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The Impact of Media Information on Issue Salience Following Other Organizations' Failures

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Research on organizational decision making seeks to understand how external events shape how organizational decision makers attend to particular issues and allocate scarce resources across the organization's activities. The author investigates whether supplemental information available to decision makers about their own and other organizations impacts this process. He finds that media coverage about particular issues following failures throughout the field can influence decisions regarding resource allocation and that coverage about other organizations may in some cases be more influential than coverage about the focal firm. The study and its findings forward our understanding regarding how organizations scan their environments and how multiple, interacting forms of external information may collectively influence internal organizational processes.

Keywords: *organizational learning; competitive dynamics; behavioral theory; decisions under risk/uncertainty*

Growing research on collective attention focus within organizational learning theory suggests that salient events in an organization's experience or history can affect how organizational decision makers interpret their environments and influence how they allocate attention to, as well as resources for, particular organizational activities (Greve, 2008; Hoffman &

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Ocasio, 2001; March & Shapira, 1992; Ocasio, 1997). Theory in this tradition enhances our understanding of the conditions that prompt organizations' investments in important areas of activity such as capacity growth, strategic change, new product development, and business process refinement (Audia & Greve, 2006; Chen, 2008; Greve, 1998, 2008; Kim, Kim, & Miner, 2009).

An emerging subset of this literature examines specifically how an organization's experience with failures, such as crises, accidents, or earnings shortfalls, can focus collective organizational attention around related issues and motivate resource investments aimed at refining underlying procedures (Audia & Greve, 2006; Nigam & Ocasio, 2010; Rerup, 2009; Sullivan, 2010). However, such direct failures also negatively impact the organization's operations, access to resources, reputation, and relationships. Therefore, research in this stream increasingly examines whether and under what conditions other organizations' failures can influence issue salience, since these external failures stand to direct collective attention toward potential problems without incurring the direct costs of failure (Baum & Dahlin, 2007; Denrell, 2003; Kim et al., 2009).

Despite their strong potential, the ultimate impact of external failures on issue salience within organizations is unclear at best. For instance, information regarding external events can go unnoticed or be prohibitively costly to gather (Rosenkopf & Nerkar, 2001). External information can also be viewed as redundant, less thorough, or irrelevant to the focal organization (March, 1991; Rosenkopf & Almeida, 2003). For these and other similar reasons, the literature on external events and collective attention has found wide variation in the rates at which external failures affect attention focus and resource investment within organizations (Denrell, 2003; Kim & Miner, 2007; Srinivasan, Haunschild, & Grewal, 2007; Terlaak & Gong, 2008).

To address this tension, I turn attention toward how supplemental information regarding external events can influence their salience and impact on organizational processes. Direct observation of external events is not the only source of information available to organizational decision makers. Organizations also receive supplemental information about external events from customers (Lapre & Tsikriktsis, 2006), employees (Arthur & Huntley, 2005), investors (Pollock & Rindova, 2003), the media (Rindova, Pollock, & Hayward, 2006; Sutton & Galunic, 1996), and a myriad of other sources (Haunschild & Beckman, 1998; Hoffman & Ocasio, 2001; Ocasio, 1997). If these supplemental sources provide additional information regarding external events, then the nature and content of that information could influence how external events are viewed by organizational decision makers and moderate the ultimate impact of external events on issue salience and resource allocation within organizations. Little research in this tradition explores the impact of supplemental information, and a more direct examination will improve our understanding of whether, why, and how particular external events shape activity within organizations (Haunschild & Beckman, 1998).

To that end, the present study takes a novel theoretical approach. I adopt agenda-setting theory, relatively new to the organizational literature but common to research on issue salience in the literature on media communication (McCombs & Shaw, 1993; Meijer & Kleinnijenhuis, 2006; Pollock & Rindova, 2003). I use agenda-setting theory to argue that supplemental information, and specifically information from media communication about a particular issue, influences the issue's salience and affects the ultimate impact of related

external events on organizational resource allocation decisions. I also extend agenda-setting theory to argue that media information about a particular issue pertaining to other firms is more influential than media information pertaining to the focal firm. Associated hypotheses are tested on a panel of railroad transportation companies by examining how media information regarding accidents moderates the relationship between external accidents and decisions by an organization's own members regarding how to allocate resources to safety and accident prevention.

Collectively, this perspective builds our understanding of external events and their influence on organizational activity. It is generally recognized that organizations' environments are replete with information and that organizational efforts to scan the environment are often constrained by this information overload (Cyert & March, 1963; March & Simon, 1958). This study's framework proposes that supplemental information helps to simplify the decision-making environment by affecting the salience of, and directing collective attention toward, particular external events. Conversely, the framework implies that the absence of supplemental information could lead decision makers to overlook potentially important events in their environment, given that these and other forms of external information compete for organizational attention (Hoffman & Ocasio, 2001; Ocasio, 1997). These and related implications are discussed following presentation of the study's findings.

Theory and Hypotheses

Research suggests that an organization's own experience, as well as observations of other organizations' activities, shapes what issues are seen as salient by organizational decision makers (Cyert & March, 1963; Levitt & March, 1988). According to this literature, external events influence issue salience and organizational action because those events shape how decision makers allocate their collective attention across various issues or categories of performance (March & Olsen, 1976; March & Shapira, 1992; Ocasio, 1997; Weick, 1979). Specifically, individuals within organizations face more environmental stimuli than it is possible to cognitively process (March, 1988; March & Simon, 1958). To resolve this problem and reduce cognitive overload, individuals choose how to allocate their attention across stimuli in order to make sense of their environments (Weick, 1979, 1995). This attention allocation process is influenced by individual and situational factors (March & Shapira, 1987, 1992; Nutt, 2005). At the organizational level, for example, the firm's recent experience and events in its external environment affect how organizational decision makers allocate their attention, with some research finding a tendency to emphasize particular issues or categories of performance that have recently been highlighted by internal or external events (Audia & Brion, 2007; Greve, 2008; Kassinis & Vafeas, 2006; Marcus & Nichols, 1999; Ocasio, 1997).

Work in this tradition has extended this perspective to understand how events shape organizational actions, such as resource allocation, by emphasizing the situated nature of cognition within organizations (Hoffman & Ocasio, 2001; Ocasio, 1997; Ross & Nisbett, 1991). *Situated cognition* refers to the fact that the attention of organizational participants toward particular issues exists above the individual level and is situated within the channels of

communication and interaction through which they relate. This suggests that attention focus is partly a collective attribute, correlated across individuals within the organization. Therefore, how coalitions of decision makers and other organizational agents choose to allocate resources among activities, how they decide which organizational activities to emphasize, and how these activities are ultimately executed are largely a function of how collective attention is allocated, and this in turn is shaped by the organization's own experience as well as its observation of external events (Hilgartner & Bosk, 1988; Hoffman & Ocasio, 2001; Ocasio, 1997; Sullivan, 2010).

This process of collective attention focus, through which external events affect organizational action, may be influenced by supplemental information regarding those events. *Supplemental information,* in this context, refers to information that is accessed by the organization regarding a particular issue but that is separate from direct observation of how other organizations approach the issue or perform with respect to related outcomes (Haunschild & Beckman, 1998; Hoffman, 1999). This supplemental information is conceptually distinct from information gained through direct observation because it often conveys the views of third parties outside of the observing and observed organizations, and it may either reinforce or conflict with findings from direct observation (e.g., Haunschild & Beckman, 1998; Pollock & Rindova, 2003; Rindova et al., 2006). For example, while organizational agents can seek information about other organizations' failures through direct observation, they also may seek supplemental information about those failures through indirect channels, such as interlocks and common stakeholders or by observing the interventions of third parties (Carroll, Rudolph, & Hatakenaka, 2002; Rosenkopf & Nerkar, 2001). This study's theoretical framework refers specifically to supplemental information provided through the media, meaning information communicated through various media channels regarding organizations and their performance with respect to particular issues (Bansal & Clelland, 2004; Deephouse & Carter, 2005). Media discourse is important to study in its own right, as it broadly reflects how the organization is viewed by prominent external stakeholders and, given its visibility, also helps to shape those external evaluations (Deephouse, 1996; Pollock & Rindova, 2003; Rindova et al., 2006).

