doi.org/10.5465/amr.35.3.zok455

Pacheco, D. F., & Dean, T. J. (2015). Firm responses to social movement pressures: A competitive dynamics perspective. *Strategic Management Journal, 36*(7), 1093–1104. https://doi.org/10.1002/smj.2273

Page, B. I., & Shapiro, R. Y. (1992). *The rational public: Fifty years of trends in Americans' policy preferences.* University of Chicago Press.

Parent, M. M., & Deephouse, D. L. (2007). A case study of stakeholder identification and prioritization by managers. *Journal of Business Ethics, 75*(1), 1–23. https://doi.org/10.1007/s10551-007-9533-y

Patterson, O. (2014). Making sense of culture. *Annual Review of Sociology, 40*(1), 1–30. https://doi.org/10.1146/annurev-soc-071913-043123

Pfeffer, J. (1981). *Power in organizations*. Pitman Pub.

Polidoro, F., & Theeke, M. (2012). Getting competition down to a science: The effects of technological competition on firms' scientific publications. *Organization Science*, *23*(4), 1135–1153. https://doi.org/10.1287/orsc.1110.0684

Popper, K. R. (1959). *The logic of scientific discovery.* Basic Books.

Potter, R. A. (2017). *More than spam? Lobbying the EPA through public comment campaigns* (Series on Regulatory Process and Perspective). Brookings Institution. https://www.brookings.edu/research/more-than-spam-lobbying-the-epa-through-public-comment-campaigns/

Proctor, R. (2011). *Golden holocaust: Origins of the cigarette catastrophe and the case for abolition*. University of California Press.

Proctor, R., & Schiebinger, L. L. (Eds.). (2008). *Agnotology: The making and unmaking of ignorance*. Stanford University Press.

Rosenberg, N. (1990). Why do firms do basic research (with their own money)? *Research Policy*, *19*(2), 165–174. https://doi.org/10.1016/0048-7333(90)90046-9

Rowley, T. J., & Moldoveanu, M. (2003). When will stakeholder groups act? An interest- and ddentity-based model of stakeholder group mobilization. *Academy of Management Review, 28*(2), 204–219. https://doi.org/10.2307/30040709

Sætre, A. S., & Van de Ven, A. (2021). Generating theory by abduction. *Academy of Management Review*, *46*(4), 684–701. https://doi.org/10.5465/amr.2019.0233

Savell, E., Fooks, G., & Gilmore, A. B. (2016). How does the alcohol industry attempt to influence marketing regulations? A systematic review. *Addiction, 111*(1), 18–32. https://doi.org/10.1111/add.13048

Schnackenberg, A. K., Bundy, J., Coen, C. A., & Westphal, J. D. (2019). Capitalizing on categories of social construction: A review and integration of organizational research on symbolic management strategies. *Academy of Management Annals, 13*(2), 375–413. https://doi.org/10.5465/annals.2017.0096

Schuler, D. A. (1996). Corporate political strategy and foreign competition: The case of the steel industry. *Academy of Management Journal*, *39*(3), 720–737. https://doi.org/10.2307/256661

Schuler, D. A., Rehbein, K., & Cramer, R. D. (2002). Pursuing strategic advantage through political means: A multivariate approach. *Academy of Management Journal*, *45*(4), 659–672. https://doi.org/10.5465/3069303

Stigler, G. J. (1971). The theory of economic regulation. *The Bell Journal of Economics and Management Science*, *2*(1), 3–21. https://doi.org/10.2307/3003160

Stocking, S. H., & Holstein, L. W. (1993). Constructing and reconstructing scientific ignorance: Ignorance claims in science and journalism. *Knowledge, 15*(2), 186–210. https://doi.org/10.1177/107554709301500205

Supran, G., & Oreskes, N. (2017). Assessing ExxonMobil's climate change communications (1977–2014). *Environmental Research Letters*, *12*(8), 084019. https://doi.org/10.1088/1748-9326/aa815f

Supran, G., & Oreskes, N. (2021). Rhetoric and frame analysis of ExxonMobil's climate change communications. *One Earth, 4*(5), 696–719. https://doi.org/10.1016/j.oneear.2021.04.014

Sweeny, K., Melnyk, D., Miller, W., & Shepperd, J. (2010). Information avoidance: Who, what, when, and why. *Review of General Psychology, 14*(4), 340–353. https://doi.org/10.1037/a0021288

Wagner, W., & Steinzor, R. (Eds.). (2006). *Rescuing science from politics: Regulation and the distortion of scientific research*. Cambridge University Press.

Wagner, W., Fisher, E., & Pascual, P. (2018). Whose science? A new era in regulatory "science wars." *Science*, *362*(6415), 636–639. https://doi.org/10.1126/science.aau3205

Waldron, T. L., Navis, C., & Fisher, G. (2013). Explaining differences in firms' responses to activism. *Academy of Management Review, 38*(3), 397–417. https://doi.org/10.5465/amr.2011.0466

Walker, E. T., & Rea, C. M. (2014). The political mobilization of firms and industries. *Annual Review of Sociology*, *40*(1), 281–304. https://doi.org/10.1146/annurev-soc-071913-043215

Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. MIT Press.

Yach, D., & Bialous, S. A. (2001). Junking science to promote tobacco. *American Journal of Public Health*, *91*(11), 1745–1748. https://doi.org/10.2105/AJPH.91.11.1745

Yackee, S. W. (2019). The politics of rulemaking in the United States. *Annual Review of Political Science*, *22*(1), 37–55. https://doi.org/10.1146/annurev-polisci-050817-092302

Appendix

TABLES AND FIGURES

Figure 1. Key events during creation of the 2015-2020 Dietary Guidelines for Americans

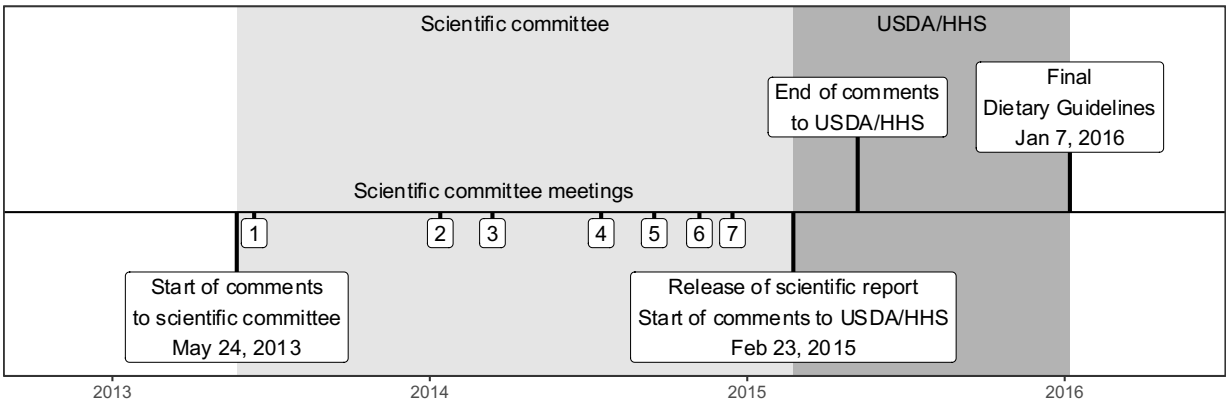

Figure 2. Number of organizations per quarter that engaged in lobbying or commenting

