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Examining the Influence of Source-Message Incongruence on Source Trustworthiness and Attitudes Regarding Hazardous Waste Cleanup Decisions

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APPROVAL OF THE DISSERTATION COMMITTEE

This dissertation has been duly read, reviewed, and critiqued by the Committee listed below, which hereby approves the manuscript of Lori Garner Manes as fulfilling the scope and quality requirements for meriting the degree of Doctor of Philosophy in Psychology.

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Abstract

Examining the Influence of Source-Message Incongruence on Source Trustworthiness and Attitudes Regarding Hazardous Waste Cleanup Decisions

Lori Garner Manes

Claremont Graduate University: 2019

Research has shown that when a source proffers a message that is incongruent with its expected position on a topic, it can have an effect on the perceived trustworthiness of the communicator, the persuasiveness of the message, and the extent to which the receiver elaborates the message. However, research in this area has not been consistent. Questions remain as to whether source-message incongruence enhances source trustworthiness, attitude change, or both, relative to source-message congruence. Focusing on an environmental risk management context involving the cleanup of a hazardous waste site, this research investigated how source-message incongruence influenced perceptions of source trustworthiness, attitude change, perceptions of risk, and support for risk management decisions, as well as the extent to which respondents elaborated the communicator's message. Experiment 1 presented participants (N = 155) with message either in favor of a Superfund designation for the hazardous waste site (pro-environmental message position) or in opposition to a Superfund designation (pro-business message position). The source of the message was either the president of a local environmental advocacy group (environmental source) or the cleanup project manager from the company responsible for the contamination and cleanup (corporate source). Taking into account participants' reported levels of environmental concern and political ideology, results indicated that incongruous messages for both sources were more effective in changing attitudes than congruent messages. However, source trustworthiness increased only in the condition in which

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the corporate source advocated an incongruent (pro-environmental) message position. When the environmental source advocated an incongruent (pro-business) message position, perceptions of trustworthiness significantly decreased. In a study similar to Experiment 1, Experiment 2 (N = 168) examined how source-message incongruence influenced participants' cognitive elaboration, while taking into account environmental concern, political ideology, and need for cognition. It was expected that the incongruent source-message combinations would elicit significantly different levels of cognitive elaboration than messages of sources advocating congruous messages. Results found no significant interaction between source and message on cognitive elaboration. Contrary to expectations, respondents in the two incongruent source-message conditions did not differ significantly in self-reported cognitive elaboration compared to the two congruent conditions. Unexpectedly, a main effect for message type emerged. Regardless of the source, when the corporate message position was advocated, participants engaged in significantly more cognitive elaboration than when the environmental message position was advocated. Possible explanations for these results are discussed, as are implications for environmental risk communication practitioners.

Keywords: environmental risk management, risk communication, source-message incongruence, expectancy disconfirmation

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Dedication

This work is dedicated to Henry, Norah, and Owen. Being your Mom is my greatest work and the inspiration for completing my academic journey.

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INTRODUCTION

Considerable research suggests that a source may be more persuasive when advocating a position that is incongruous with its expected position on a given topic (Baker & Petty, 1994; Eagly, Wood, & Chaiken, 1978; Koeske & Crano, 1968; Petty, Fleming, Priester, & Feinstein, 2001; Priester & Petty, 1995; Walster, Aronson, & Abrahams, 1966). The underlying assumption of this effect is that when a source advocates an incongruent message, the recipient presumes that the source is unbiased, more trustworthy, and therefore the message is more believable than when a congruent message is advocated. In addition to being more persuasive, incongruent source-message combinations have been shown to alter message processing (Baker & Petty, 1994; Hunt, Smith, & Kernan,1989; O'Brien & Myers, 1985; Wood and Eagly, 1981; Ziegler, 2010). However, the effects of source-message incongruence on post-message processing has been inconclusive, with some studies suggesting that elaboration is increased with incongruence (e.g., Eagly & Chaiken; Ziegler, Diehl, & Ruther, 2002), and others finding decreased elaboration (e.g., Wood & Eagly, 1981) in cases of source-message incongruence.

The current research sought to test the ability of source-message incongruence to bolster perceptions of source trustworthiness and foster attitude change, as well as to clarify the effects of incongruence on the cognitive elaboration of messages, while taking into account personal relevance and relevant demographic variables. An environmental risk management scenario provided a novel context for the research. Environmental risk managers are tasked with evaluating environmental risks, such as those that might exist at a hazardous waste site, and making decisions about how to manage them in a manner that protects public health and the environment. Despite being scientific experts, risk managers are generally viewed as

untrustworthy (Peters, Covello, & McCallum, 1997; Slovic, 1999). Fiske and Dupree's (2014) research on the credibility of scientists as communicators suggests that although scientists and engineers typically fulfill the expertise component of credibility and have the public's respect, they do not necessarily have their trust. Indeed, there is generally a low level of trust in institutional risk managers. Moreover, a number of studies have shown that most federal and state agencies are perceived as untrustworthy (see Chryssochoidis, Strada, & Krystallis, 2009 for a review). This is a perplexing problem, as distrust is associated with increased perceptions of risk, and has consistently been blamed for the failure of risk communication programs (Slovic, 1999). This dissertation sought to test the utility of social psychological research on source credibility and trustworthiness, specifically the effects of source-message incongruence, in enhancing the success of risk communication efforts by environmental risk managers. Although social psychology literature on attitudes and attitude change literature has not been completely ignored by risk communication scholars (e.g., Terpstra, 2011; Trumbo & McComas, 2008), Renn and Levine (1991) pointed out that there has been "a fair amount of ignorance or negligence in considering or applying the vast amount of research results from psychological or sociological studies on the effectiveness of communication and on the role of trust and credibility" (p. 176). This dissertation aims to fill this gap, one the author argues still exists to some degree today.

Overview of the Current Research

The first research question focuses on how congruent versus incongruent source-message pairings impact attitudes, source trustworthiness, perceived risk, and support for risk management. Study 1 sought to examine these questions. The general hypothesis was that sources advocating messages that are incongruent with their expected positions will lead to more attitude change, enhanced perceptions of source trustworthiness, reduce perceptions of risk, and

increase support for risk management decisions, compared to sources that advocate messages that are congruent with their expected positions.

The second research question, addressed in Study 2, extended the investigation by examining the psychological processes behind the effects of source-message (in)congruence. Source and message variables were manipulated to clarify the influence of source-message incongruence on the cognitive elaboration of messages. The general hypothesis for Study 2 was that incongruent source-message combinations (i.e., corporate source advocating environmental congruent message and environmental activist advocating a business congruent message) would lead to significantly different amounts of cognitive elaboration than congruent combinations, however, no predictions were made as to the direction of the difference.

CHAPTER ONE:
The Role of Source Credibility in Persuasion

For decades, social psychologists have been studying the persuasive effect of source credibility and how it impacts attitudes and behavior. Hovland, Janis, and Kelley (1953) identified two components of source credibility: *expertise* and *trustworthiness*. Hovland and colleagues define expertise as "the extent to which a communicator is perceived to be a source of valid assertions" (p. 21). In short, expertise is the extent to which an audience member perceives that the communicator is knowledgeable about the subject matter of interest. Trustworthiness, on the other hand, refers to "the degree of confidence in the communicator's intent to communicate the assertions he [sic] considers most valid" (p. 21). Although other source credibility dimensions have been proposed via factor-analytic studies (e.g., Berlo, Lemert, & Mertz, 1969; McCroskey, 1966), most persuasion scholars agree that credibility is a combination of expertise and trustworthiness factors (Pornpitakpan, 2004; Stiff & Mongeau, 2016).

Hovland and Weiss (1951) demonstrated that high credibility sources are superior to low credibility sources when it comes to producing attitude change. Since then, an abundance of research has supported the assertion that high-credibility sources are more persuasive than low-credibility sources (see Petty & Wegener, 1998; Pornpitakpan, 2004 for reviews). In addition to being more persuasive, high credibility sources have also been shown to have a positive influence on behavioral compliance (Crano, 1970; Levine, Moss, Ramsey, & Fleishman, 1978), source evaluations (Albright & Levy, 1995), attitudes toward leadership (Mugny, Tafani, Falomir, & Layat, 2000), confidence in thoughts generated in response to persuasive messages (Briñol, Petty, & Tormala, 2004; Petty, Briñol & Tormala, 2002), and even performance (Weick, Gilfillan, & Keith, 1973).