Media information, and supplemental information more generally, likely influences whether external events are noticed and how these events ultimately impact issue salience as well as organizational action. However, to understand the exact nature of this process, and to situate the present study relative to prior work, we must first return to the theoretical mechanisms through which external events impact collective attention. It is generally recognized that how organizations incorporate and act upon external information is largely constrained by where decision makers allocate their attention, and to that end Ocasio (1997) distinguishes between attention toward particular organizational issues (such as notable events or important categories of performance) and organizational answers (such as particular choices, actions, or solutions to performance challenges).

Somewhat surprisingly, past research on supplemental information has largely focused on answers rather than issues—that is, on whether and how supplemental information, such as information obtained through the media, might provide solutions to specific performance challenges—while more generally assuming that organizational decision makers understand and agree on which types of performance merit attention to begin with. For example,

Schwab (2007) found that organizations integrated local as well as external information to determine how to streamline a particular innovative practice in order to enhance its effectiveness, and Haunschild and Beckman (1998) found that information from a variety of sources affected organizations' strategic choices regarding how to grow most effectively through their acquisitions.

In contrast to prior approaches, which typically examine how supplemental information directs attention toward particular answers or solutions, I examine the process through which media information can focus attention around issues more generally. This approach does not presume that information communicated through the media is rich, knowledge intensive, or accurate. Rather, I argue that media information may communicate the general salience or importance of particular issues to organizational decision makers, as it reflects how prominent external stakeholders view those issues relative to other issues within the field (Hoffman & Ocasio, 2001; Pollock & Rindova, 2003).

The research reviewed above generally recognizes that organizational decision makers cannot attend equally to all events in their environments (Hoffman & Ocasio, 2001; Ocasio, 1997). Organizations may not have ample resources to thoroughly scan their environments, and without sufficient motivation, the exploration for new information tends to be relatively localized (Rosenkopf & Almeida, 2003; Rosenkopf & Nerkar, 2001). Therefore, organizations' collective awareness of other organizations' failures may be intermittent, as some external failures are too small to notice or are deemed unimportant (Denrell, 2003). Given this limitation, supplemental information indicating that a particular issue or category of performance is important to external stakeholders throughout the field likely directs decision makers' attention toward that issue within their own organizations and also directs their search for information regarding other organizations' performance with respect to that issue. This agenda-setting function of media information is explicated in greater detail below.

Agenda Setting and External Information

Agenda-setting theory is common to research on media influence in political science, sociology, and mass communications (Erbring, Goldenberg & Miller, 1980; Petrocik, 1996) and is increasingly incorporated into organizational research (Meijer & Kleinnijenhuis, 2006; Pollock & Rindova, 2003). Agenda-setting theory argues that, rather than merely transmitting information, media communication can leave an imprint of its own on political and social processes by impacting the nature of discourse and action within fields (Hoffman, 1999; Meijer & Kleinnijenhuis, 2006).

Most notably, agenda-setting theory implies that media communication shapes the agendas of decision makers by influencing what issues, activities, and events are seen as salient (Meijer & Kleinnijenhuis, 2006; Pollock & Rindova, 2003). While decision makers must attend to a variety of organizational activities that compete for attention and resources (Hoffman & Ocasio, 2001; Ocasio, 1997), media communication provides information regarding which activities are prioritized by influential external constituents (Deephouse & Carter, 2005). Not all constituents' viewpoints are reflected in media discourse, however; organizations that do not effectively respond to issues or challenges communicated through

the media may substantially damage their reputations and lose access to critical resources, making it even more difficult to satisfy other constituents' demands (Elsbach, Sutton & Principe, 1998; Suchman, 1995).

Prior research on media communication suggests that both the volume and tenor of media coverage about a particular issue convey information to organizational decision makers (Bansal & Clelland, 2004; Deephouse, 1996; Pollock & Rindova, 2003). However, tenor is more appropriate (than volume) to agenda-setting theory and to theory regarding issue salience. Media communication that reflects negative or unfavorable viewpoints regarding organizational failures tends to be more investigative in nature and less likely to passively support public image management efforts undertaken by poorly performing organizations (Sutton & Galunic, 1996). In contrast, extremely favorable media coverage tends to overattribute causes of failures to forces outside of organizational control and provides less direct information to other organizations as a result (Rindova et al., 2006).

More specifically, negative media coverage about the focal organization's performance on a particular issue or dimension indicates to decision makers that the issue is salient to external constituents and that the organization's performance with respect to that issue is unsatisfactory. Various responses are possible in this situation. For example, organizations with limited resources or other constraints may attempt to shift external constituents' evaluations by managing their own public images (Elsbach et al., 1998; Greening & Gray, 1994). However, when controlling for resource differences, decision makers confronted with poor external evaluations regarding a particular issue will likely shift their attention to that issue and attempt to allocate resources toward examining and resolving the organization's performance with respect to the issue, since inaction or the inability to satisfy external observers could impact the organization's or entire field's future activities or access to resources (Cyert & March, 1963; Greve, 1998; Suchman, 1995).

In this case, negative media coverage about a particular issue enhances the salience of other organizations' performance with respect to that issue. Since unfavorable media coverage alerts organizational decision makers that the specific issue is seen as important to observers throughout the field, decision makers will become more likely to focus on the issue and to benchmark their own organization's performance, relative to peers, on that issue. Investments aimed at improving the firm's performance become more likely when many other organizations are experiencing similar failures on a salient issue, since this benchmarking process reveals flaws in common routines, technologies, or procedures in use throughout the field (Baum & Dahlin, 2007; Carroll et al., 2002; Haunschild & Sullivan, 2002). Therefore, the agenda-setting perspective implies that media information about a particular issue raises the issue's salience, directs the organization's efforts to scan the external environment for related information, and enhances the impact of other organizations' failures on the organization's own resource allocation decisions.

Hypothesis 1a: Other organizations' failures on an issue will lead to greater increases in resources allocated toward improving the organization's own performance on that issue when negative media coverage about the issue at the focal organization is high rather than when it is low.

Comparably, negative media evaluations regarding other organizations across the field would similarly enhance issue salience. Negative media coverage about other organizations across the field indicates not only that a particular issue is salient to external constituents but also that comparable organizations are performing poorly with respect to the issue. When this supplemental information is combined with direct observation of poor performance across the field, organizational decision makers may presume that media scrutiny or other negative attributions could spill over to the focal organization unless proactive steps are taken to examine the issue or address the organization's own performance on the issue (Jonsson, Greve, & Fujiwara-Greve, 2009; Yu, Sengul, & Lester, 2008). Thus, the agenda-setting perspective suggests that negative media coverage regarding other organizations' performance on an issue will enhance the relationship between other organizations' failures on that issue and the organization's own resource investments, since media coverage indicates that the issue or dimension of performance is viewed as important by prominent constituents throughout the field.

Hypothesis 1b: Other organizations' failures on an issue will lead to greater increases in resources allocated toward improving the organization's own performance on that issue when negative media coverage about the issue at other organizations is high rather than when it is low.