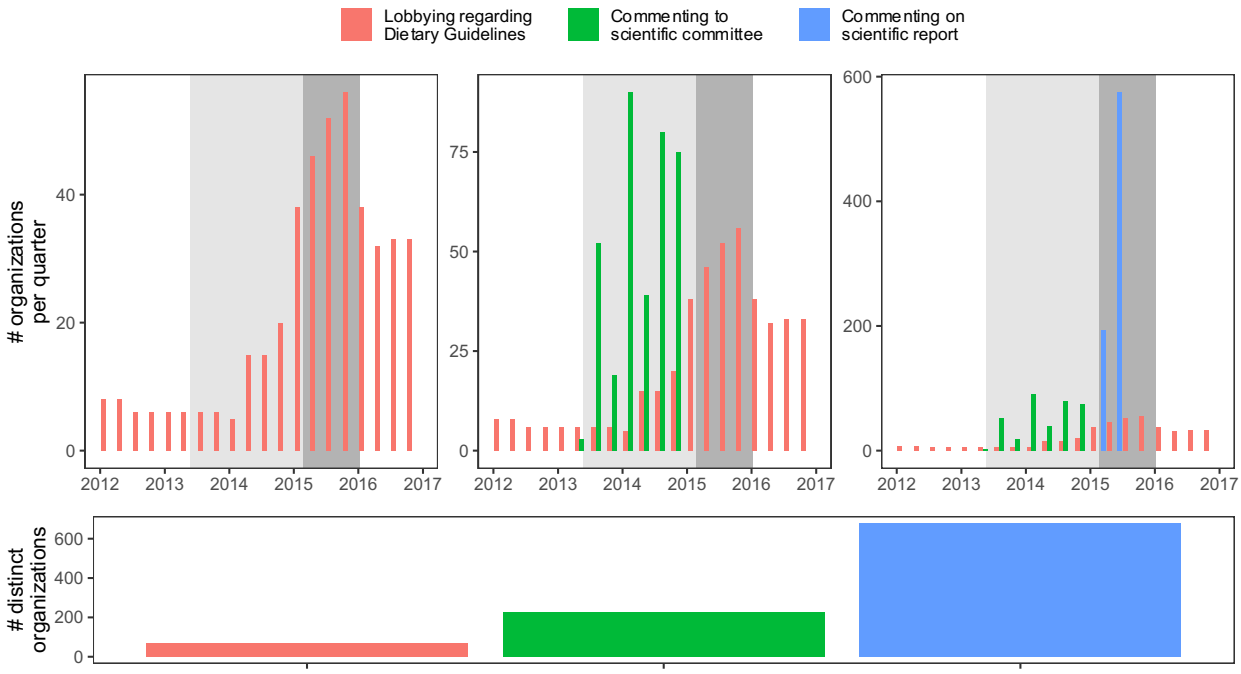

Figure 3. Percentage of organizations that engaged in each activity

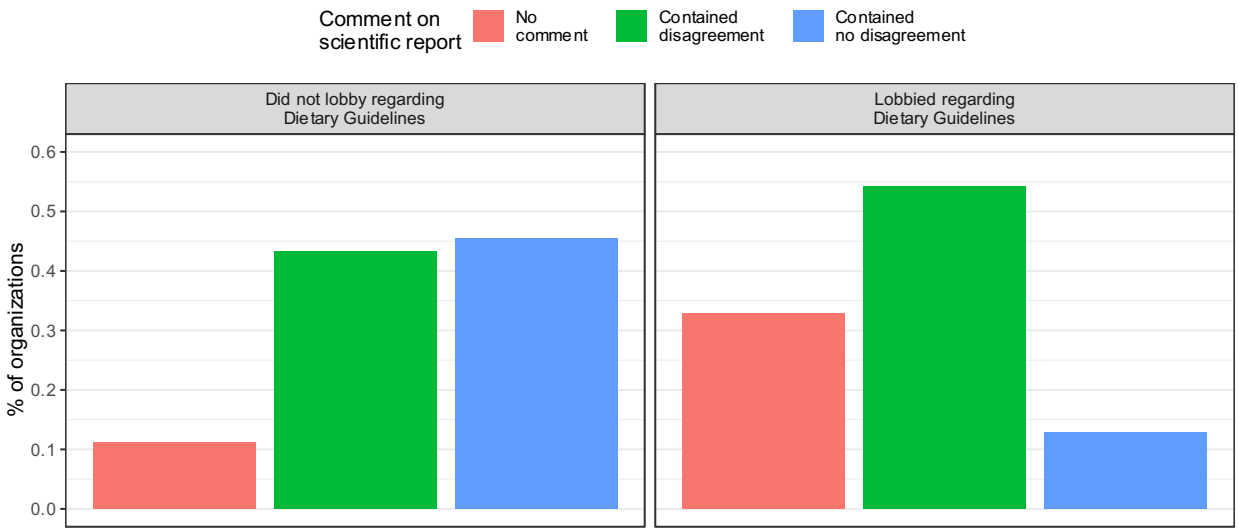

Table 1. Examples of organizations that lobbied/disagreed versus did not lobby/disagree

Organizations that lobbied on the DGA and disagreed with the scientific report	Organizations that did not lobby on the DGA or disagree with the scientific report
American Bakers Association	350
American Beverage Association	AARP Foundation
American Frozen Food Institute	Almond Board of California
American Public Health Association (APHA)	American Academy of Family Physicians (AAFP)
Beer Institute	American Association for Dental Research (AADR)
Center for Science in the Public Interest (CSPI)	American Dietetic Association
Coca-Cola Company	American Institute for Cancer Research (AICR)
Consumers Union	American Pistachio Growers
Corn Refiners Association	Animal Welfare Institute
Distilled Spirits Council of the United States (DISCUS)	California Dried Fruit Coalition
Florida Crystals Corporation	Canned Food Alliance
Grocery Manufacturers Association	Center for Food Safety
International Dairy Foods Association (IDFA)	Consumer Federation of America
Kraft Foods Group, Inc.	Cranberry Institute
Livestock Marketing Association	Danone / Dannon
Missouri Farm Bureau Federation	Drinking Water Research Foundation (DWRF)
Monster Energy Company	Foundation for Advancing Alcohol Responsibility (FAAR)
National Beer Wholesalers Association	George Mason University
National Cattlemen's Beef Association (NCBA)	Hass Avocado Board
National Chicken Council	Louisiana State University
National Council of Farmer Cooperatives	McCormick Science Institute
National Kidney Foundation	Mushroom Council
National Pork Producers Council (NPPC)	National Berry Crops Initiative (NBCI)
National Restaurant Association	National Coffee Association
Nebraska Farm Bureau Federation	National Sunflower Association
Pepsi-Cola Bottling Co.	Organic Trade Association
Red Bull North America	Produce Marketing Association
Snack Food Association / SNAC International	Sabra Dipping Company, LLC
Texas Cattle Feeders Association (TCFA)	Soyfoods Association of North America
USA Dry Pea & Lentil Council (USADPLC)	Sun-Maid Growers of California
United States Cattlemen's Association	United Egg Producers
Welch's	United Fresh Produce Association (UFPA)
Wine Institute	WW (Formerly Weight Watchers)