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Within the elaboration likelihood (ELM; Petty & Cacioppo, 1986) and heuristic–systematic (HSM; Chaiken, Liberman & Eagly, 1989) models of persuasion, source credibility can affect persuasion in one of three ways (Crano & Prislin, 2008; Kruglanski & Thompson, 1999; Petty, Cacioppo, & Goldman, 1981; Petty & Wegener, 1998; Tormala, Briñol, & Petty, 2006). First, when elaboration likelihood is low, source credibility could serve as a peripheral (or heuristic) cue to persuasion. For example, an unmotivated recipient receiving a persuasive message from a highly credible source should assume that the source's assertions are valid, and thereby spend little time elaborating the message. In this scenario, source credibility is viewed as a direct path to persuasion, as it is expected to be the only influence on the expressed attitudes of the message recipient. Second, when elaboration likelihood is high, source credibility can serve as a persuasive argument and increase persuasion through issue-relevant cognitive responses (Crano & Prislin, 2008; Fleming & Petty, 2000). Similarly, it can affect persuasion by positively or negatively biasing systematic processing (Chaiken & Maheswaran, 1994). The third way that source credibility can influence persuasion is by affecting a recipient's motivation or ability to process information via systematic/central-route processing. For instance, if the elaboration likelihood is in the middle range of the elaboration continuum, source credibility may increase a recipient's message-relevant thinking, leading them to invest more cognitive effort to process the message (Crano & Prislin, 2008; Heesacker, Petty & Cacioppo, 1983; Kruglanski & Thompson, 1999).

Source-Message Incongruence and Trustworthiness

In addition to studying source credibility effects and underlying mechanisms, persuasion researchers have also studied factors that can lead to increased or decreased credibility of a communicator. For example, research suggests that incongruous, or unexpected source-message

pairings can influence the perceived credibility of the communicator, the persuasiveness of the message, as well as the process by which persuasion occurs. Research in this area has revealed that people generally expect a source to take a position that aligns with their own self-interest. When a source violates the message recipient's expectancies via the communication of an incongruous message, the source is viewed as more trustworthy and their message more believable than when a message is expected (Baker & Petty, 1994; Eagly, Wood, & Chaiken, 1978; Koeske & Crano, 1968; Petty, et al., 2001; Priester & Petty, 1995; Walster, Aronson, & Abrahams, 1966).

Research conducted by Walster, Aronson, and Abrahams (1966) was among the earliest to suggest that the credibility of a communicator may not depend simply on characteristics such as expertise and trustworthiness, but an interaction between the source and the nature of the message. That is, the extent to which a message aligns with a communicator's best interest, or whether the source has something to gain from the advocacy. They pointed to nonsignificant findings from research by Hovland and Weiss (1951) in which a low credibility source led to more opinion change than a high credibility source. In this study, a female gossip columnist (considered a low credibility source) argued that there would be a decrease in the number of movie theaters resulting from the advancement of television. Walster et al. speculated that the gossip columnist was more effective than the reputable *Fortune* magazine because she was arguing against her own best interest. To test the hypothesis that a low-credibility source could be as, or even more effective, than a high-credibility source, they conducted an experiment in which high credibility (a judge or prosecutor) and low (a criminal) credibility communicators advocated either increased or reduced powers for the courts. They expected the criminal would be more convincing when arguing for increased power for the courts, since this position

appeared contrary to his best interests. They expected the judge, on the other hand, to be more convincing when advocating the argument for decreased power for the courts, which, in light of his role, would not be expected (i.e., incongruous). Their results demonstrated that the advocacy in favor of reduced court powers led to significantly more opinion change when coming from the judge rather than the criminal, supporting their hypothesis. In addition to being more persuasive, the incongruous source-message combination enhanced the perceived credibility of the judge, compared to when he advocated the congruent message position.

Likewise, Dutton (1973) found both enhanced perceptions of source trustworthiness and persuasiveness when the source was a so-called maverick (someone who had quit an organization because of personal beliefs that were in conflict with the organization) compared to a non-maverick. Koeske and Crano (1968) also sought to test the incongruity effect. They were interested in whether the credibility of a statement (message) would be enhanced if the statement was contrary, i.e., incongruous, to a source's known or supposed ideological position. They predicted that a statement made by an individual that is contrary to their known position would be more credible (more believable) than if the statement were not attributed to any source. To do this, they associated two known sources (William Westmoreland, Commander of U.S. forces in the Vietnam War, and Stokeley Carmichael, an activist in the Black Power movement) with simple "belief statements" and asked study participants to rate the credibility of each statement. They found that statements attributed to an incongruous source were unequivocally more believable than same (but unattributed) statement, although no source credibility effect emerged. That is, there was no associated enhancement of source credibility for sources who made took an incongruent position.

In contrast to Koeske and Crano's (1986) finding, other research has found enhanced source credibility, but the effect did not extend to attitudes. McPeek and Edwards (1975) found that perceptions of source credibility increased when two sources delivered unexpected messages, either in favor or opposition to marijuana use, compared to an expected message. However, the credibility effect did not enhance attitude change. In their study, a "hippie" student and a seminary student training to become a Catholic priest advocated a message about marijuana use that was contrary to participants' initial opinion. The hippie advocating an anti-marijuana (unexpected) position was more effective in changing attitudes (though the effect was not significant) than the seminary student advocating the same (expected) position, but, contrary to predictions, there was no impact on attitude change when the seminary student advocated an unexpected (pro-marijuana) position. Similarly, Kohn and Snook (1976) revealed a significant credibility effect but no significant change in attitude when a source advocated an incongruous message. In their study, three different sources (liberal, conservative, and no political affiliation) advocated against youthful illicit drug use. It was expected that the liberal source advocating the anti-drug message would be the most unexpected, and therefore be the most persuasive, perceived as most credible and evaluated most positively compared to the other sources. Results indicated that the liberal source was most effective in arguing against illicit drug use compared to the other sources, though the difference was only marginally significant. McGarry and Hendrick (1974) also found credibility effects for incongruous source-message pairings, but no effect on persuasion.

Attributional analysis of persuasion

The above research was largely the basis for the development of the Attributional Analysis of Persuasion (AAP; Eagly & Chaiken, 1975; Eagly, Wood, & Chaiken,1978; Wood &

Eagly, 1981). Put simply, the analysis predicts that the more unexpected the message given the communicator's personal characteristics or situational pressures, the more persuasive it should be. According to the AAP, this phenomenon is the result of a message recipient's inferences concerning why the communicator has taken the advocated position. Rooted in attribution theory (Heider, 1958; Jones & Davis, 1965; Kelley, 1967, 1973), the AAP proposes that to the extent the position taken in a message can be explained in terms of either personal characteristics of the communicator or situational "pressures" driving their position, the message is regarded as biased and thus should be relatively unpersuasive. On the other hand, attributing a source's position to accurate and unbiased reporting should make the message more persuasive.

In line with these ideas, Eagly and Chaiken (1975) exposed participants to a message from an attractive or unattractive communicator who espoused either a desirable or undesirable position on two topics: venereal disease and unemployment among recent college graduates. Attractiveness was manipulated by having the source either praise (attractive) or derogate (unattractive) the participant population (college undergraduates). Position desirability was manipulated by using positions that were pre-tested by a set of undergraduate students as being either desirable or undesirable. The desirable positions for venereal disease and unemployment, respectively, were "Venereal disease will be controlled so successfully during the next five years that the current epidemic will be completely curtailed," and "During the next three years, unemployment among recent college graduates will drop sharply." The undesirable positions were "Venereal disease will spread at such an astounding rate that it will soon become America's No. 1 health problem," and "During the next three years, unemployment among recent college graduates will surpass even the devastating level which occurred during the Great Depression of the 1930s." The underlying expectancy assumption (which was tested and confirmed in a pilot

study) was that attractive communicators would be expected to take a desirable position and an unattractive communicator would be expected to take an undesirable one; therefore, unattractive/desirable combinations should be unexpected. Their results showed a significant source attractiveness X position desirability interaction for opinion change for both topics, such that the incongruous source-position combinations (i.e., unattractive/desirable combinations) yielded greater opinion change than the congruous combinations (i.e., unattractive/undesirable combinations). Although attractive communicators were overall more persuasive than unattractive ones, an attractive communicator that confirmed expectancies (by advocating a desirable position), was no more persuasive than an unattractive communicator that disconfirmed expectancies (by advocating an undesirable position). Eagly and Chaiken proposed an attributional explanation for their results, suggesting that the communicator characteristic of attractiveness (the only background information given to message recipients) provided a causal explanation for their position -- leading to the superiority of the attractive communicator's persuasive effect when communicating the undesirable message. Despite this interpretation, their study did not provide an unambiguous demonstration of the attribution framework, given the fact that attractive communicators and desirable positions were overall more persuasive than unattractive communicators and desirable positions.

A subsequent study by Eagly, Wood, and Chaiken (1978) attempted to clarify the attributional hypothesis and eliminate the complication of bias toward attractive sources and desirable positions. In their experiment, respondents were given information about the waste disposal practices of a fictitious company and the impact on a local city. Participants then read a meeting transcript in which a mayoral candidate with either a pro-environmental or pro-business background, speaking either to a group of businessmen or environmentalists, advocated a pro-

business or pro-environmental solution. It was expected that when the mayor disconfirmed expectancies (based on either background information or the audience), that he would be seen as less biased and produce more opinion change than when confirming expectancies. Indeed, when the communicator's position disconfirmed subjects' expectancies based on the communicator's background, the identity of his audience, or both factors, he was significantly more persuasive than when expectancies were confirmed. In addition, his true opinion was regarded as more pro-environment when he addressed a pro-business rather than a pro-environment audience. In other words, in the incongruous message conditions, the candidate was perceived to be more sincere.