Negative media evaluations of other organizations may also enhance issue salience and resource allocation through another mechanism, also consistent with agenda-setting theory. Research on agenda setting decomposes media coverage into two distinct components, issues and entities (Meijer & Kleinnijenhuis, 2006). Media coverage regarding a particular issue enhances the salience of that issue to organizational decision makers, as described above. However, media coverage is also heterogeneous across the organizational field, with some organizations receiving more coverage than others. This entity-specific component of media information can be used by organizational decision makers to direct their external scanning efforts. Following failures across the organizational field, organizations that receive a disproportionate share of negative media evaluations are likely those that most notably violate, or are anticipated to violate, external constituents' expectations about what actions are viewed as appropriate (Deephouse & Carter, 2005; Suchman, 1995). As decision makers often lack sufficient resources to thoroughly scan the entire environment (Cyert & March, 1963), negative media evaluations of other organizations can be used to direct searches for information about external failures across the interorganizational field.

While the issue-specific component of media information is available through media coverage about the focal organization as well as about other organizations across the field, the entity-specific component is available only through media coverage involving other organizations. That is, the focal firm's media coverage can indicate the salience of particular issues but cannot easily indicate where in the organization's environment to look for information, while media coverage about other firms can indicate issue salience as well as direct attention to specific firms across the field. Because agenda-setting theory forwards this additional mechanism with respect to others' media coverage, I propose that the influence of others' media coverage will outweigh the influence of a focal firm's own media coverage.

Hypothesis 2: Negative media coverage about others will increase the relationship between other organizations' failures and the organization's own resource allocations more strongly than negative media coverage about the focal organization.

It is important to note that media coverage may be influenced or driven by failures (Elsbach et al., 1998; Greening & Gray, 1994), and the present study's theoretical framework allows for this possibility. In this study's setting as well as in other contexts, media coverage may reflect facts directly associated with failures, such as their severity or the visibility of involved organizations. However, media coverage is also known to convey the opinions and preferences of external third parties as well as to attribute importance and blame for failed actions in its own right (Erbring et al., 1980; Meijer & Kleinnijenhuis, 2006). Thus, while media coverage serves in part to convey information directly associated with failures, it also introduces and incorporates new information into these transmissions. This latter process has received much attention in research on agenda setting and also is the focus of the present study's theoretical framework (Erbring et al., 1980; Petrocik, 1996; Pollock & Rindova, 2003). The direct relationship between failures and media coverage is controlled in this study's empirical analysis and also addressed through supplemental tests, as described below.

Method

Sample and Data

I tested these hypotheses on a panel of all U.S. class I railroad firms operating at any point between 1979 and 2003. The U.S. railroad industry began deregulating in the late 1970s, making prior years incomparable (deregulation was completed with implementation of the Staggers Act between 1980 and 1981; excluding these years did not alter results). Class I railroads engage in freight or passenger transport; this excludes firms that focus on ancillary services. Firms are grouped based on their revenues, with class I carriers accounting for over 95% of the industry's traffic (*Railroad Ten-Year Trends,* 1984). There were a total of 36 class I carriers in 1979; the number declined to 7 by 2003 primarily as a result of mergers or exits. The unit of analysis is the company-year, with a total of 427 company-years in the sample. Most data come from the annual *Analysis of Class I Railroads,* published by the Association of American Railroads. An analysis of media reports was also conducted, as described below.

Measures

The study's theoretical framework seeks to predict resource allocations aimed toward examining and improving organizational performance on a particular issue or dimension of performance. I focus on accident performance (i.e., safety) in the study's empirical context. In the railroad industry, accidents are a clear indication of performance failure because they indicate the inability to transport freight or passengers on schedule and without damage,

injury, or loss. Theoretical literature in this tradition provides little guidance regarding the types of resource investments that are aimed toward accident prevention and safety enhancement, and I rely instead on prominent safety-oriented investment decisions in the study's empirical context. Specifically, I independently examine two forms of resource allocation, rail replacement and reported system maintenance, each described below.

Rail replaced per track mile. The study's first dependent variable estimates the average tons of rail replaced per mile of railroad track within the focal organization's rail system. This is a particularly sensitive indicator of maintenance actions over which railroad decision makers exert direct control, since rail metal receives substantial wear and is among the most frequently replaced components of railroad systems (Oaks, 1999). This measure is also beneficial in that it excludes rail metal added through system expansions, instead focusing directly on the amount of resources devoted toward improving system safety performance through efforts to reduce and repair track defects or upgrade existing rail lines.

Reported system maintenance. The rail replacement variable is a particularly sensitive indicator of resource allocation decisions, but it also represents a relatively narrow perspective on resources devoted to system safety enhancement since it focuses on only one component of the organization's rail system. Therefore, another dependent variable was constructed to estimate the number of reported initiatives undertaken by the organization related to system safety, maintenance, accident reduction, or related performance improvements. These included any major facility enhancements, equipment improvements, implementations of new rail technologies, or other initiatives that primarily focused on safety rather than on other efforts (such as capacity expansion) as reported by the organization.

This variable was developed by reviewing the organization's press releases related to safety, obtained through searches of the Lexis Nexis media database, which provides broad coverage of railroad organizations' press releases over the study period. These searches were limited to press releases that contained safety-related keywords such as *collision, accident, derailment, injuries, fatalities,* or *hazardous materials spill*. Organizations clearly described efforts to undertake major system upgrades or other initiatives in these press releases and also typically indicated the primary purpose of these initiatives, allowing differentiation between efforts to enhance system safety and initiatives instead directed primarily toward capacity expansion or other primarily nonmaintenance efforts. This dependent variable equals the number of distinct safety-related initiatives reported by the focal firm during the year.

Railroad organizations do not typically issue press releases for minor changes; however, they have an incentive to publicly disclose major system repairs and other broad safety-related upgrades, since railroads are commonly evaluated by freight shippers and other customers based on their abilities to deliver shipments on time and without damage or loss. Therefore, while these public relations efforts may not reveal the entirety of organizations' safety initiatives, they are important in their own right since they indicate major system initiatives that organizational decision makers desire to communicate to their external constituents. When combined with analyses using the more direct measure of rail replacement, described above, this approach provides a robust understanding of organizational decision makers' safety-related resource allocations.

Others' accident experience. The primary independent variable estimates a focal organization's experience gained by observing others' accidents across the field, and the study's hypotheses are tested by interacting this variable with media information variables, described below. Railroads are required to report all accidents that result in fatalities, significant injuries, or property damage above an established threshold value (Federal Railroad Administration, 2003). Reportable accidents include, but are not limited to, collisions, derailments, and similar incidents involving the operation of on-track equipment, as well as impacts between railroad equipment and pedestrians or motorists.