Figure 4. Relationship between disagreement with the scientific report, commenting to the scientific committee, and quarterly lobbying activity

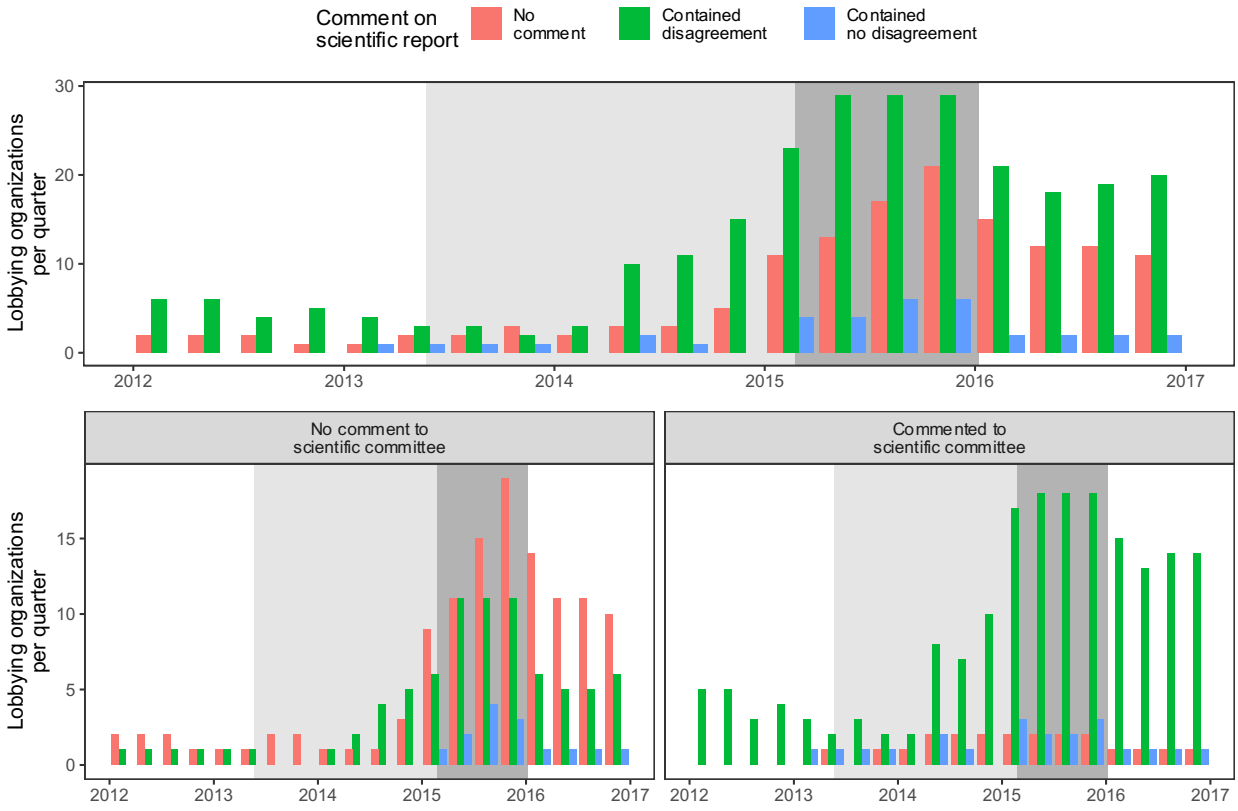

Table 2. Regression results for engagement in lobbying

Commented to scientific committee	Full sample	No			Yes		
Comment to USDA/HHS about scientific committee's report	Full sample	No comment	Disagreement	No disagreement	No comment	Disagreement	No disagreement
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Before May 2013 (base)							
Scientific committee, May 2013-Feb 2015	0.005	-0.001	0.003	0.000	0.015	0.010	0.011
	(0.003)	(0.039)	(0.005)	(0.000)	(0.011)	(0.018)	(0.007)
	p = 0.118	p = 0.971	p = 0.475	p = 1.000	p = 0.162	p = 0.582	p = 0.095
USDA/HHS, Feb 2015-Jan 2016	0.053	0.595	0.034	0.009	0.024	0.162	0.040
	(0.007)	(0.083)	(0.011)	(0.005)	(0.015)	(0.039)	(0.025)
	p = 0.000	p = 0.000	p = 0.002	p = 0.059	p = 0.104	p = 0.000	p = 0.120
After Jan 2016	0.035	0.495	0.017	0.004	0.012	0.118	0.014
	(0.007)	(0.103)	(0.008)	(0.004)	(0.012)	(0.037)	(0.018)
	p = 0.000	p = 0.001	p = 0.029	p = 0.319	p = 0.321	p = 0.002	p = 0.439
Observations	15,640	400	5,220	5,500	1,660	1,700	1,160
Adjusted R^2	0.410	0.511	0.345	0.176	0.327	0.477	0.246

Figure 5. Organizations that only lobbied and did not comment in any period

Figure 6. Graphical representation of regression coefficients for engagement in lobbying