Expectancy violation theory

Expectancy violation theory (EVT; J. Burgoon, 1993, J. Burgoon & Jones, 1976) research provides further support for the idea that incongruent source-message combinations can lead to more positive evaluations of an actor than than congruent communications (J. Burgoon & LePoire, 1993). EVT is a communication theory that seeks to explain an individual's response to violations of expected behaviors. Initially developed to account for the effect of violations of personal space expectations and violations, the theory has extended beyond nonverbal behaviors and been applied to a variety of contexts such as interpersonal dialogue (J. Burgoon & LePoire, 1993), physician-patient communication (M. Burgoon, Birk, & Hall, 1991), online communication behavior (Nichols & Rice, 2017), and health communication campaigns (Campo, Cameron, Brossard, and Frazer, 2004; Siegel & J. Burgoon, 2002). EVT holds that communication expectancies are enduring patterns of anticipated behavior. Expectancy violations are "actions sufficiently discrepant from the expectancy to be noticeable and classified as outside of the expectancy range" (J. Burgoon, 1995, p. 200). When this happens in an interaction, arousal increases, and a series of cognitive appraisals are initiated within the

receiver. This “orienting response” shifts attention away from the message and toward the interaction partner (J. Burgoon & LePoire, 1996) while the unexpected behavior and message are scrutinized and evaluated by the receiver. EVT posits that both confirmations and violations can be perceived as either positive or negative. Violation valences depend on (1) the evaluation of an enacted behavior by the target, (2) whether the discrepancy between the expected and enacted behavior is perceived by the target as more or less favorable, and (3) the magnitude of the discrepancy. Positive violations occur when behaviors are evaluated by the target more favorably than expected and negative violations occur when behaviors are evaluated by the target less favorably than expected (J. Burgoon & Hale, 1988). In a practical sense, EVT predicts that a communicator is better off committing a violation than doing what is expected, so long as the violation is in the positive direction, that is, the target evaluates is more favorable than expected. Negative violations, which are expected to have the worst outcomes, have been associated with reduced liking and credibility (J. Burgoon & LePoire, 1993). Because the perceived valence of an expectancy violation is related to the act of the breach itself rather than the violator, even a disliked source can benefit from violations.

The research examining the effects of source-message incongruence supports the idea that incongruent or unexpected source-message combinations may enhance source trustworthiness, and, by extension, source credibility, and have more impact on attitude change compared to congruent or expected messages. However, the inability for research studies to consistently demonstrate a positive effect of incongruence on both attitudes and source trustworthiness suggests more is at play. McGarry and Hendrick (1974) suggested the mixed findings may have to do with factors such as the desirability of the position advocated, and the level of involvement, and initial attitudes recipients have regarding message topics. Indeed,

many of the studies cited here failed to measure initial attitudes on a topic or take into account personal relevance of the message recipients. The current research aims to clarify the effect of source-message incongruence on source trustworthiness and attitudes by measuring and controlling for initial attitudes and message relevance.

Message Processing and Incongruence

Research on the effects of source-message incongruence has also examined how it influences message processing. Wood and Eagly's (1981) attributional analysis posits that a message recipient engages in a series of stages in message recipients' information processing. Information processing takes place both before and after the message. Prior to the message, receivers use information about a communicator's background to form expectancies about the position the communicator will take in the message. After the message, recipients first make inferences regarding the reason the communicator took the position they did. The first is the personal or situational characteristics of the communicator. The second is relevant factual evidence. Next, recipients determine the degree of communicator bias. Accordingly to Wood and Eagly, if the receiver attributed the message as resulting from the communicator's personal characteristics or situation, the communicator is seen as biased. If, on the other hand, the message was accounted for by factual evidence, the communicator is considered unbiased. The perception of bias affects the persuasiveness of the message for the receiver in the next post-message step. If the communicator is viewed as unbiased, persuasion increases. The perceived bias of the communicator is also posited to affect the comprehension of the message. If the message is perceived as unbiased, that is, the communicator accurately represented the facts, there is less processing of the message compared to when the receiver perceives the communicator to be biased.

The extent to which the pre-message expectancy is confirmed or disconfirmed is expected to impact on the outcome at each step of a recipient's post-message processing. In their research, disconfirmation of expectancies led to message recipients attributing the message to factual evidence related to the issue at hand. On the other hand, when expectancies were confirmed, message recipients attributed the message to the communicator's background. The extent to which recipients attributed the message to the factual evidence (via expectancy disconfirmation) rather than to the communicator's background (via expectancy confirmation), recipients perceived the message source as unbiased, and opinion change toward the advocated message increased. They also found that message comprehension decreased when expectancies were disconfirmed, whereas when expectancies were confirmed, message comprehension was enhanced. Wood and Eagly suggest that when pre-message expectancies are confirmed, the source and message are called into question and the recipient must analyze the message more carefully prior to acceptance. Conversely, when expectancies are disconfirmed, the recipient views the source as more trustworthy, and their message is perceived as more truthful; thus, there is little need to scrutinize the message.

In contrast to AAP's hypothesis that disconfirmation, or incongruence, decreases message processing, considerable research has indicated the opposite: that more effortful processing of messages occurs when expectancies are disconfirmed. For example, Baker and Petty (1994) investigated the impacts of endorsement of a position by a numerical majority or minority on message processing, and whether source-message congruence or incongruence led to greater message scrutiny or cognitive elaboration. They found when the source-message pairings were incongruent or unexpected (i.e., majority/counter attitudinal, minority/pro-attitudinal), argument quality had a larger impact on attitudes than when the source and message position

were expected (i.e., majority-pro and minority-counter messages)--a strong indicator of increased elaboration (Petty & Cacioppo, 1986). Participants in Ziegler's (2010) research engaged in more effortful message processing when initial information disconfirmed rather than confirmed expectancies. Ziegler, Diehl, and Ruther (2002) found that argument quality affected attitudes and favorability of message-related thoughts in the case of inconsistent source characteristics but not in the case of consistent source characteristics--that is, source incongruence led to increased message scrutiny. Results from O'Brien and Myers (1985) and Hunt, Smith, and Kernan (1989) also indicate that incongruence promotes deeper levels of message analysis and enhances message recall. Furthermore, results from Eagly and Chaiken's (1975) own AAP study also contradict the hypothesis that disconfirmation decreases message processing. Using argument recall as the measure for processing, their study showed that expectancy disconfirming messages produced increased message processing (operationalized by message recall) than expectancy confirming messages.

Priester and Petty (1995) sought to clarify the inconsistent findings regarding message processing. Ultimately, their findings were in line with the AAP's hypothesis that when a source disconfirmed the expected message position, perceptions of source trustworthiness were enhanced, and message processing was reduced compared to conditions in which the source took the expected position. However, they clarified a moderator in the relationship: the processing effect was most apparent for individuals who were not intrinsically motivated to think—those low in need for cognition (Cacioppo & Petty, 1981).

Petty, Fleming, Priester, and Feinstein (2001) qualified the effect further by distinguishing between individual versus group expectancies. They found that trustworthiness was not enhanced in situations where a communicator violated the interest of an ingroup, rather

than their own interest. When a group's interest was violated, message scrutiny increased. They suggest the increase in message scrutiny may be due to the greater attributional ambiguity when group interest was violated. The level of personal involvement with a also appears to play a role in message processing. People with higher levels of personal relevance tend to spend more time processing messages, and process them in a more partisan way, than people with lower levels of personal relevance (Howard-Pitney, Borgida, & Omoto, 1986). As a result, this research will examine and take into account the role of personal relevance of the topic at hand.

CHAPTER TWO:
The Importance of Trust in Environmental Risk Management

Risk scholars have increasingly recognized that public risk perceptions are linked to the how much trust they have in risk managers and communicators (Flynn, Burns, Mertz, & Slovic, 1992; Leiss, 1996; Siegrist, Cvetkovich, & Roth, 2000; Viklund, 2003; Wynne, 1992). As a result, there's been a great deal of attention dedicated to the concept of source credibility in environmental risk management and communication literature. Because risk management typically involves the assessment and communication of risk by scientists who are considered high on expertise (Fiske & Dupree, 2014), source credibility in this context is focused on the trustworthiness component. Environmental risk management involves the evaluation of what environmental risks exist and the determination for how to manage those risks in a manner that protects public health and the environment (Environmental Protection Agency, 2019).