Evidence regarding external events and collective attention in the organizational learning literature consistently suggests that the impact of external events on collective attention, resource allocation, and related organizational outcomes tends to accumulate over time, such that organizations may be influenced by recent events as well as events in their more distant history (Argote, Beckman & Epple, 1990; Arthur & Huntley, 2005; Baum & Ingram, 1998; Haunschild & Sullivan, 2002). Furthermore, the strength of this impact may depreciate over time (Haunschild & Sullivan, 2002). Therefore, analyses were conducted to determine whether the impact of information from external events depreciates over time and to estimate an appropriate rate of depreciation in order to appropriately construct the others' accident experience variable. The present study follows a commonly accepted methodology developed by Argote et al. (1990) that depreciates this impact over an organization's entire history by a fixed parameter each year and uses an iterative procedure to estimate that parameter (see also Arthur & Huntley, 2005; Darr, Argote, & Epple, 1995). This parameter is referred to as lambda, and the related index is constructed as

$$\text{INFO}_{i,t} = (\text{lambda} \times \text{INFO}_{i,t-2}) + \text{EXPERIENCE}_{i,t-1}. \quad (1)$$

In this formula, $\text{INFO}_{i,t}$ is the measure of information retained through others' accidents for company i using the retention parameter lambda, which must be between 0 and 1. $\text{EXPERIENCE}_{i,t-1}$ is the number of others' accidents (excluding focal company i) in period $t - 1$. In the extreme case of full information depreciation, the retention parameter lambda is set to 0 and $\text{INFO}_{i,t}$ is equal to the number of others' accidents (excluding focal company i) in the prior period. In the opposite case of full information retention, lambda is set to 1 and $\text{INFO}_{i,t}$ is the cumulative sum of accidents across the field (excluding company i) over all prior periods. To determine the most appropriate rate for depreciation, base regression models were estimated under varying values of lambda (following Argote et al., 1990; Arthur & Huntley, 2005). These models included the others' accident experience variable but were otherwise identical to the first model used in the analyses below including only control variables (Table 2, Model 1). These preliminary models were repeatedly estimated under values of lambda ranging from 0 to 1 in .01 intervals, and model fitness was compared to obtain the value of lambda that led to the highest explanatory power (Argote et al., 1990; Arthur & Huntley, 2005). This resulted in a lambda value of .68, meaning that approximately 68% of the impact of others' accidents persists from one year to the next. This lambda value was used to calculate the variable estimating experience with others' accidents, using the formula described above.

Own and others' unfavorable media coverage. To estimate the negative (i.e., unfavorable) tenor of media coverage, I conducted a content analysis following methodology employed by prior research on media tenor (Bansal & Clelland, 2004; Deephouse, 1996; Deephouse & Carter, 2005). Specifically, I collected a stratified random sample of all print media pertaining to the company panel, using the Factiva news media database, which I chose for its balanced coverage of national, regional, and local publications during the study period. All articles entered the sampling scheme if the relevant company name appeared anywhere and the article was an editorial, letter to the editor, commentary, or front-page story, since these represent media content items with high visibility and broad readership (Deephouse, 1996; Deephouse & Carter, 2005). I also randomly sampled 33% of general news stories within each company-year if the relevant company name appeared in the headline or lead paragraph. When fewer than 5 articles were available in any company-year, I collected all articles to increase accuracy. This procedure yielded 4,828 articles.

The study's theoretical framework specifies media information related to the particular issues surrounding failure. As failures are defined as accidents in this empirical context, articles broadly pertaining to safety, accidents, and related issues were isolated from the larger media database. An iterative search procedure was used to separate articles if they contained keywords such as *collision, accident, derailment, injuries, fatalities,* or *hazardous materials spill*. Convenience samples of articles were reviewed to revise the procedure. Following these iterations, I reviewed each of the 4,828 articles to either confirm or revise its selection or exclusion. A colleague also reviewed 12% (597) of the articles, selected randomly. In all cases, this review confirmed results of the keyword search. Collectively, this procedure identified 705 articles that discussed safety issues pertaining to the company panel.

Each article discussing safety issues was rated as endorsing the focal railroad company's safety practices, criticizing its safety practices, or neutral in content. Articles were rated as critical when they presented evidence that a company's safety procedures or performance were being challenged by any of a company's stakeholders (e.g., regulators, proximate communities, employees, suppliers). Examples include reports regarding faulty accident investigations, community concerns regarding dangerous rail crossings, and customer concerns regarding shipments delayed by accidents. Articles were instead recorded as favorable if they presented endorsements of a company's safety practices or performance, such as favorable reports of safety-related innovations, accolades for a strong safety record, and other presentations of favorable public opinions regarding rail safety. If an article presented favorable and unfavorable evidence, it was evaluated for a main stance or coded as neutral if a main stance could not be discerned. I read and coded all sampled articles. A colleague used the same coding scheme on 12% (83) of the articles, selected randomly. The two raters agreed on 80 of the 83 coding units (96%), resulting in a Cohen's kappa of .90, which suggests high intercoder reliability (Weber, 1990).

The variables estimating own and others' negative (unfavorable) media coverage use the results of this content analysis. Following prior research on media tenor (Bansal & Clelland, 2004; Deephouse, 1996), I constructed a proportional measure of unfavorable to favorable media articles for each company during each observation year. In the following formula, n is the annual number of negatively toned articles discussing safety issues, p is the annual number of positively toned articles, and t is $n + p$.

$$\text{UNFAVORABLE COVERAGE} = \begin{cases} (n^2 - np) / t^2 \text{ if } n > p \\ (np - p^2) / t^2 \text{ if } p > n \\ 0 \text{ if } n = p. \end{cases} \quad (2)$$

The resulting variable has several beneficial attributes. It ranges from –1 to 1, with higher (more positive) values indicating a greater proportion of negatively toned articles, lower (more negative) values indicating a greater proportion of positively toned articles, and values near zero indicating comparable or low levels of either activity. Thus, the resulting variable directly accounts for the unfavorability of media discourse pertaining to the focal firm (Bansal & Clelland, 2004; Deephouse, 1996). The variable estimating others' negative media coverage is the average of this proportional variable across other companies (excluding the focal company).

Control variables. Past research and industry characteristics suggest a number of relevant controls. An organization's own failures can affect resource allocations; thus, I control for the focal firm's own number of accidents in the prior period (Baum & Dahlin, 2007; Haunschild & Sullivan, 2002). Accident severity can also influence media coverage as well as resource allocations outside of the study's theorized relationships; thus, variables control for the average number of people (employees or civilians) injured or killed for each of the organization's own accidents as well as across other organizations' accidents, respectively. Organizations with larger maintenance functions likely vary in their propensities to undertake maintenance initiatives; therefore, I control for the organization's maintenance intensity, or its ratio of expenditures on equipment and track maintenance or accident prevention to revenue from train operations. I also control for the total number of press releases issued by the focal organization and pertaining to safety, since higher values on this variable may reflect firms with greater public relations intensity rather than more frequent safety-related initiatives or may otherwise indicate organizations' efforts to influence public opinion regarding related issues throughout the field.

In addition, media articles appearing in high-visibility outlets or articles with broad distribution (such as those issued by wire agencies) may spark broader interest than less prominent articles. Thus, I control for the ratio of media articles about the focal firm that appear in high-visibility outlets such as the *New York Times* and the *Wall Street Journal*, as well as wire sources such as the Associated Press Newswires and Business Wire, to the total number of media articles about the focal firm. A similar variable controls for fieldwide media visibility using articles about all other firms across the field.

I also control for the organization's age, since age-dependent inertia can influence resource allocation (Hannan, 1998). In addition, while all railroads in the sample operated freight services, some firms also transported passengers. Passenger transportation requires different infrastructure investments and safety procedures, and firms operating passenger services may differ in their rates of safety investment independent of the theorized processes. Thus, a ratio of passenger transportation revenue to total transportation revenue controls for each railroad company's passenger service mix. Financial performance may also influence

resource investment; therefore, the present study controls for each firm's return on assets. Consolidation is one of the most prominent trends in the deregulated rail industry and may influence safety investment. Thus, a mergers and acquisitions variable controls for the number of consolidated entities that comprise each railroad company, since the activity of large conglomerates may be constrained by inertia. A year variable was included to control for the influence of changes affecting the entire industry linearly over time, such as shifts in density, demand, and regulatory standards, which could each influence resource allocation processes. Finally, as railroads operating in different regions face different regulatory and community pressures, a categorical variable controls for each railroad firm's primary geographic region of operation (following a common classification system; see *Railroad Ten-Year Trends,* 1984).