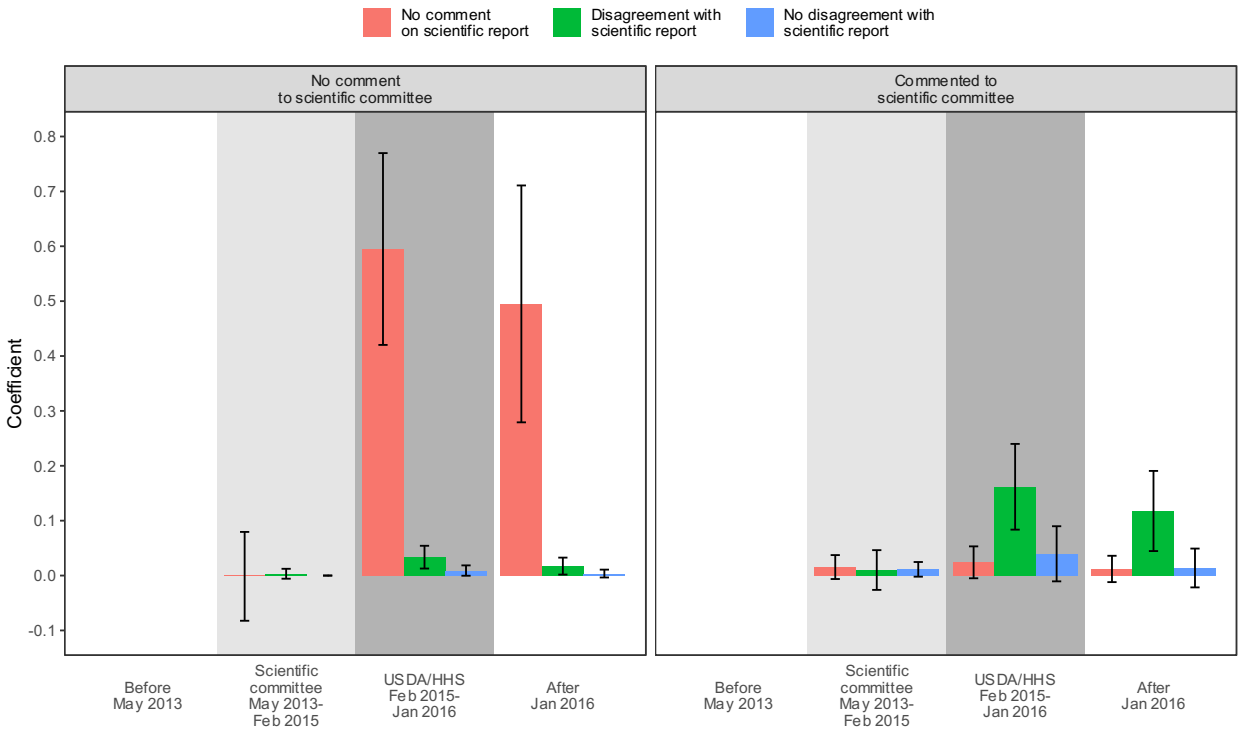

Figure 7. Descriptive statistics for articles

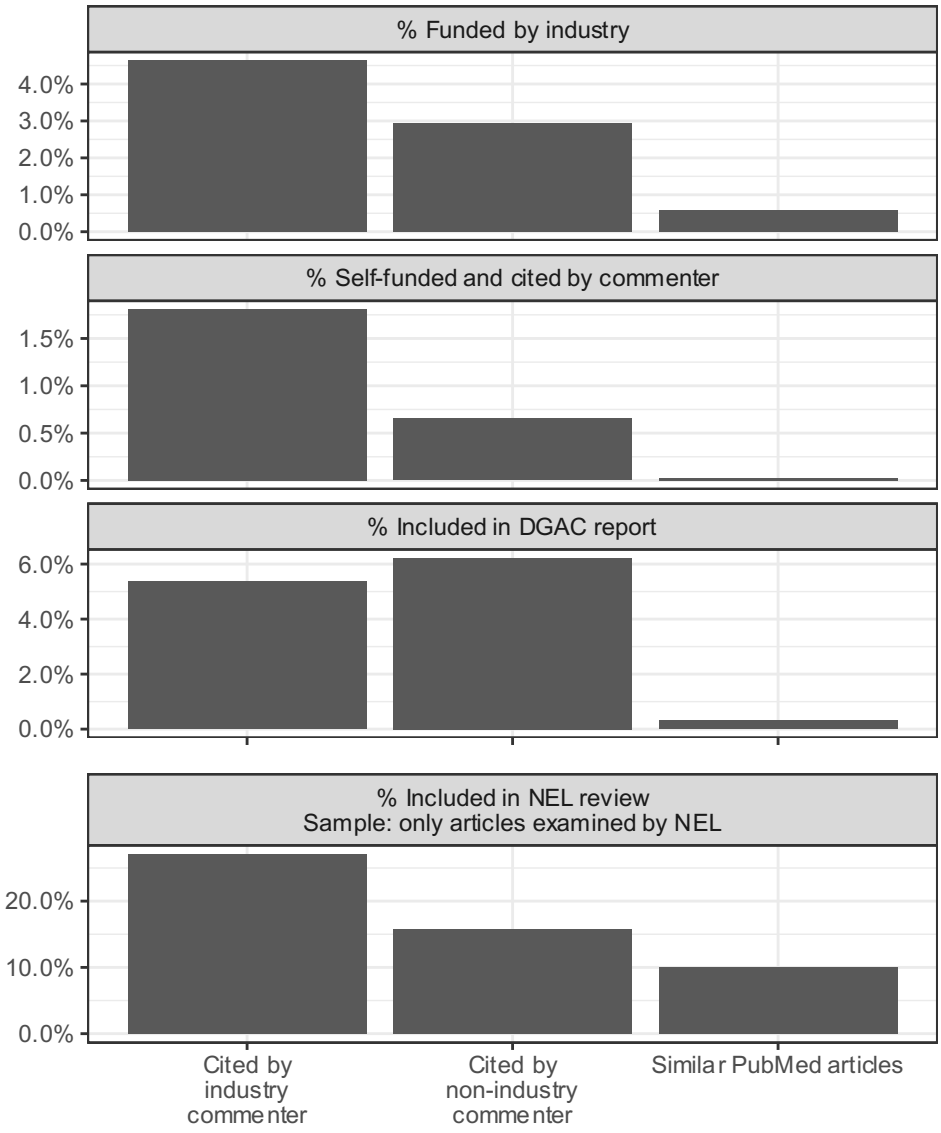

Table 3. Regression results for industry funding

	DV: funded by industry					DV: self-funded and cited by commenter				
Comparison set of similar PubMed articles	All	20	10	5	1	All	20	10	5	1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Cited by industry commenter	0.039	0.022	0.015	0.012	0.013	0.030	0.027	0.025	0.022	0.014
	(0.008)	(0.009)	(0.009)	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.005)	(0.003)
	p = 0.000	p = 0.018	p = 0.078	p = 0.108	p = 0.054	p = 0.000	p = 0.001	p = 0.000	p = 0.000	p = 0.000
Cited by non-industry commenter	0.005	-0.000	0.001	-0.004	0.001	-0.005	-0.010	-0.009	-0.009	-0.003
	(0.012)	(0.014)	(0.014)	(0.013)	(0.010)	(0.006)	(0.006)	(0.006)	(0.007)	(0.005)
	p = 0.683	p = 0.979	p = 0.967	p = 0.746	p = 0.956	p = 0.377	p = 0.090	p = 0.162	p = 0.215	p = 0.558
Observations	275,001	46,364	24,288	13,248	4,416	275,001	46,364	24,288	13,248	4,416
Adjusted R^2	0.029	0.067	0.087	0.110	0.148	0.035	0.040	0.038	0.038	0.074

Table 4. Regression results for article inclusion in the DGAC report

Comparison set of similar PubMed articles	All	20	10	5	1
	(1)	(2)	(3)	(4)	(5)
Cited by industry commenter	0.055	0.041	0.039	0.042	0.036
	(0.009)	(0.009)	(0.008)	(0.007)	(0.007)
	p = 0.000	p = 0.000	p = 0.000	p = 0.000	p = 0.000
Cited by non-industry commenter	0.038	0.035	0.032	0.037	0.037
	(0.015)	(0.014)	(0.013)	(0.013)	(0.012)
	p = 0.013	p = 0.017	p = 0.015	p = 0.004	p = 0.002
Funded by industry	0.011	0.017	0.025	0.025	0.026
	(0.008)	(0.013)	(0.017)	(0.018)	(0.028)
	p = 0.163	p = 0.179	p = 0.154	p = 0.154	p = 0.359
Funded by non-industry	0.009	0.034	0.045	0.103	0.039
	(0.022)	(0.060)	(0.079)	(0.113)	(0.093)
	p = 0.696	p = 0.567	p = 0.569	p = 0.362	p = 0.680
Self-funded and cited by industry commenter	-0.070	-0.051	-0.052	-0.046	-0.035
	(0.011)	(0.014)	(0.017)	(0.017)	(0.026)
	p = 0.000	p = 0.001	p = 0.002	p = 0.007	p = 0.174
Self-funded and cited by non-industry commenter	0.066	0.238	0.232	0.171	0.425
	(0.210)	(0.329)	(0.328)	(0.332)	(0.366)
	p = 0.752	p = 0.469	p = 0.480	p = 0.608	p = 0.246
Observations	275,001	46,364	24,288	13,248	4,416
Adjusted R^2	0.065	0.101	0.146	0.143	0.121