Risk communication is the process of informing people about the potential risks that exist in the environment. This process typically has one of two objectives. First, it can be used to create a sense of urgency (i.e., increase perceptions of risk) when people are *not concerned* about a hazard (risk object) but evidence indicates the hazard *does* pose a significant threat. An example of this risk-enhancing type of communication is a message urging the evacuation of a community during a catastrophic flood event. Risk communication can also be used to calm people down (i.e., decrease perceptions of risk) when people *are highly concerned* about a risk object, but data indicate it *does not* pose a significant threat (Covello & Sandman, 2001). An example of a risk-reducing type of communication is a public health campaign aimed at dispelling misconceptions about childhood vaccinations in order to increase vaccination behaviors.

Risk communication stemmed from risk perception research and the recognition that technical experts and the public view and understand risk very differently. Technical risk assessment experts determine acceptable risk by calculating the product of the probability and consequences of a "hazard," or adverse event. This approach assumes that risk estimates are determined by rational and objective evaluations, and do not consider political, economic, emotional, or social conditions. The public, on the other hand, rely on a broader, more subjective set of criteria to evaluate riskiness.

The Basis of Risk Perceptions

In its most basic sense, risk can be defined as "things, forces, or circumstances that pose danger to people or to what they value" (National Research Council, 1996, p. 215). Three questions are generally considered in the understanding of risk: (1) What can go wrong?, (2) How likely is that to happen?, and (3) If it does go wrong, what are the consequences? (Kaplan & Garrick, 1981). From a technical perspective, risk is viewed objectively, and encompasses two dimensions: *probability* of the occurrence of a hazard event and the *magnitude of consequences* of the event (Breakwell, 2007; Rayner & Cantor, 1987). One of the primary approaches to understanding risk perception is the psychometric paradigm, which is based on the premise that people's risk judgments are influenced by the unique qualities, or characteristics, of different types of risks (Slovic, 1987). The psychometric paradigm originated with work of Starr (1969), which attempted to weigh technological risks and benefits to answer the question, "How safe is safe enough?" Concerns about the validity of the assumptions in Starr's *revealed preferences approach* prompted Fischhoff, Slovic, Lichtenstein, Read, and Combs (1978) to conduct a similar study about *expressed preferences*. In this seminal study, Fischhoff et al. (1978) revealed that whereas experts focus on the quantitative characteristics of a risk object, most people make

risk judgments based on unique qualities, or characteristics, of different types of risks. According to this research, known as the psychometric paradigm, perceptions of risk increase to the extent that exposure is involuntary, the effects are immediate, the risk is not well understood, it is controlled by others, it is unfamiliar, and is not naturally occurring (Slovic, 2016). Subsequent research has classified this range of risk characteristics as falling into two key categories that determine the perception and acceptance of risk: dread and unknown risk (Slovic, 1987; Slovic et al., 1985; Slovic et al., 1986). These two key risk characteristics have emerged across multiple cultures (Cha, 2000; Englander, Farago, Slovic, & Fischhoff,1986; Renn & Rohrmann, 2000; Tiegen, Brun, & Slovic, 1988) and hazards (Gaskell et al., 2004; Gstraunthaler & Day, 2008).

Other research has examined individual characteristics that influence risk perceptions. Overall, risks tend to be judged lower by men (especially white men) than women (Bord & Connor, 1997; Davidson & Freudenburg, 1996; Finucane, Slovic, Mertz, Flynn, & Satterfield, 2000; Lindell & Hwang, 2008; Flynn, Slovic, & Mertz, 1994; Gutteling & Wiegman, 1993; Steger & Witt, 1989) and older people tend to view hazards as more harmful than younger people, as do individuals with lower incomes compared to those with higher incomes (Lindell & Hwang, 2008; Mohai & Bryant, 1998; Shepherd, Jepson, Watterson, & Evans, 2011).

The role of affect in the construction of risk perception has gained increasing awareness over the past two decades. Finucane, Alhakami, Slovic, and Johnson's (2000) *affective heuristic* and Loewenstein, Weber, Hsee, & Welch's (2001) *risk-as-feelings hypothesis* expanded individual risk perceptions to include not only what people think about a risk, but also how they feel about it, and how much they like or dislike an external stimulus.

Other scholars have examined social processes that influence risk perceptions. Most notably, the social amplification of risk framework (SARF) defines a phenomenon by which

psychological, social, institutional and cultural processes interact to amplify or attenuate public risk perceptions that subsequently shape risk behavior, influence institutional processes, and affect risk consequences (Kasperson et al., 1988; Kasperson, Golding, & Tuler, 1992; Kasperson & Kasperson, 1996). SARF posits that risk perceptions are influenced by various signals that are processed at formal or informal amplification stations. These amplification stations can include the scientists or experts who conduct and communicate technical risk assessments, the risk-management institution, news media, social activist organizations, opinion leaders within social groups, personal networks, and public agencies. Amplification occurs at two stages: in the transfer of information about the risk, and in the response mechanisms of society. Amplified risk leads to societal behavioral responses that result in secondary impacts, or ripple effects. Ripple effects might include enduring mental perceptions and attitudes, such as anti-technology attitudes or social apathy, impacts on business sales and economic activity, political and social pressure, social disorder such as protesting or rioting, and increased liability and insurance costs. An underlying assumption of SARF is that the nature and magnitude of risk are determined by these systems and public responses that create amplification.

The Relationship Between Trust and Risk

Trust in risk management has been found to lead to lower risk perceptions and higher perceived benefits from a hazard or technology (Flynn et al., 1992; Siegrist, Cvetkovich, & Roth, 2000; Viklund, 2003). It has also been found to increase individual acceptance of risk (Earle, 2004; Kasperson et al., 1992; Leiss, 1996; Löfstedt, 2005; Renn & Levine, 1991) and may influence public compliance with risk management recommendations (Trettin & Musham, 2000). Distrust in risk management, on the other hand, can increase public concern and lead people to oppose even the smallest risks and the institutions responsible for managing them (Freudenburg,

1993; Kasperson, et al., 1992; McComas & Trumbo, 2001; Poortinga & Pidgeon, 2003). Distrust has also been linked to political activism (Slovic, 1993; 1999) and it can lead to the stigmatization of technologies that experts deem relatively safe (e.g., Flynn et al., 1992) as well as the social amplification of risk after a risk management failure (Freudenberg, 2003; Kasperson, Kasperson, Pidgeon, & Slovic, 2003).

The Roots of Public Distrust in Risk Management

The earliest attempts at environmental risk communication focused on experts correcting the 'misperceptions' of an ignorant public (Bennet, 1999). The tendency was to view public involvement as a liability, leading to poor and more costly risk management decisions. Communication was typically viewed as a top-down process in which organizations inform and educate the public about risk information to persuade the public towards "rationality" and accept risk judgments. This approach contradicts the current view of risk communication. It has evolved over the past few decades from being viewed as simply a means to bridge the gulf between expert views and public perceptions of risk, to a more collaborative, democratic endeavor where attempts are made to understand people's perceptions of risk, openly provide information, and collaborate with the public to develop solutions. Communication is regarded as constructive dialogue among all stakeholders and a central part of the decision making with risk management (Gurabardhi et al., 2005; Rowe, 1994). On the whole, trust in risk management sustained significant damage during the evolutionary process (see Fischhoff, 1995 for a review).

Once trust has been broken, it is very difficult to re-establish. Slovic (1993) demonstrated the fragile nature of trust through what he called the trust asymmetry principle. The trust asymmetry principle holds that negative information reduces trust more than positive information increases trust and explains why trust can take years to build yet can be destroyed in

an instant by a single misstep. Slovic attributes the bias toward distrust to a few key factors. First, negative (trust-destroying) events are usually well-defined incidents and therefore more noticeable than positive (trust-building) ones. Second, negative events carry much greater weight than do positive events (e.g., Hovland and Weiss, 1951). In addition, sources of information about negative events tend to be seen as more credible than sources of positive news. Finally, once distrust has been introduced, it tends to be reinforced and perpetuated, either through avoidance of distrusted sources or by viewing future events through the lens of prior distrust. The trust asymmetry principle has been demonstrated across various risk contexts, ranging from nuclear power (Cvetkovich et al., 2002) through genetically modified foods (Poortinga & Pidgeon, 2004) to food additives (White, Pahl, Buehner, & Haye, 2003) and occupational risks (Conchie & Burns, 2008), and it may explain in part why public distrust still plagues environmental risk controversies.

Compounding the problem for individual risk managers is the overall decline in trust of social institutions, especially government and industry, over the past several decades. Research suggests that the less confidence people have in an institution, the more trust they assign to organizations that act as checks and balances (Lipset & Schneider, 1983). This explains why the number of citizen-based organizations have increased, and publics have increasingly shifted their trust to these groups (Heath & O'Hair, 2010; Peters, Covello, & McCallum, 1997). Laird (1989) describes the situation in which the public is increasingly reluctant to defer important decisions to institutional elites in the government as part of an overall "decline in deference" (p. 543). Slovic, Flynn, and Layman (1991) similarly describe a "crisis of confidence" (p. 1606) for technological risk managers. In line with these descriptions, a number of studies have shown that

most federal and state agencies, who are often tasked with environmental risk management, are perceived as untrustworthy (see Chryssochoidis, Strada, & Krystallis, 2009 for a review).