Following established methodology in this area of research, all independent and control variables were lagged to reduce the possibility of reverse causality (Baum & Dahlin, 2007; Greve, 1998; Haunschild & Sullivan, 2002). Thus, analyses examine the influence of covariates on resource allocations made during the next period. This is an appropriate approach in the study's empirical context since shifts in railroads' resource allocation patterns typically take time to implement, given the capital intensive nature of such investments (Oaks, 1999).

Analysis

I estimated models on the pooled data set with an observation for each railroad company in each year it operated between 1979 and 2003. Using ordinary least squares regression to conduct estimations with panel data may yield biased estimates since repeated observations for the same panel members are pooled over time. Therefore, feasible generalized least squares regression was employed to estimate rail replaced per track mile, as this estimation method corrects for the bias (Baltagi & Wu, 1999). Models estimating reported system maintenance instead use random-effects negative binomial regression since this dependent variable is a count variable approximating the negative binomial distribution, making feasible generalized least squares regression inappropriate (Wooldridge, 2002).

Results

Descriptive statistics and correlations are shown in Table 1. The high negative correlation between others' accident experience and year ($r = -.86$) was expected, given that safety innovations reduced accident frequencies across the industry over time. In addition, a fairly high positive correlation exists between year and others' unfavorable media coverage ($r = .77$), as well as a moderate negative correlation between others' unfavorable media coverage and others' accident experience ($r = -.69$).

Each of these correlations could potentially introduce multicollinearity problems, as the influence of each predictor becomes difficult to isolate. To address this possibility, models were hierarchically nested and model fit statistics, such as likelihood ratio tests, are reported since these tests are not affected by the presence of multicollinearity (Wooldridge, 2002).

Results of the analyses estimating rail replaced and reported system maintenance are presented in Table 2. Models 1 through 3 estimate rail replaced and Models 4 through 6 estimate

Table 1
Descriptive Statistics and Correlations (n = 423)

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Rail replaced per track mile	4.79	3.48																	
2. Reported system maintenance	0.55	1.49	−.12																
3. Others' accident experience	9.40	0.43	.16	−.45															
4. Unfavorable media coverage	0.26	0.49	−.09	.11	−.24														
5. Others' unfavorable media coverage	0.26	0.16	−.13	.30	−.69	.13													
6. Own accidents	218.05	252.87	.02	.21	−.16	.15	−.03												
7. Own injuries per accident	0.32	2.61	.01	−.01	−.05	.00	.13	−.04											
8. Others' injuries per accident	0.19	0.10	−.06	.15	−.32	.11	.30	.12	.01										
9. Maintenance intensity	36.79	12.57	.05	−.12	.12	.00	−.07	.08	−.02	−.04									
10. Safety press releases	0.32	1.13	−.06	.50	−.38	.18	.16	.24	−.01	.03	−.06								
11. Own media visibility	0.46	0.35	.23	−.13	.37	−.14	−.16	−.02	−.03	−.25	−.04	−.14							
12. Others' media visibility	0.47	0.23	.05	−.18	.63	−.07	−.27	−.15	−.07	−.43	.07	−.15	.55						
13. Age	102.80	39.20	−.02	−.10	−.03	.01	.05	−.27	.01	.03	.12	−.01	−.08	.00					
14. Passenger revenue ratio	0.01	0.08	.16	−.05	.10	.03	−.11	.01	.01	−.01	.18	−.03	−.05	.00	.09				
15. Return on assets	3.67	3.15	.10	.07	−.11	.02	.05	−.06	.00	.01	−.61	−.01	.08	−.14	−.14	−.15			
16. Consolidated entities	0.04	0.20	−.03	.15	−.10	.14	.11	.12	−.01	.05	−.02	.18	−.01	−.01	−.01	−.03	−.03		
17. Year	1,987.21	6.82	−.15	.46	−.86	.25	.77	.03	.12	.24	−.16	.38	−.19	−.29	.09	−.12	.14	.11	
18. Region (East, West, South)	1.60	0.61	−.16	−.04	.11	−.03	−.07	−.17	.04	−.08	−.04	−.09	−.07	.02	−.03	.04	.01	−.03	−.07

reported system maintenance. For the models estimating rail replaced, Model 1 includes only controls. Model 2 adds the variables for others' accident experience, unfavorable media information covering the focal firm, and unfavorable media information covering other firms. Preliminary models adding each variable (and its respective interaction term) separately yielded similar results, and no hypothesis tests were affected. Model 3 adds the interaction between others' experience and the focal firm's unfavorable media coverage, as well as the interaction between others' experience and other firms' unfavorable media coverage. Again, preliminary models added each interaction term separately, and no hypothesis tests were affected.

The interaction between others' accident experience and the focal firm's unfavorable media coverage is positive in Model 3, consistent with theory; however, it is not significant. Therefore, support for Hypothesis 1a cannot be inferred through this model. However, the interaction between others' accident experience and others' unfavorable media coverage is positive and significant in Model 3. As accidents across the field increase, organizations increase their own rate of rail replacement more steeply when more unfavorable media coverage exists across the field than when less coverage exists across the field. This finding provides support for Hypothesis 1b.

Model 4 in Table 2 estimates reported system maintenance and includes only controls. Model 5 adds main effects, and Model 6 includes the interactions between others' accident experience and own or others' unfavorable media coverage, respectively. Preliminary models adding each term separately yielded nearly identical results, with no hypothesis tests affected. In Model 6, the interaction between others' accident experience and own unfavorable media coverage again exerts a positive but nonsignificant effect, and the interaction with others' media coverage is again positive and significant. Therefore, findings across the models in Table 2 provide strong support for Hypothesis 1b but fail to support Hypothesis 1a.

Finally, Hypothesis 2 predicts that the effect of others' accident experience will be more steeply moderated by others' unfavorable media coverage than by unfavorable media coverage about the focal organization. The interaction term including others' media coverage in Model 3 is more positive than the interaction term including focal media coverage, but this difference is only marginally significant at the $p < .10$ level, $\chi^2(1) = 3.72$, $p = .054$. The interaction with others' media coverage in Model 6 is also more positive than the interaction including focal media coverage, and again this difference is also only marginally significant, $\chi^2(1) = 3.63$, $p = .057$. While these findings do not provide strong support for Hypothesis 2, they are consistent with the theory motivating Hypothesis 2 and are generally indicative of the need to replicate these tests in other empirical contexts.

To aid in interpreting this study's results, Figures 1 and 2 plot the significant interactions from Models 3 and 6 in Table 2, respectively. Figure 1 plots the interaction between others' media coverage and others' accident experience from Model 3. The slope difference is slight but discernible, with more unfavorable media coverage associated with steeper increases in rail replacement as others' accidents increase. Figure 2 plots the interaction between others' media coverage and others' accident experience based on results in Model 6 and similarly displays a steeper increase in the relationship between others' accidents and reported system maintenance as others' unfavorable media coverage increases.