Table 5. Regression results for article inclusion in the NEL reviews

Cited by industry commenter	0.157
	(0.052)
	p = 0.003
Cited by non-industry commenter	0.032
	(0.055)
	p = 0.563
Funded by industry	0.253
	(0.105)
	p = 0.017
Funded by non-industry	-0.088
	(0.042)
	p = 0.037
Self-funded and cited by industry commenter	-0.477
	(0.123)
	p = 0.001
Observations	8,244
Adjusted R^2	0.104

Figure 8. Graphical representation of regression coefficients for industry funding, inclusion in the DGAC report, and inclusion in the NEL reviews

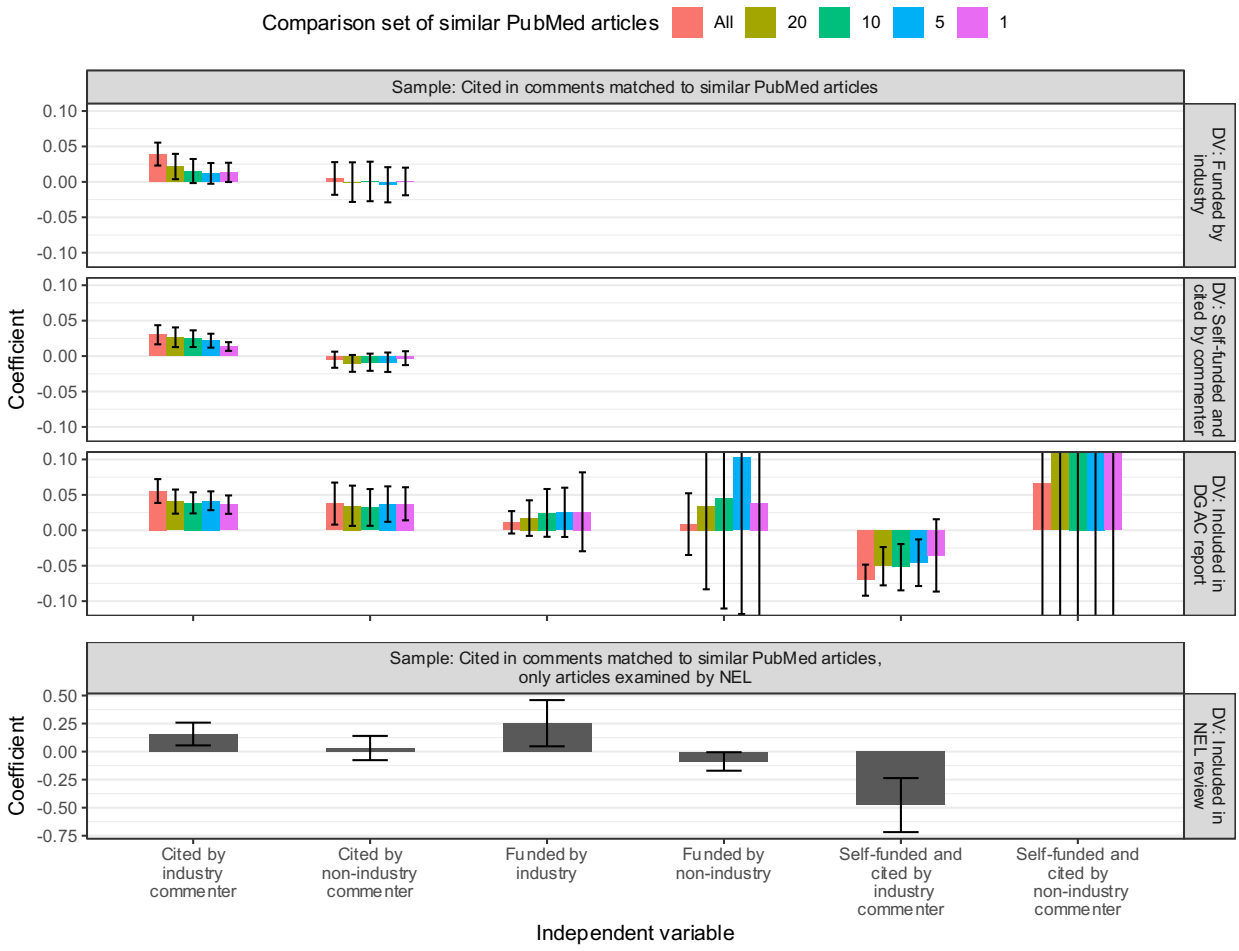

Table 6. Regression results for inclusion in the DGAC report based on article type

Comparison set of similar PubMed articles	All	20	10	5	1	All	20	10	5	1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Synthesis	0.004	0.013	0.016	0.010	0.022					
	(0.002)	(0.006)	(0.007)	(0.006)	(0.014)					
	p = 0.034	p = 0.041	p = 0.020	p = 0.135	p = 0.126					
Synthesis, not systematic						-0.004	-0.008	-0.009	-0.012	-0.002
						(0.001)	(0.002)	(0.004)	(0.005)	(0.013)
						p = 0.000	p = 0.001	p = 0.011	p = 0.029	p = 0.884
Synthesis, systematic						0.045	0.077	0.091	0.076	0.086
						(0.010)	(0.021)	(0.021)	(0.018)	(0.037)
						p = 0.000	p = 0.001	p = 0.000	p = 0.000	p = 0.019
Observations	275,001	46,364	24,288	13,248	4,416	275,001	46,364	24,288	13,248	4,416
Adjusted R^2	0.045	0.089	0.133	0.123	0.103	0.050	0.097	0.143	0.129	0.107

Figure 9. Graphical representation of regression coefficients for inclusion in the DGAC report based on article type