The risk management literature affirms the importance of trust for effective risk management and communication. It also brings to light the significant challenges risk managers and communicators face with earning and maintaining public trust, making the field of environmental risk management a ripe context to test the efficacy of incongruous source-message statements to enhance source trustworthiness.

CHAPTER THREE:
Study 1

The overall goal of this research was to examine the efficacy of incongruent versus congruent source-message combinations to change attitudes and enhance communicator trust. while taking into account environmental concern and political ideology. To investigate these ideas, two experiments were conducted. A scenario based on the proposal of a (hypothetical) hazardous waste site as a Superfund site was the context for the research. The scenario describes a hypothetical site--the Wagner Laboratory--that is being considered for designation as a Superfund site. Superfund is a federal program established by the United States Congress in 1980 designed to facilitate cleanup of sites that have been contaminated with chemical and other hazardous substances resulting from the poor management of hazardous waste, and authorizes the EPA to seek out the parties responsible for the contamination and assure their cooperation.

Study 1 explores how source-message incongruence and environmental concern influence perceptions and evaluations of the source and their message, as well as perceived risk and support for risk management. Study 2 examines how source-message incongruence or congruence and environmental concern influences cognitive elaboration of messages in the same environmental risk management context.

Study 1

Focusing on the domain of environmental risk management and, specifically, on messages advocating either for or against the designation of a hazardous waste site as Superfund, the primary goal of Study 1 was to determine the effect of source-message incongruence and on source trustworthiness, message believability, attitudes, perceived risk, and trust in risk management.

Hypotheses

Hypothesis 1: Taking into account the covariates (environmental concern and political beliefs), participants in conditions in which sources advocate incongruous messages (i.e., corporate source advocating pro-environmental message and environmental activist advocating a pro-business message) will report significant changes in attitudes regarding the Superfund designation, toward the advocated position, compared to congruous message conditions.

Hypothesis 2: Taking into account the covariates, participants in conditions in which sources advocate incongruous messages will report significantly more positive source trustworthiness between pre-message and post-message evaluations compared to congruous message conditions.

Hypothesis 3: Taking into account the covariates, participants in conditions in which sources advocate incongruous messages will report significantly lower perceptions of risk regarding the cleanup site, compared to those in which congruous messages are advocated.

Hypothesis 4: Taking into account the covariates, participants in conditions in which sources advocate incongruous messages will report significantly stronger support for risk management compared to when congruous messages are advocated.

Method

Participants

Participants included 270 adults (aged 18 and over) recruited from Amazon's Mechanical Turk (Mturk; Buhrmester, Kwang, & Gosling, 2011; Hauser & Schwarz, 2016; Paolacci, Chandler, & Ipeirotis, 2010) to participate in a study hosted by Qualtrics, an online survey platform. They were offered $1.00 for their participation and told it will take approximately 10-15 minutes of their time. The sample was restricted to U.S. citizens because two of the three

independent variables were delivered in a scenario-based manipulation related to U.S. environmental policy. From the initial sample of 270 respondents, 115 cases (42.5%) were removed from the analyses: 38 respondents were removed because they did not complete the survey (14.1%), 48 respondents (17.7%) were removed because they were either located outside of the U.S. or their IP address included multiple entries, seven people (2.6%) responded to the data quality measure that their data should not be used in the analysis, and 22 people (8.1%) were excluded for failing the manipulation checks. The final data set was comprised of 155 respondents.

The final sample (N = 155) was heavily male (58.7%), and predominantly Caucasian (72.9% Caucasian, 7.7% Hispanic/Latino, 9.7% Black/African American, 7.1% Asian/Pacific Islander, 4.1% Native American/Alaskan Native, and 0.6% Mixed Race). The average age was 36 years (M = 36.60, SD = 10.83) and most participants had at least some college experience (12.9% high school diploma, 19.4% some college no degree, 14.2% Associate degree, 39.4% Bachelor's degree, 9.0% Master's degree, 0.6% Doctoral degree, and 4.5% professional degree). In terms of political ideology, the sample leaned left (M = 2.72, SD = 2.13 on a 1-7 scale with left/right anchors). A total of 52.9% identified as Democrat, 22.6% as Republican, 23.9% as Independent, and 0.6% as Other.

Design and Procedure

The study employed a 2 (source type: corporate risk manager vs. environmental activist) X 2 (message type: pro-environmental versus pro-business) x 2 (time: pre-message versus post-message measures) mixed factorial design. A pre/post- measure was utilized to Participants were randomly assigned via block randomization to one of the four source-message conditions via a scenario-based manipulation.

Participants were told they would participate in a survey regarding environmental contamination and cleanup. They learned about the Wagner Laboratory, a former research facility near a town called Springfield where missile defense systems and rocket engines were tested and manufactured. Participants were told the facility is owned and operated by Wagner Aerospace Corporation and is being considered for designation by the U.S. Environmental Protection Agency as a Superfund site due to the contamination of groundwater at the site. Respondents were then asked to read a newspaper article containing the experimental manipulations. The newspaper article reported on an EPA-sponsored public meeting about the Wagner Laboratory and the Superfund designation. Page 1 of the article described general background information about the site--its operational history, potential impacts from the contamination left behind, and ongoing cleanup efforts. Participants were also introduced to the "Friends of the Environment," an environmental organization that was described as being active in ensuring the cleanup of the Wagner Laboratory, and critical of the speed at which cleanup was occurring.

After reading page 1, and before reading page 2 of the article, participants were provided some additional background information about the Superfund designation. Participants were told that having a site designated as a Superfund is controversial, and that some people are strongly in favor of the designation, and others strongly oppose it. In order to set expectancies regarding source-message congruence for both sources and positions, all participants read both viewpoints about Superfund designations in general. Participants read both an argument in support of Superfund designation and an argument against it. The argument in favor of Superfund stated that the EPA should have the authority to mandate the cleanup of hazardous waste sites to ensure that parties responsible for the contamination bear the burden of the cleanup costs. The argument

against Superfund designation stated that a Superfund designation adds excessive regulatory oversight that can lead to increased cleanup costs and extend the time to complete cleanup. The pro-Superfund designation viewpoint was described as a generally pro-environmental position and the anti-Superfund designation viewpoint was described as generally pro-business position. After reading the arguments for and against Superfund designation, respondents were asked to finish reading the newspaper article. Page 2 conveyed the experimental manipulations in the form of a direct quote from a gentleman by the name of Steve Fields who spoke at the EPA public meeting. Mr. Field's affiliation and message position varied depending on experimental condition. In environmental source conditions, Mr. Fields was described as the president of Friends of the Environment, a nonprofit organization committed to the protection of the environment and public health. In the corporate source conditions he was described as the cleanup project manager for Wagner Aerospace Corporation (owner of the cleanup site). In the pro-environmental conditions, Mr. Fields stated support for the Superfund designation, and in the pro-business conditions, he opposed the Superfund designation.

After reading Mr. Field's position on Superfund designation, participants completed survey questions intended to measure attitudes toward Superfund, perceived trustworthiness of the Wagner Aerospace Corporation and Friends of the Environment, perceived risk associated with the Wagner Laboratory site, and support for risk management (Wagner Aerospace Corporation).

Manipulated Variables

Source type. Steve Fields, was described as either the cleanup project manager for the Wagner Aerospace Corporation, owner of the potential Superfund site, or the president of

Friends of the Environment, a nonprofit organization committed to the protection of the environment and public health.

Message position. Steve Fields was quoted as either strongly supporting (pro-environmental) or strongly opposing (pro-business) the Superfund designation of the Wagner Laboratory.

In total, there were two congruent (environmentalist source/pro-environmental message, corporate source/pro-business message) and two incongruent (environmentalist source/pro-business message, corporate source/pro-environmental message) conditions. See Appendix A for the newspaper article for each of the four experimental conditions.

Measures

Environmental concern. Prior research suggests that greater environmental concern is associated with greater risk perceptions across a variety of ecological risks (Kellstedt, Zahran, & Vedlitz, 2008; Stern and Dietz, 1994; Slimak and Dietz, 2006). As such, prior to reading the experimental messages, respondents were asked to answer a series of questions about their thoughts and feelings toward the Earth and the environment. Participants completed the revised New Environmental Paradigm scale (NEP; Dunlap, Van Liere, Mertig, & Jones, 2000). The NEP is a 15-item, 7-point Likert Scale ranging from *Strongly Disagree to Strongly Agree* ($\alpha = .73$). In the environmental psychology literature, NEP is commonly understood to measure general environmental concern (Bogner & Wiseman, 2002; Poortinga, Steg, & Vlek, 2004; Schuett & Ostergren, 2003). Sample items include "Humans have the right to modify the natural environment to suit their needs," "Humans are seriously abusing the environment," and "The so-called "ecological crisis" facing humankind has been greatly exaggerated."