Table 2
Regression Models of Rail Replaced or Reported System Maintenance

	FGLS Regression Models of Rail Replaced per Track Mile			Negative Binomial Regression Models of Reported System Maintenance		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Others' accident experience		2.669	3.588*		–1.681*	–1.265
		(1.434)	(1.494)		(0.787)	(0.807)
Unfavorable media coverage		–0.135	–0.044		–0.012	0.329
		(0.296)	(0.319)		(0.163)	(0.374)
Unfavorable Media Coverage × Others' Accident Experience			0.337			0.724
			(0.742)			(0.675)
Others' Unfavorable Media Coverage		0.630	3.715		–0.175	3.225
		(1.345)	(2.006)		(0.583)	(1.652)
Others' Unfavorable Media Coverage Others' Accident Experience			7.204*			5.886*
			(3.507)			(2.672)
Own accidents	0.000	0.000	0.000	–0.001	–0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Own injuries per accident	0.040	0.022	0.020	–0.070	–0.064	–0.106
	(0.054)	(0.055)	(0.054)	(0.145)	(0.172)	(0.330)
Others' injuries per accident	–1.060	–1.514	–1.270	0.197	0.666	0.652
	(1.580)	(1.596)	(1.592)	(0.456)	(0.507)	(0.527)
Maintenance intensity	0.009	0.009	0.010	0.015	0.012	0.009
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.016)
Safety press releases	0.000	0.028	0.027	0.099*	0.088*	0.074
	(0.151)	(0.153)	(0.153)	(0.038)	(0.039)	(0.041)
Own media visibility	1.952***	1.846**	1.749**	0.413	0.184	0.144
	(0.545)	(0.548)	(0.547)	(0.410)	(0.431)	(0.427)
Others' media visibility	–1.627	–3.541*	–3.673**	–0.041	1.252	1.065
	(0.918)	(1.417)	(1.412)	(0.985)	(1.202)	(1.262)
Age	0.000	–0.001	0.000	–0.011	–0.010	–0.011
	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)
Passenger revenue ratio	8.533**	8.417**	8.631**	–16.495	–16.138	–16.361
	(2.694)	(2.656)	(2.657)	(16.315)	(15.667)	(16.205)
Return on assets	0.080	0.073	0.084	0.076	0.069	0.062
	(0.067)	(0.067)	(0.067)	(0.056)	(0.056)	(0.056)
Consolidated entities	0.118	0.092	0.188	0.224	0.263	0.289
	(0.638)	(0.643)	(0.643)	(0.293)	(0.289)	(0.300)
Year	–0.049	0.064	0.074	0.164***	0.103**	0.112**
	(0.037)	(0.082)	(0.082)	(0.026)	(0.039)	(0.039)
Region = East	–1.685***	–1.760***	–1.785***	–0.277	–0.012	–0.028
	(0.482)	(0.475)	(0.475)	(0.514)	(0.532)	(0.546)
Region = South	–0.191	–0.329	–0.165	–17.636	–17.121	–17.826
	(0.897)	(0.887)	(0.888)	(3915.177)	(3928.393)	(7903.953)
χ^2	44.14***	49.94***	54.65***			
Log likelihood				–264.41	–261.98	–258.89
Likelihood ratio					4.87	6.17*
df (vs. model number)					3 (Model 5)	2 (Model 6)

Note: For Models 1-3, $n = 423$; for Models 4-6, $n = 427$. Standard errors are in parentheses. FGLS = feasible generalized least squares regression.
*$p < .05$. **$p < .01$. ***$p < .001$.

Figure 1
Moderation of Others' Unfavorable Media Coverage on Effect of Others' Accident Experience (Table 2, Model 3)

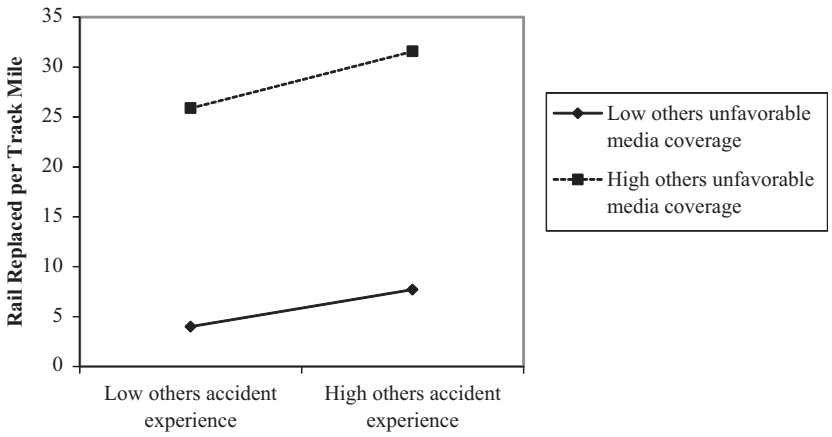
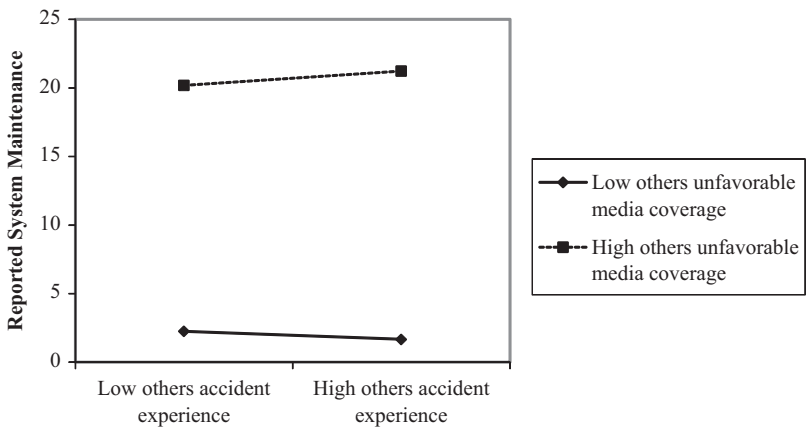


Figure 2
Moderation of Others' Unfavorable Media Coverage on Effect of Others' Accident Experience (Table 2, Model 6)



Robustness Checks

A number of limitations and alternative explanations for the findings described above deserve further consideration. First, accidents in this and other empirical settings likely influence media coverage regarding issues related to safety. While the present study does not

seek to develop predictions regarding the nature of this relationship, it would be difficult to infer support for the study's theoretical arguments regarding the joint influence of accidents and media coverage unless the direct relationship between accidents and media coverage was addressed or controlled and a number of additional steps were warranted to ensure that this direct relationship does not bias the study's primary results.

First, the influence of accidents on media coverage is likely strongest for the most severe accidents. The study's main analysis controls for severity through variables measuring average injuries or deaths per accident for the focal company as well as for other companies, respectively. Support obtained for the hypotheses while including these controls is somewhat reassuring since the findings are likely not driven by differential media coverage during periods with high accident severity. However, a more direct method to address this issue involves replicating the analyses using just highly severe accidents (those resulting in any injuries or deaths among employees or bystanders) rather than the entire population of accidents. Table 3 presents regression models identical to those used in the main analysis except that others' accident experiences and related interaction terms (as well as the control for own accidents) are limited to these highly severe accidents. While interaction terms are not significant in Model 3, the interaction between others' media coverage and others' accident experience is significant and positive in Model 6. Furthermore, this effect is significantly more positive than the effect of the interaction with a firm's own media coverage in this model, $\chi^2(1) = 6.63$, $p < .05$. Results of this model provide reassurance that the study's findings are not driven solely by accident severity.

Relatedly, it is also informative to examine the direct influence of accidents on media coverage in this empirical setting. While accidents and other prominent events are known to spur external scrutiny (Elsbach et al., 1998), the direct relationship can be decoupled through organizations' use of impression management; it also can vary in intensity depending on the size, age, and visibility of firms across the field.

These and related factors were controlled in the main analysis and are also included in Table 4, which presents models estimating unfavorable media coverage for the focal firm (as defined above). Model 2 in Table 4 includes variables measuring own and others' accidents, which fail to exhibit a significant influence on media coverage in this setting. While tobit regressions were most appropriate for these estimations (given the bounded nature of the dependent variable), preliminary models estimated using alternate procedures such as generalized least squares yielded similar results except that some controls became more significant. Collectively, these results suggest that a direct relationship between accidents and media coverage is not necessarily a concern in this setting once controls for an organization's media influence efforts, size, age, and other factors are included.