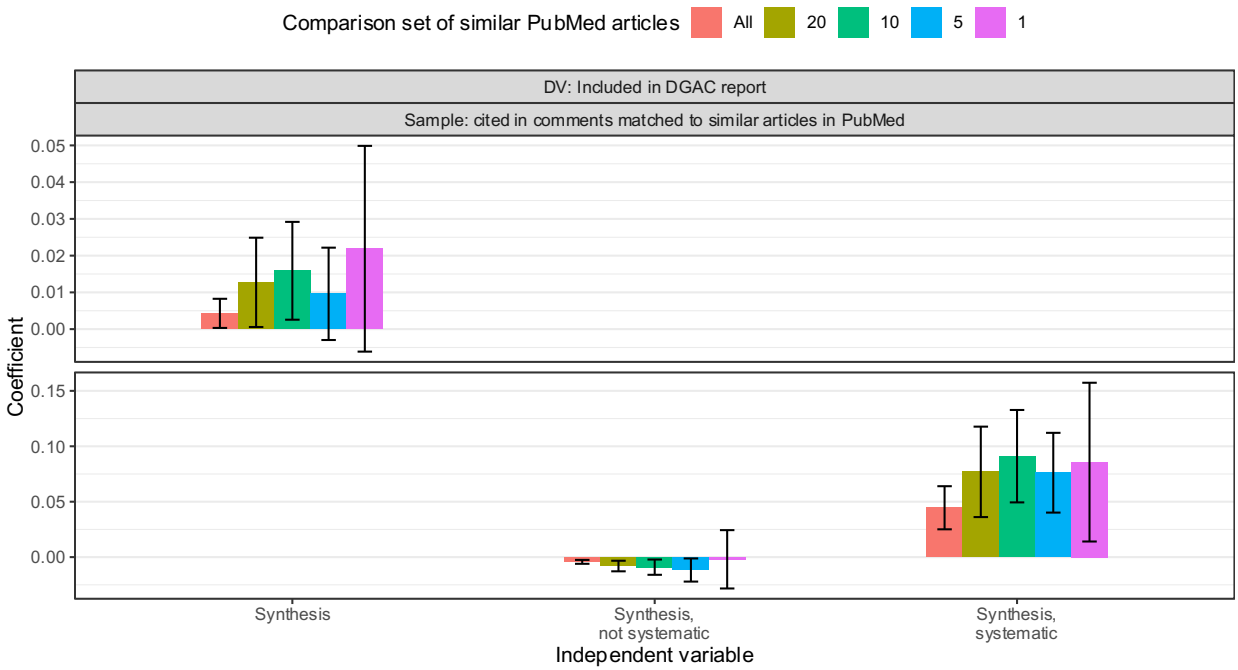

Table 7. Regression results for inclusion of systematic syntheses in the DGAC report

Comparison set of similar PubMed articles	DV: Is synthesis					DV: Is systematic synthesis Sample: synthesis articles				
	All	20	10	5	1	All	20	10	5	1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Cited by industry commenter	0.014	0.019	0.030	0.039	0.050	0.093	0.036	0.026	0.042	0.021
	(0.009)	(0.009)	(0.009)	(0.008)	(0.011)	(0.025)	(0.019)	(0.017)	(0.020)	(0.027)
	p = 0.110	p = 0.039	p = 0.001	p = 0.000	p = 0.000	p = 0.001	p = 0.062	p = 0.136	p = 0.040	p = 0.437
Cited by non-industry commenter	0.049	0.047	0.053	0.054	0.063	0.103	0.069	0.067	0.068	0.049
	(0.021)	(0.021)	(0.019)	(0.017)	(0.017)	(0.033)	(0.028)	(0.027)	(0.028)	(0.038)
	p = 0.019	p = 0.023	p = 0.007	p = 0.002	p = 0.001	p = 0.002	p = 0.013	p = 0.013	p = 0.017	p = 0.197
Funded by industry	0.024	0.029	0.027	0.042	0.072	0.040	0.016	0.004	0.055	0.051
	(0.016)	(0.019)	(0.023)	(0.027)	(0.039)	(0.040)	(0.042)	(0.050)	(0.065)	(0.095)
	p = 0.129	p = 0.122	p = 0.242	p = 0.117	p = 0.063	p = 0.322	p = 0.709	p = 0.935	p = 0.395	p = 0.595
Funded by non-industry	0.041	0.056	0.038	0.047	-0.014	0.079	-0.032	-0.036	-0.055	-0.041
	(0.034)	(0.051)	(0.070)	(0.077)	(0.090)	(0.109)	(0.057)	(0.053)	(0.035)	(0.038)
	p = 0.226	p = 0.278	p = 0.585	p = 0.539	p = 0.874	p = 0.471	p = 0.575	p = 0.501	p = 0.121	p = 0.282
Self-funded and cited by industry commenter	-0.092	-0.071	-0.066	-0.106	-0.149	-0.197	-0.049	-0.018	-0.069	-0.044
	(0.030)	(0.026)	(0.030)	(0.037)	(0.061)	(0.106)	(0.037)	(0.035)	(0.054)	(0.085)
	p = 0.003	p = 0.007	p = 0.029	p = 0.004	p = 0.016	p = 0.063	p = 0.179	p = 0.618	p = 0.204	p = 0.605
Self-funded and cited by non-industry commenter	-0.364	-0.280	-0.274	-0.320	-0.542					
	(0.078)	(0.106)	(0.121)	(0.147)	(0.361)					
	p = 0.000	p = 0.008	p = 0.024	p = 0.030	p = 0.133					
Observations	275,001	46,364	24,288	13,248	4,416	39,660	7,121	3,855	2,175	860
Adjusted R^2	0.155	0.295	0.340	0.397	0.547	0.396	0.617	0.669	0.690	0.743

Comparison set of similar PubMed articles	DV: Included in DGAC report Sample: systematic synthesis articles				
	All	20	10	5	1
	(11)	(12)	(13)	(14)	(15)
Cited by industry commenter	0.157	0.176	0.164	0.198	0.130
	(0.047)	(0.049)	(0.044)	(0.049)	(0.078)
	p = 0.001	p = 0.001	p = 0.001	p = 0.000	p = 0.101
Cited by non-industry commenter	0.195	0.200	0.233	0.223	0.215
	(0.073)	(0.073)	(0.071)	(0.075)	(0.121)
	p = 0.008	p = 0.007	p = 0.002	p = 0.004	p = 0.080
Funded by industry	0.011	0.023	0.050	0.154	0.250
	(0.054)	(0.071)	(0.074)	(0.074)	(0.106)
	p = 0.843	p = 0.744	p = 0.502	p = 0.038	p = 0.022
Funded by non-industry	-0.072	-0.121	-0.099	-0.273	-0.542
	(0.069)	(0.074)	(0.063)	(0.089)	(0.247)
	p = 0.299	p = 0.103	p = 0.118	p = 0.003	p = 0.032
Self-funded and cited by industry commenter	-0.163	-0.187	-0.191	-0.297	-0.250
	(0.065)	(0.081)	(0.082)	(0.086)	(0.106)
	p = 0.012	p = 0.022	p = 0.021	p = 0.001	p = 0.022
Observations	7,260	1,874	1,047	587	258
Adjusted R^2	0.148	0.212	0.293	0.155	-0.088

Figure 10. Graphical representation of regression coefficients for inclusion of systematic syntheses in the DGAC report