Attitudes. To measure attitudes, participants then gave their opinion about the Superfund designation by responding to a 7-point scale ranging from 1-"oppose Superfund designation" to 7-"support Superfund designation." In addition, they responded to a six-item, 7-point semantic differential scale with the following anchors: bad/good, unfavorable/favorable, harmful/beneficial, worthless/valuable foolish/wise, and unfair/fair. The seven items were combined into a single measure ($\alpha = .98$). Attitudes were measured both before and after participants were exposed to the experimental manipulations.

Source trustworthiness. Respondents completed a six-item, 7-point semantic differential scale evaluating the trustworthiness of both the Friends of the Environment ($\alpha = .93$), and Wagner Aerospace Corporation ($\alpha = .97$) sources. Scale anchors were: negative/positive, does not care about me/cares about me, not credible/credible, biased/unbiased, bad/good, and untrustworthy/trustworthy. Source trustworthiness for both the corporate and environmental sources were measured at two time points: once before the experimental manipulation and once after. The trustworthiness of the source communicating the experimental message was of most interest to this investigation, but respondents evaluated the trustworthiness of both the corporate and environmental organizations, regardless of their message condition. Thus, it is possible to examine the evaluations of trustworthiness for the organization at odds with the source of the experimental message (page 1 of the newspaper article stated that the Friends of the Environment organization had been "critical of the speed at which the cleanup was occurring," setting up the group as critics of the Wagner Corporation). For the purposes of this study, these groups will be referred to as the source's outgroup.

Perceived risk. A seven-item Likert Scale (1-7; *Strongly Disagree to Strongly Agree*) was used to assess perceived risk associated with the contamination from the Wagner Laboratory site

(α = .70). Sample questions included "The threat from contamination of the Wagner Laboratory site will extend to future generations," "Living near the Wagner Laboratory site is risky," and "The Wagner Laboratory site poses negative impacts to human health." Perceived risk was measured before and after the experimental manipulations.

Support for risk management. Participants rated their trust in "Wagner Aerospace Corporation management" to effectively manage the contamination from Wagner Laboratory site. Responses were given on a scale ranging from 1-"strongly disagree" to 7-"strongly agree" (α = .97). The six scale items were: "I trust Wagner Aerospace Corporation management to: (1) effectively manage the contamination from the Wagner Laboratory site, (2) provide the best available information on the contamination from the Wagner Laboratory site, (3) provide me with enough information to decide what actions I should take regarding the contamination from the Wagner Laboratory site, (4) provide me with truthful information about the contamination from the Wagner Laboratory site, (5) provide me with timely information the contamination from the Wagner Laboratory site, (6) to make wise decisions regarding the cleanup of the Wagner Laboratory site. Support for risk management measured both before and after participants were exposed to the experimental manipulations.

Manipulation check and data quality measures. After reading the newspaper article containing the experimental manipulations, participants were asked to report (depending on condition) either Wagner Aerospace Corporation or Friends of the Environment's position regarding the Superfund designation on a Likert-type scale (1-7; Oppose Superfund designation to Support Superfund designation). Participants whose ratings were not 5 or above, or 3 and below, depending on condition, were removed from the analysis. Participants also reported whether their attention to the study was adequate to produce accurate responses. It was

acknowledged that some people get distracted during surveys and are not able to respond thoughtfully, and participants responded to the following yes/no question: Without penalty (you will still receive compensation for your time), please tell us -- should we use the data from your responses?"

Political Ideology. Participants indicated their current political ideology on a 2-item Likert Scale (1-7; left/right and liberal/conservative); $\alpha = .94$). Lower scores indicate more liberal political leanings and higher scores indicate more conservative political leanings.

Demographics. Participant background information was collected, including age, sex, education level, and ethnicity. See Appendix B for all Study 1 Measures. See also Table 1 for scale correlations and descriptive statistics. among all scales.

Table 1

Study 1 Pre-Test Variables: Correlations and Descriptive Statistics (N=155)

Measure	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1 Attitudes	1	-.036	.295**	.204*	-.106	.117	-.307**
2 Corporate source trustworthiness		1	.083	-.281**	.869**	.111	.281**
3 Environmental source trustworthiness			1	.176*	.085	.291**	.053
4 Perceived risk				1	-.242**	.473**	-.151
5 Support for risk management					1	.166*	.284**
6 Environmental concern							.015
7 Political ideology							1

Measure	1	2	3	4	5	6	7
M	5.66	3.38	5.29	4.99	3.24	4.66	2.74
SD	1.46	1.51	1.04	0.75	1.59	0.78	2.06
α	.98	.97	.93	.70	.97	.73	.94

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Results

Correlational Analyses

In line with prior research, attitudes were significantly, positively correlated with perceived risk ($r = .204$, $p < .05$). Attitudes and environmental concern were also positively correlated ($r = .172$, $p < .05$), indicating that the more environmental concern a participant reported, the more positive their attitudes toward the Superfund designation. Additionally, attitudes significantly, positively correlated with trust in the environmental source, such that the greater the trust, the more positive attitudes toward the Superfund designation ($r = .295$, $p < .01$), There was also a significant, negative correlation between attitudes and political ideology, such that the further right, or more conservatism participants reported, the less they supported the Superfund designation ($r = - .347$, $p < .01$). In other words, the more conservative one's political ideology, the less they aligned with the pro-environmental position regarding Superfund (and, thus the more they aligned with the pro-business position). Similarly, there was a significant positive correlation between political ideology and both corporate source trustworthiness ($r = .281$, $p < .01$) and support for risk management ($r = .284$, $p < .01$). Participants reporting more

conservative political leanings reported more trust in the corporate source, and more support for risk management. Perceived risk was significantly positively correlated with environmental concern ($r = .473$, $p < .01$) and negatively correlated with corporate source trustworthiness ($r = -.281$, $p < .01$) and support for risk management ($r = -.242$, $p < .01$).

Pre-Message Evaluations

Univariate analysis of variance yielded no significant initial differences between conditions of participants' responses to key pre-message measures of attitudes regarding the Superfund designation $F(3, 154) = 1.07$, $p = .363$, perceptions of trustworthiness of the environmentalist source $F(3, 154) = .045$, $p = .987$ or the corporate source $F(3, 154) = 1.71$, $p = .168$. However, overall, pre-message attitudes were biased toward the environmental position such that respondents were overall in favor of the environmental position of designating the Wagner Laboratory as a Superfund site ($M = 5.65$, $SD = 1.46$ on a 7-point scale). There was also a pro-environmental bias regarding pre-message evaluations of source trustworthiness. A paired sample t-test revealed that, overall, the environmentalist source was perceived as significantly more trustworthy ($M = 5.29$, $SD = 1.04$) than the corporate source ($M = 3.38$, $SD = 1.51$), $t(154) = 12.88$, $p < .001$, see Figure 1.

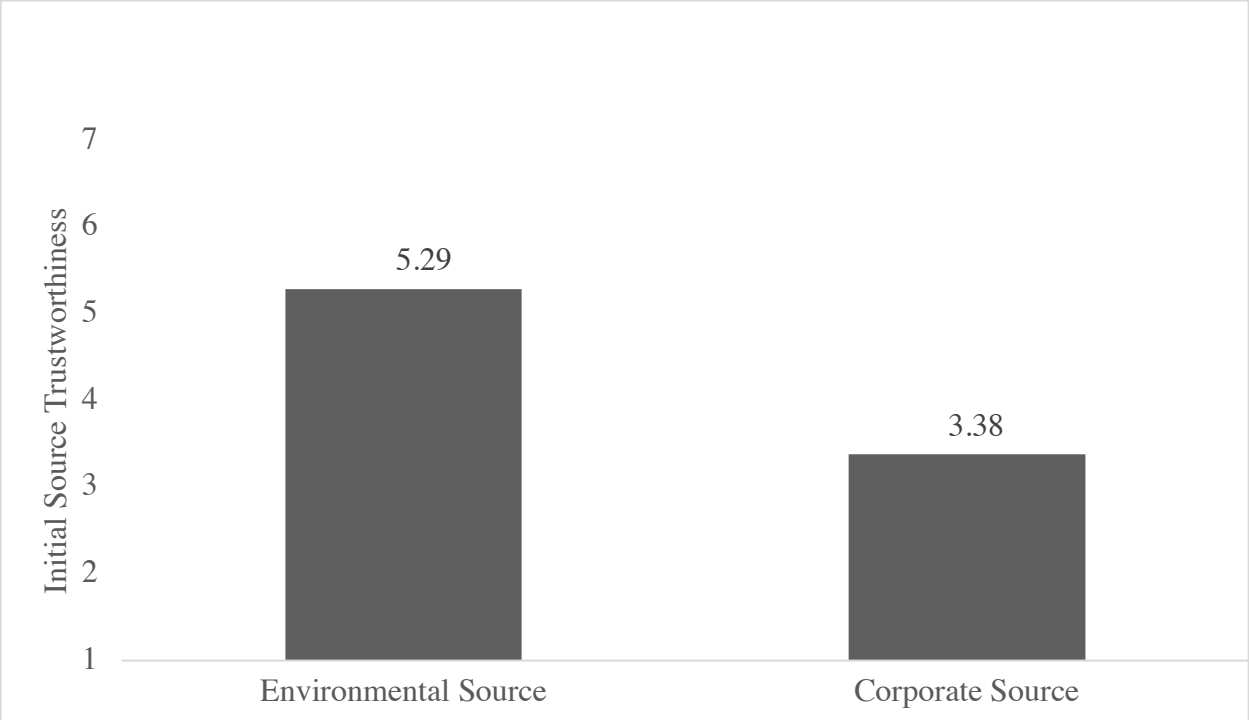

Figure 1. Pre-message evaluations of source trustworthiness. Note: higher scores indicate more trust.