As seen across the study's primary and supplemental analyses, Hypothesis 1b receives strong support. Organizations appear to increase their safety-oriented resource allocations more strongly following failures across the field when supplemental information, and in this case media information about other organizations, reinforces the unfavorable nature of performance across the field. Hypothesis 1a is not supported; resource allocations do not appear to be influenced by media coverage about the focal firm in this study's empirical context. Finally, results across the study's analyses are generally consistent with Hypothesis 2 but provide strong significance only in Model 6 in Table 3. Media coverage about other

Table 3
Regression Models of Rail Replaced or Reported System Maintenance

	FGLS Regression Models of Rail Replaced per Track Mile			Negative Binomial Regression Models of Reported System Maintenance		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Others' accident experience (injurious only)		1.152	1.710		–2.046	–2.055
		(1.785)	(1.834)		(1.294)	(1.335)
Unfavorable media coverage		–0.144	–0.093		0.065	0.181
		(0.300)	(0.313)		(0.170)	(0.302)
Unfavorable Media Coverage × Others' Injurious Accident Experience			0.365			0.352
			(0.949)			(0.639)
Others' unfavorable media coverage		0.578	2.073		0.184	3.512*
		(1.409)	(1.843)		(0.626)	(1.380)
Others' Unfavorable Media Coverage × Others' Injurious Accident Experience			4.747			6.769**
			(3.816)			(2.488)
Own accidents (injurious only)	–0.006	–0.003	0.001	–0.008	–0.009	–0.004
	(0.013)	(0.014)	(0.014)	(0.008)	(0.008)	(0.009)
Own injuries per accident	0.040	0.035	0.035	–0.059	–0.049	–0.076
	(0.054)	(0.055)	(0.055)	(0.115)	(0.119)	(0.202)
Others' injuries per accident	–1.042	–1.204	–1.033	0.160	0.635	0.855
	(1.581)	(1.610)	(1.612)	(0.460)	(0.541)	(0.577)
Maintenance intensity	0.009	0.009	0.009	0.013	0.011	0.005
	(0.015)	(0.015)	(0.016)	(0.015)	(0.015)	(0.016)
Safety press releases	0.008	0.030	0.031	0.099**	0.094	0.073
	(0.153)	(0.155)	(0.156)	(0.038)	(0.040)	(0.041)
Own media visibility	1.961***	1.875**	1.818**	0.397	0.360	0.196
	(0.545)	(0.556)	(0.557)	(0.415)	(0.436)	(0.434)
Others' media visibility	–1.636	–2.446	–2.395	–0.209	1.205	1.795
	(0.914)	(1.668)	(1.667)	(0.955)	(1.314)	(1.402)
Age	0.000	0.000	0.000	–0.011	–0.011	–0.010
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Passenger revenue ratio	8.569**	8.586**	8.690**	–18.409	–16.967	–16.080
	(2.686)	(2.673)	(2.682)	(15.842)	(15.097)	(15.484)
Return on assets	0.081	0.082	0.090	0.073	0.065	0.049
	(0.067)	(0.067)	(0.067)	(0.056)	(0.057)	(0.057)
Consolidated entities	0.127	0.120	0.169	0.250	0.273	0.300
	(0.640)	(0.645)	(0.646)	(0.291)	(0.289)	(0.296)
Year	–0.048	–0.022	–0.014	0.152***	0.081	0.087
	(0.037)	(0.078)	(0.078)	(0.023)	(0.051)	(0.052)
Region = East	–1.693***	–1.704***	–1.718***	–0.132	0.061	0.126
	(0.477)	(0.474)	(0.474)	(0.497)	(0.506)	(0.525)
Region = South	–0.199	–0.212	–0.103	–18.050	–19.166	–16.598
	(0.894)	(0.890)	(0.894)	(4924.304)	(9748.166)	(4049.219)
χ^2	44.66***	46.44***	48.12***			
Log likelihood				–265.51	–264.21	–260.22
Likelihood ratio					2.59	7.98*
df (vs. model no.)					3 (Model 5)	2 (Model 6)

Note: For Models 1-3, $n = 423$; for Models 4-6, $n = 427$. Standard errors are in parentheses. FGLS = feasible generalized least squares regression.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 4
Random-Effects Tobit Regression Models of Unfavorable Media Coverage

	Model 1	Model 2
Others' accident experience		–0.456
		(0.268)
Own accidents		0.000
		(0.000)
Own injuries per accident	–0.014	–0.008
	(0.013)	(0.013)
Others' injuries per accident	–0.081	–0.069
	(0.375)	(0.385)
Maintenance intensity	–0.003	–0.004
	(0.003)	(0.003)
Safety press releases	–0.010	–0.029
	(0.033)	(0.034)
Own media visibility	–0.023	–0.029
	(0.119)	(0.119)
Others' media visibility	0.099	0.501
	(0.191)	(0.289)
Age	0.000	0.001
	(0.001)	(0.001)
Passenger revenue ratio	0.647	0.625
	(0.443)	(0.440)
Return on assets	–0.010	–0.005
	(0.014)	(0.014)
Consolidated entities	0.182	0.186
	(0.169)	(0.174)
Year	0.026***	0.004
	(0.006)	(0.014)
Region = East	–0.078	–0.035
	(0.072)	(0.074)
Region = South	0.107	0.135
	(0.145)	(0.144)

Note: $n = 427$. Standard errors are in parentheses.
***$p < .001$.

organizations exerts a significantly stronger moderating effect than focal media coverage only in the case of severe accidents and when resource allocations are estimated through reported system maintenance actions (Model 6, Table 3).

Discussion

This study finds that unfavorable media coverage about issues related to failure interacts with experience gained by observing other organizations' failures, making the focal firm

more likely to invest in safety-enhancing technologies when that media coverage provides information regarding other organizations throughout the field. Furthermore, in some limited cases, this coverage regarding other organizations across the field exhibits a stronger moderating effect than coverage pertaining solely to the focal firm. These findings are directly consistent with agenda-setting theory (McCombs & Shaw, 1993; Meijer & Kleinnijenhuis, 2006) and its extension to organizational learning theory (Cyert & March, 1963; Levitt & March, 1988). Issue salience within organizations, as measured by issue-related investment decisions, appears to depend on information from supplemental sources, in this case media communication and its reinforcing effect following other organizations' failures. Further, such information about other organizations may in some cases be more useful than information limited solely to the focal organization, as information about others can be used to direct external scanning and learning efforts.

This study makes several contributions to research on issue salience and collective attention focus and to our understanding of organizational learning and decision-making processes more generally. In a pioneering study on issue salience and alternate information, Haunschild and Beckman (1998) surmised that organizational decision makers may view media information as more pallid, secondhand, or incomplete than direct experience. As such, the authors suggested that organizational decision makers might not be likely to knowingly use a less rich information source in lieu of direct experience. However, the present study develops a formal theoretical argument that differs from Haunschild and Beckman's (1998) suggestion. Rather than being more pallid, I use agenda-setting theory to argue that media information is intimately beneficial following failures across the field, since such information directs organizational attention in the appropriate direction (to the appropriate issues and toward specific entities) following failures. This perspective relaxes the assumption that media information must be rich in order to benefit organizational learning, since even information that does not reveal specific solutions to a particular organizational problem may enhance learning by indicating which issues or problems are seen as important or by motivating investments intended to find solutions to those problems.