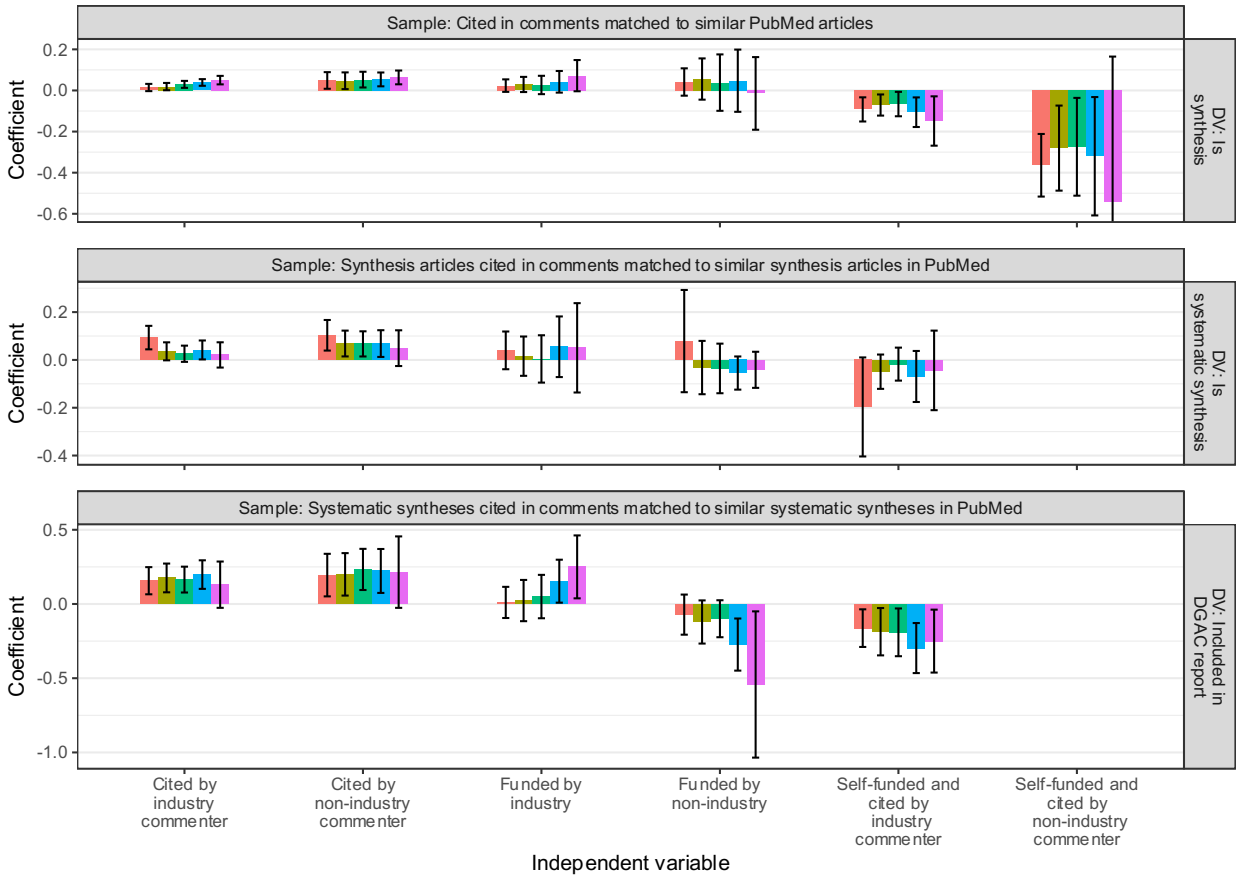

Table 8. Regression results for inclusion in the NEL reviews based on article type

	(1)	(2)
Synthesis	-0.185	
	(0.033)	
	p = 0.000	
Not synthesis, not RCT		0.148
		(0.031)
		p = 0.000
Not synthesis, RCT		0.373
		(0.071)
		p = 0.000
Observations	8,244	8,244
Adjusted R^2	0.077	0.108

Figure 11. Graphical representation of regression coefficients for inclusion in the NEL reviews based on article type

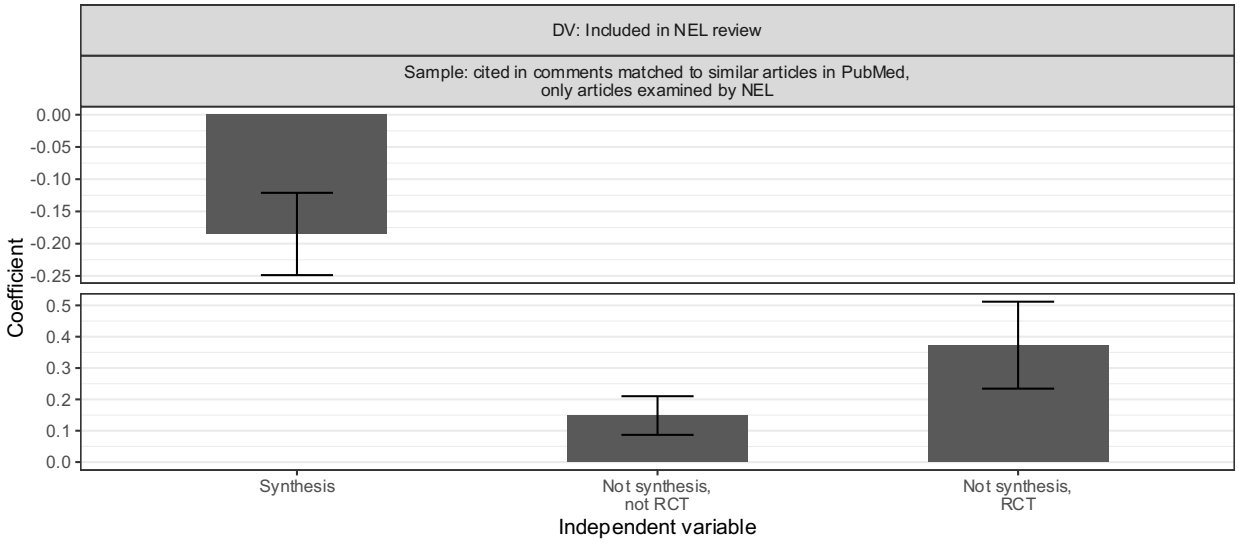

Table 9. Regression results for RCT inclusion in the NEL reviews

	DV: Is RCT Sample: non-synthesis articles	DV: Included in NEL review Sample: RCTs
	(1)	(2)
Cited by industry commenter	0.030	0.337
	(0.035)	(0.168)
	p = 0.386	p = 0.046
Cited by non-industry commenter	0.026	0.042
	(0.062)	(0.180)
	p = 0.677	p = 0.814
Funded by industry	0.092	0.545
	(0.065)	(0.182)
	p = 0.155	p = 0.004
Funded by non-industry	-0.147	
	(0.078)	
	p = 0.060	
Self-funded and cited by industry commenter	-0.242	
	(0.089)	
	p = 0.007	
Observations	7,759	1,076
Adjusted R^2	0.316	0.188

Figure 12. Graphical representation of regression coefficients for RCT inclusion in the NEL reviews