Source and Message Effects

A three-way mixed MANCOVA was conducted to assess whether there was a statistically significant difference between conditions across time points for attitude, source trustworthiness, perceived risk, and support for risk management while taking into account the covariates of environmental concern and political ideology. The independent between-group variables were source (environmentalist versus corporate) and message type (pro-environmental versus pro-business). The repeated measure (Time 1, Time 2) indicated pre-message and post-message measures of the dependent variables (attitude, source trustworthiness, perceived risk, and support for risk management).

Between Subjects Effects

The MANCOVA for the between effect showed there was a statistically significant overall main effect of message type, $F(5, 145) = 2.97$, $p = .013$; Pillai's Trace = .094, partial η^2 = .094, while taking into account the covariates; however, the overall main effect of source type did not reach statistical significance ($F(5, 145) = 2.00$, $p = .08$; Pillai's Trace = .065, partial η^2 = .065). The main effect of message type was significant for corporate source trustworthiness, F(1, 149) = 10.18, $p < .01$, partial $\eta^2 = .064$, and support for risk management, $F(1, 149) = 11.72$, p = .001, partial $\eta^2 = .073$. To follow up on the significant main effect of message type, post hoc analyses were conducted to assess the differences between groups, while taking the covariates into account. Pairwise comparisons indicated that, regardless of the source type, when the pro-environmental message was advocated, respondents reported significantly more trust in the corporate source ($M = 3.73$) than when the pro-business message was endorsed ($M = 3.01$), M_{diff} = .204, $p < .01$, *95% CI* [.271, 1.15]. In addition, the pro-environmental message resulted in significantly more support for risk management ($M = 3.66$) compared to the pro-business message ($M = 2.86$), $M_{diff} = .803$, $p = .001$, *95% CI* [.340, 1.27]. The MANCOVA also revealed a statistically significant two-way interaction between source type and message type, $F(5, 145)$ = 5.52, $p = .02$; Pillai's Trace = .088, partial $\eta^2 = .088$. The two-way source type by message type interaction was significant for corporate source trustworthiness, $F(1, 149) = 2.79$, $p < .05$, partial $\eta^2 = .036$, and environmental source trustworthiness, $F(1, 149) = 4.38$, $p < .05$, partial $\eta^2 = .029$. Post hoc tests revealed that in conditions in which the corporate source advocated the pro-environmental (incongruent) message, they were viewed as significantly more trustworthy (M = 4.09, $SD = 1.41$) overall than when advocating the pro-business (congruent) message position (M = 2.70, $SD = .870$), $M_{diff} = .1.29$, $p < .001$, *95% CI* [.707, 1.87], providing support for Hypotheses 2. On the other hand, when the environmental source advocated the pro-environmental

(congruent) message, they were perceived as significantly more trustworthy overall (M = 5.32, SD = 1.28) than when advocating the pro-business (incongruent) message (M = 4.81, SD = .876), M_{diff} = .513, $p < .05$, *95% CI* [.059, .968], although there was no difference in corporate source trustworthiness. This result was the opposite of what was predicted in Hypothesis 2. Hypothesis 1, 3, and 4 were not supported.

Within Subjects Effects

The MANCOVA test for the within (repeated measures) effect did not show an overall main effect of time, $F(5, 145) = .539$, $p = .746$; Pillai's Trace = .018, partial $\eta^2 = .018$. However, it revealed a two-way interaction between source type and time, $F(5, 145) = 6.15$, < .001; Pillai's Trace = .175, partial $\eta^2 = .175$ and a two-way interaction between message type and time, $F(5, 145) = 5.81$, $p < .001$; Pillai's Trace = .167, partial $\eta^2 = .167$. The multivariate test for the within effect also showed a statistically significant three-way interaction between source type, message type, and time, indicating an overall difference between the four message conditions across time points while taking into account environmental concern and political ideology, $F(5, 145) = 10.59$, $p <.001$; Pillai's Trace = .267, partial $\eta^2 = .267$. Univariate tests indicated this three-way interaction was significant for attitudes ($F(1, 149) = 3.92$, $p = .049$, partial $\eta^2 = .026$), environmental source trustworthiness, $F(1, 149) = 12.21$, $p = .001$, partial $\eta^2 = .076$), corporate source trustworthiness ($F(1, 149) = 18.80$, $p < .001$, partial $\eta^2 = .175$), and support for risk management, $F(1, 149) = 12.91$, $p < .001$, partial $\eta^2 = .080$. The differences in perceived risk across conditions did not reach statistical significance ($F(1, 149) = 12.91$, $p < .080$.

To follow up on the significant interaction, simple effect analyses were conducted to assess which groups had statistically significant differences between pre-test and post-test while taking the covariates into account.

Attitudes

Simple effects analyses of the two-way interaction between source type and time showed that environmental source conditions, regardless of message advocated, produced less favorable attitudes toward the Superfund designation (the pro-business position) between pre-message (M = 5.46, SD = 1.60) and post-message measures (M = 5.28, SD = 1.80), though the change did not reach statistical significance M_{diff} = .189, p = .09, *95% CI* [-.30, .408]. In contrast, the corporate source conditions, regardless of their message, produced more favorable attitudes toward the Superfund designation (the pro-environmental position) between pre-message (M = 5.87, SD = 1.27) and post-message measures (M = 5.98, SD = 1.34), though the change was not statistically significant, M_{diff} = -.113, p = .11, *95% CI* [-.249, .024]. A univariate comparison of attitude change scores revealed that the environmental source produced significantly more attitude change between time points than the corporate source (M = -.189 versus M = .113, respectively), M_{diff} = -.294, p = .03, *95% CI* [-.563, -.025].

Simple effects analyses of the two-way interaction between message and time showed that, regardless of the source, when the pro-business message was advocated, there was a significant change in attitudes between the pre-message (M = 5.69, SD = 1.48) and post-message measures (M = 5.41, SD = 1.71), M_{diff} = .275, p < .01, *95% CI* [.079, .470] toward the pro-business position. In other words, the pro-business message led to more negative attitudes toward the Superfund designation. On the other hand, when the environmental message was advocated, there was no statistically significant change in attitudes between pre-message (M = 5.63, SD = 1.46) and post-message measures (M = 5.78, SD = 1.56), M_{diff} = -.149, p = .11. A univariate comparison of attitude change scores revealed that the pro-business message produced

significantly more attitude change between time points than the pro-environmental source (M = -.275 versus M = .149, respectively), M_{diff} = -.462, p = .001, *95% CI* [-.734, -.191].

Simple effects analyses of the three-way interaction, which subsumes all main effects and interactions, and hence is the most relevant of the comparisons, revealed significant differences in the persuasiveness of the incongruent compared to the congruent source-message combinations. In line with Hypothesis 1, the environmental source advocating the pro-business (incongruent) message led to a significant change in attitude toward the corporate position between pre-message (M = 5.50, SD = 1.54) and post-message measures (M = 4.99, SD = 1.76), M_{diff} = .517, p = .001, *95% CI* [.222, .812], whereas when the corporate source advocated the pro-business (congruent) message, there was no attitude change between pre-message and post-message measures (M = 5.91, SD = 1.40 versus M = 5.93, SD = 1.52, p = .808). For the corporate source advocating the pro-environmental (incongruent) message, there was a significant change in attitude pre-message and post-message attitude measures toward the environmental position, as expected (M = 5.85, SD = 1.16 versus M = 6.03, SD = 1.21, respectively), but the change was not quite statistically significant (p = .084). In line with expectations, the environmental source advocating the pro-environmental (congruent) message, led to no attitude change between pre-message and post-message measures (M = 5.41, SD = 1.67 versus M = 5.53, SD = 1.82, respectively), most likely because of a ceiling effect. See Figure 2.