This study contributes to related research in another way beyond prior efforts to incorporate the role of supplemental information (Baum & Dahlin, 2007; Haunschild & Beckman, 1998; Schwab, 2007). While Haunschild and Beckman (1998) surmise that characteristics of supplemental information could influence its impact on issue salience and related processes, little systematic attention has been given to proposing and testing such relationships. I extend this literature by arguing that media coverage about other organizations is more beneficial to issue salience and related decision-making processes than media coverage about the focal organization, as the former contains directional, entity-specific information in addition to issue-specific information (Meijer & Kleinnijenhuis, 2006). This establishes that a particular component of alternate information affects its ultimate impact on vicarious learning. While the present study was unable to find strong support for this assertion in its empirical context, future work should seek to replicate this study's tests in alternate contexts. Relatedly, future efforts should also examine additional information characteristics and their relationships with issue salience and organizational decision-making processes. For example, information from powerful sources or reflecting more urgent concerns could be more heavily weighted or exert a more intensive impact than information from other sources (Mitchell, Agle, & Wood, 1997).

Beyond directly forwarding research on supplemental information and issue salience, this study contributes to an emerging stream of research with broad scholarly interest on decision making within the literature on organizational learning. Research increasingly attempts to determine whether and how organizational decision making is influenced by information from multiple forms of experience (Baum & Dahlin, 2007; Kim et al., 2009). Although learning and organizational decision-making theories have long recognized that organizations exist in complex environments and decision makers must reconcile various forms of information and experience in order to adapt and change (Cyert & March, 1963; Levitt & March, 1988), empirical analysis and extension of these arguments is a fairly recent undertaking. Various perspectives have emerged in this research, with some proposing that decision makers must allocate a fixed amount of attention across competing stimuli and that some potentially valuable forms of information could be discounted as a result (Hoffman & Ocasio, 2001; Ocasio, 1997) and with others proposing that spans of attention could expand to encompass and interpret a broader set of stimuli under proper organizational conditions (Weick, 1995). While the present study falls most prominently in the former camp, it could be seen as an initial attempt to reconcile this with the latter perspective. Although I suggest that decision makers within the organizations in this study cannot uniformly attend to all events in their external environments, I find that relevant informational aids can be used to more effectively guide attention, enhancing interpretation of the environment and exhibiting a strong impact on organizational resource allocation decisions.

Aside from its theoretical contributions, this study also contains several practical implications. Failures are complex, as the causes and consequences of large organizational failures may be difficult to understand, even under close scrutiny (Haunschild & Sullivan, 2002). Therefore, research increasingly examines whether and how failures may influence organizational processes (Audia & Greve, 2006; Baum & Dahlin, 2007; Kim & Miner, 2007; Knott & Posen, 2005). While much research in this tradition examines the characteristics of organizations or of failures themselves, the present study's findings strongly suggest that supplemental information provided through third parties may help organizations better recognize and incorporate external failures into their own decision-making processes. The most direct practical implication of this approach is that managers who establish structures and technologies to help them digest information from multiple sources will likely be able to enhance their organizations' responsiveness to failures since these decision-making aids may direct managerial attention toward previously unrecognized failures in their environment.

An equally important practical corollary is that managers should attend to media coverage and other supplemental information regarding entities throughout the field rather than focusing narrowly on coverage regarding their own organizations. Such a broad search is typically perceived as costly and of questionable value since information obtained regarding distant or dissimilar organizations is not always viewed as transferable to the focal organization (Rosenkopf & Almeida, 2003; Rosenkopf & Nerkar, 2001). However, this study's findings suggest that such broad information may be more beneficial than local information following failures, since it helps direct attention toward particular areas of the environment to search more intensively. Finally, some research suggests that organizational decision makers in practice tend to concentrate on successes and overlook failures, despite strong potential for learning through the latter forms of experience (Denrell, 2003). This study suggests that

supplemental information about failures may help to overcome this bias by reinforcing awareness of failures and providing information to aid related processes. Therefore, organizations that actively disseminate relevant information about the field to their employees may be able to complement or enhance their employees' decision-making abilities in practice.

Despite its theoretical and practical contributions, this study contains several limitations that also suggest opportunities for further research. First, this study is limited by the inability to directly observe additional characteristics of media information. Media coverage reflecting views of more powerful constituents, or coverage that is consistent with broader normative expectations regarding acceptable organizational behaviors, could differ in impact from coverage with different attributes (Mitchell et al., 1997). While this study was unable to directly control for these differences, the study's methodology potentially limits related concerns. For example, bounding the study's empirical scope to safety-related failures ensured that negative media coverage was fairly uniform in conveying normative expectations. In addition, anecdotal review of media coverage suggested that, in the aftermath of accidents, similar points of view were often communicated by powerful entities (e.g., customers) and less powerful entities (e.g., bystanders) alike, limiting the ability to isolate power and its impact in this context. Nonetheless, future research should directly account for these differences.

In addition, this study is potentially limited by its industry context. Studies conducted entirely within one industry context are beneficial in that specific measures can be developed to directly reflect various aspects of the research setting, promoting external validity. However, individual industry contexts may be relatively idiosyncratic, and this study deserves replication in other settings. Nonetheless, care was taken to control for factors that could have introduced idiosyncrasy in the current empirical setting. In addition, the study period is limited to the deregulated market environment, as the regulated market environment in the U.S. railroad industry was quite distinct from competitive market environments in this and other industries (Smith & Grimm, 1987).

Finally, this study and its findings suggest several other important avenues for further research. First, the study focuses on organizational responses following failures rather than events with more favorable outcomes. This is theoretically beneficial, as failures are known to be salient motivators of changes in organizational resource allocation patterns (Baum & Dahlin, 2007; Greve, 1998; Haunschild & Sullivan, 2002). Nonetheless, events with more positive outcomes, such as competitive successes or favorable external recognition of companies within the industry, likely also impact organizational resource allocations. Furthermore, media communication regarding these events or issues may stand to enhance their impact or make it more enduring over time. Therefore, future work should examine whether and how media communication impacts the salience of positive issues and events.

Similarly, future work can develop a more refined understanding of how other forms of experience are impacted by media communication or other interventions. For example, organizations may be less likely to alter resource allocations following accidents that arise through factors believed to be outside of their direct control, and media communication may also be less relevant in these settings. This possibility could not be directly examined in the study's empirical setting; although particular accidents (such as some railroad crossing collisions) may initially appear to be outside of the railroad's direct control, more precise

determinations of controllability in this setting depend on the operation of relevant crossing signals, train speeds, environmental conditions, and other factors that could not be systematically collected across the study panel. Thus, further research is required to better understand how specific accident characteristics or other characteristics of past experience might influence issue salience and organizational responses.

Although the present study was not able to focus on specific failure characteristics, it nonetheless represents an important contribution to our understanding of issue salience and theory regarding how event salience impacts organizational responses. While some work examines how organizations respond to salient events (e.g., Greve, 1998; Hoffman, 1999), we lack an understanding of how external representations, such as media communication, tend to condition organizations' responses. This study begins to fill this void by identifying that media representations generally influence organizations' responses to negative events throughout the field. Nonetheless, additional research is needed to build and test a more comprehensive framework of issue salience and organizational response. To that end, research examining positive events as well as specific event characteristics would be particularly beneficial.

Collectively, this study advances research on collective attention and issue salience in organizational decision making, and on related streams of research in the organizational learning literature more generally, by suggesting that supplemental information can complement more direct observation of external failures and that this process influences how organizations allocate resources to related issues or dimensions of performance. These and the study's other findings add to our understanding of how organizations are influenced by external events, how organizational decision makers scan their environments, and how multiple forms of information interactively influence resource allocation decisions and organizational decision-making processes more generally. Future research in this domain should replicate these findings in other settings and develop new theories regarding how various information characteristics influence these and related organizational decision making processes.

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