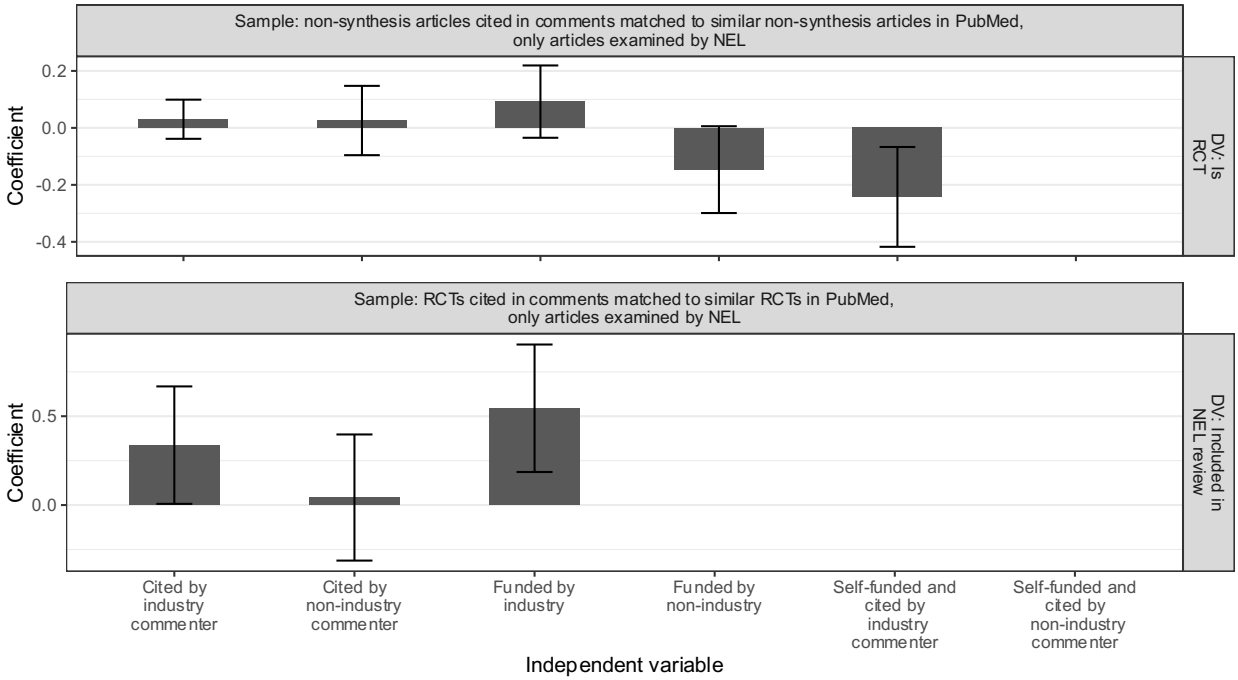

Figure 13. Theoretical model for how firms use empirically-based resistance strategies

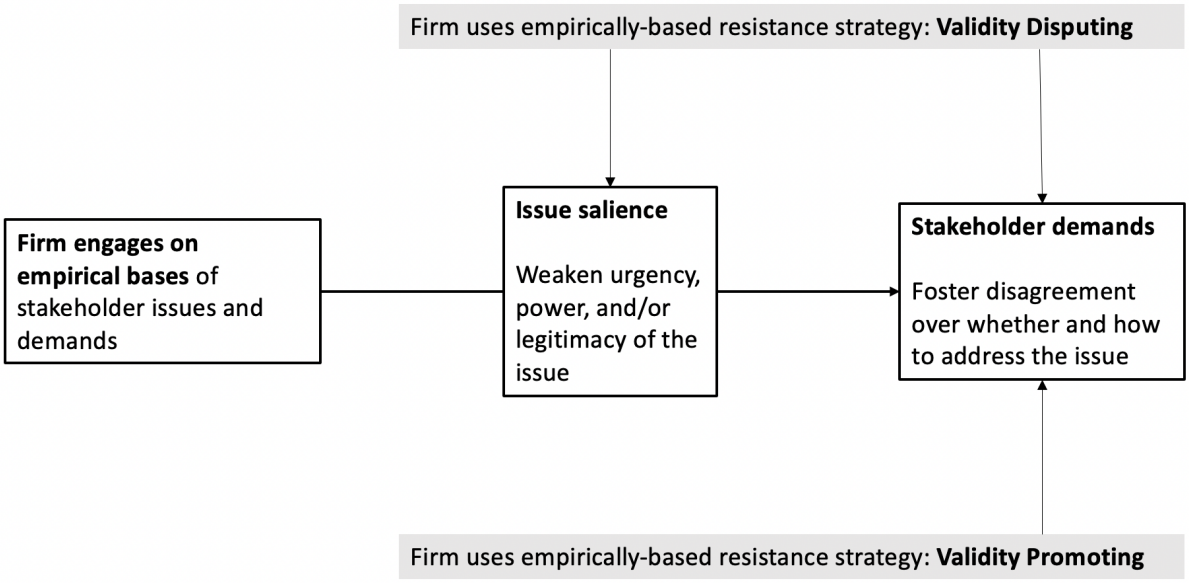

Table 10. Classification of validity disputing tactics

Tactic	Example	Sources
Defiance tactics		
Dismiss	Dismiss validity of empirical evidence if it • Is not generated using the most rigorous methods • Has any weaknesses or limitations • Relies on associations instead of causality	(McGarity & Wagner, 2010; Wagner & Steinzor, 2006)
Challenge	Challenge reliability of empirical evidence • If there are mixed results or null associations in the body of evidence as a whole • Argue that more research is needed to address uncertainties Challenge causality by proposing alternative causes or explanations	(McGarity & Wagner, 2010; Proctor, 2011; Proctor & Schiebinger, 2008; Wagner & Steinzor, 2006)
Attack	Attack credibility of the empirical evidence by • Commissioning critical letters to the editor of scientific journals • Requesting formal review of study data • Using firm-funded think tanks to label empirical evidence as "pseudo-science" • Bringing defamation lawsuits against researchers	(Dunlap & McCright, 2010; Farrell, 2016; McGarity & Wagner, 2010; Wagner & Steinzor, 2006)
Manipulation tactics		
Coopt	Fund the production of favorable empirical evidence or counter-empirical evidence by • Individual academics, university research centers, think tanks, and consultants Advocate for firm-funded scientists to • Write review articles on state of knowledge • Serve on scientific advisory committees • Sit on blue ribbon panels to review specific studies	(Brulle, 2014; Farrell, 2016; McGarity & Wagner, 2010; Oreskes & Conway, 2011; Wagner & Steinzor, 2006)
Manipulate	Exert influence over the selection of research questions, designs, disclosure and interpretation of findings so that firm-funded studies reach pre-determined conclusions	(McGarity & Wagner, 2010)
Control	Ghostwrite publications for submission at peer-reviewed journals that claim to be authored by academics	(Glenna & Bruce, 2021)

Table 11. Comparison of validity disputing and promoting

	Validity Disputing	Validity Promoting
Purpose	To misalign empirical evidence with a set of arguments	To align empirical evidence with a set of arguments
What it does	Sows doubt and fosters confusion and disagreement on the validity of empirical evidence	Draws attention to the firm's preferred means of addressing the issue and substantiates the efficacy and efficiency of this solution with empirical evidence
How it acts on issues	Weakens issue salience by: • Dismissing, challenging, or attacking empirical evidence that supports an issue's urgency, power, or legitimacy • Coopting, manipulating, or controlling the production of counter-empirical evidence	Does not act on issues
How it acts on demands	Sows doubt on the justifications for stakeholder demands by: • Dismissing, challenging, or attacking empirical evidence that supports the efficacy and efficiency of stakeholders' proposed means of addressing the issue and demands on the firm • Coopting, manipulating, or controlling the production of empirical evidence that contradicts the efficiency and efficacy of stakeholders' proposed means of addressing the issue and demands on the firm	Deters stakeholders from making demands on the firm by: • Drawing attention to the firm's preferred means of addressing the issue, the efficiency and efficacy of which are substantiated with empirical evidence • Coopting, manipulating, or controlling the production of empirical evidence that substantiates the efficiency and efficacy of the firm's preferred means of addressing the issue