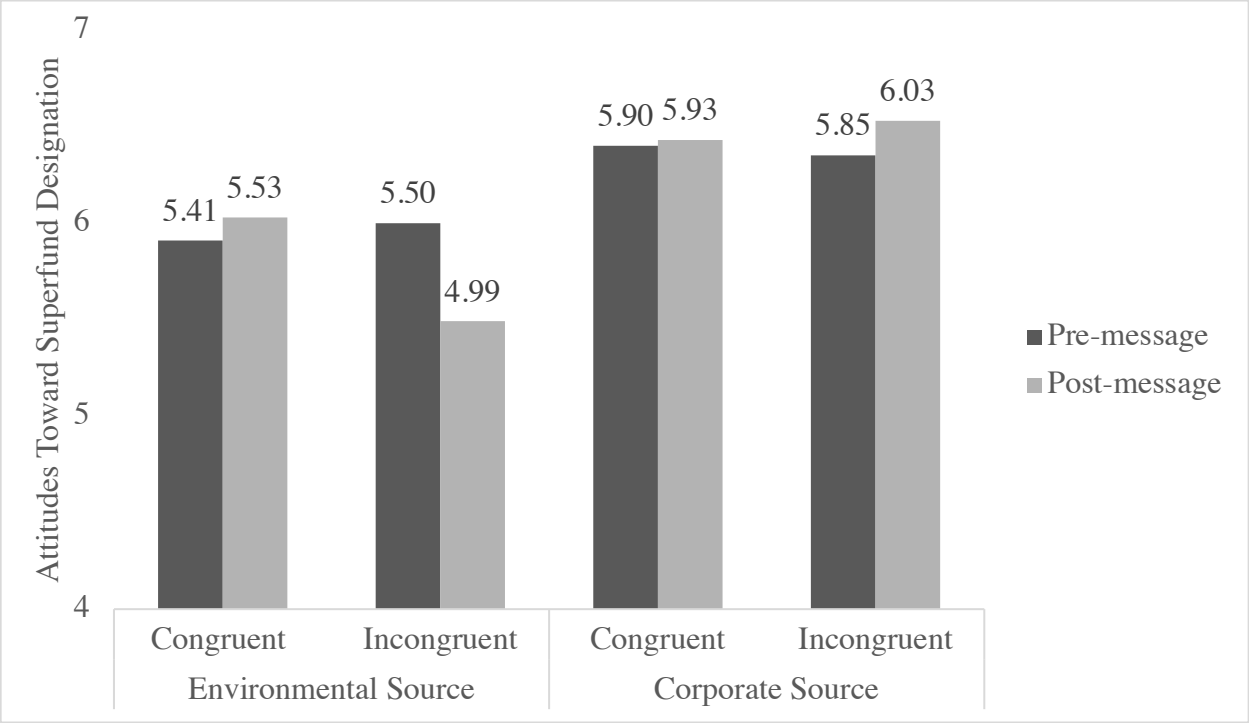

Figure 2. Attitudes as a function of source, message, and time. Note: higher scores indicate more positive attitudes toward Superfund (the pro-environmental position) and lower scores indicate more negative attitudes toward Superfund (the pro-business position).

Additionally, a comparison of attitude change scores between Time 1 and Time 2 revealed a significant difference in change scores across conditions, $F(3, 155) = 6.69$, $p < .001$. The most persuasive source-message combination was the environmentalist source advocating the pro-business message ($M = -.546$, $SE = .131$), followed by the other incongruent combination in which the corporate source advocated the pro-environmental message ($M = .184$, $SE = .127$), see Figure 3.

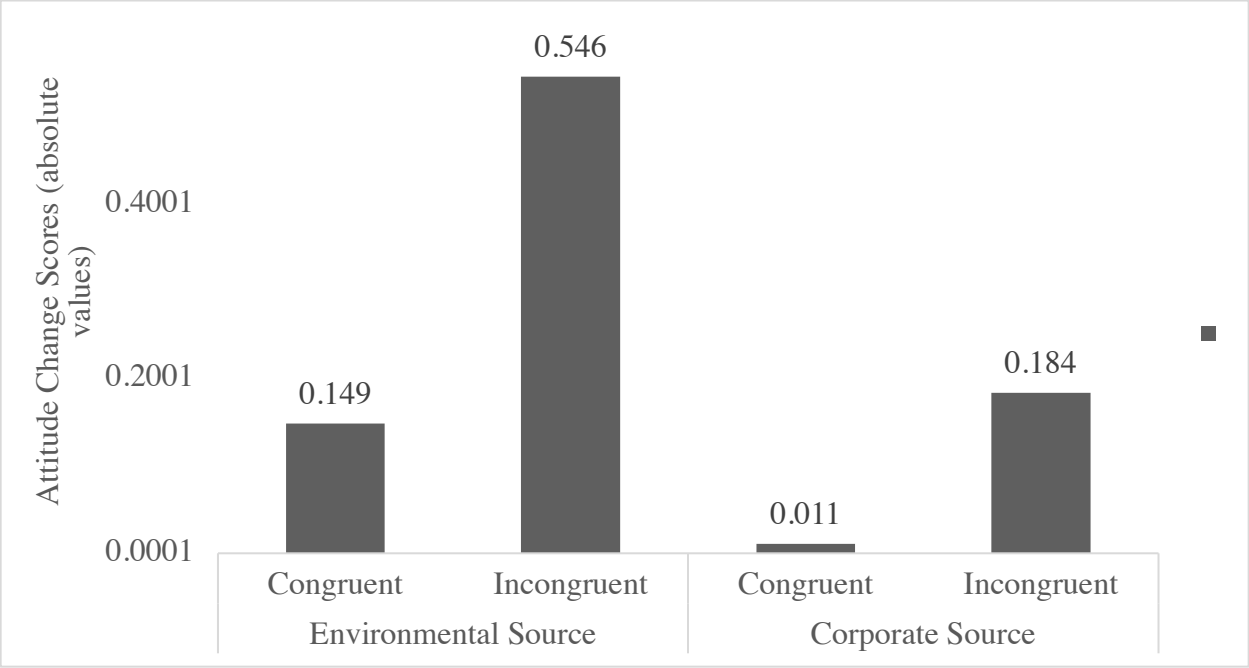

Figure 3. Attitude changes scores across experimental conditions

Source Trustworthiness

Simple effects analyses of the two-way interaction between message type and time showed that, regardless of the source, when the pro-environmental message was advocated, perceptions of corporate source trustworthiness significantly increased between pre-message (*M* = 3.63, *SD* = 1.69) and post-message measures (*M* = 3.98, *SD* = 1.73), M_{diff} = -.353, *p* = .01, *95% CI* [-.631, -.075], taking into account the covariates. Evaluations of environmental source trustworthiness also increased between pre-message (*M* = 5.28, *SD* = 1.13) and post-message (*M* = 5.41, *SD* = 1.19) measures, though the change did not reach statistical significance M_{diff} = -.139, *p* = .08, *95% CI* [-.299, .021]. When the pro-business message was advocated, regardless of the source advocating the message, corporate source trustworthiness decreased significantly between pre-message (*M* = 3.10, *SD* = 1.23) and post-message (*M* = 2.78, *SD* = 1.34) evaluations, M_{diff} = .317, *p* < 05, *95% CI* [.041, .593]. Environmental source trustworthiness also decreased

significantly between pre-message (M = 5.30, SD = 0.94) and post-message (M = 4.85, SD = 1.40) evaluations, M_{diff} = .453, p = 01, *95% CI* [.102, .804].

Simple effects analyses of the two-way interaction between source and time revealed significant differences between evaluations of source trustworthiness, regardless of message type, between timepoints, while taking into account environmental concern and political ideology. In the environmental source conditions, evaluations of trustworthiness of the (environmental) source significantly decreased between pre-message (M = 5.30, SD = 1.19) and post-message measures (M = 4.85, SD = 1.50), M_{diff} = .447, p < .01, *95% CI* [.140, .753]. Evaluations of trustworthiness of the source's outgroup (corporation) also decreased significantly between pre-message (M = 3.44, SD = 1.58) and post-message evaluations (M = 3.22, SD = 1.62), M_{diff} = .220, p < .05, *95% CI* [.018, .422].

On the other hand, in corporate source conditions, regardless of the message, trustworthiness of the (corporate) source increased between pre-message (M = 3.32, SD = 1.44) and post-message measures (M = 3.66, SD = 1.70), though it did not quite reach statistical significance, M_{diff} = -.338, p = .06, *95% CI* [-.691, .015]. Evaluations of trustworthiness of the source's outgroup (environmental organization) also increased between pre-message (M = 5.27, SD = 0.87) and post-message measures (M = 5.48, SD = 0.99), M_{diff} = -.212, p < .01, *95% CI* [-.355, -.068].

The three-way interaction between source, message, and time subsumes and clarifies these two-way interactions. The environmentalist source advocating the pro-business (incongruent) message was evaluated as significantly less trustworthy between pre-message (M = 5.34, SD = 1.01) and post-message measures (M = 4.29, SD = 1.44), M_{diff} = 1.04, p < .001, *95% CI* [.515, 1.57]. This was in the opposite direction predicted in Hypothesis 1. The corporate

source advocating the environmental (incongruent) message was evaluated, in accordance with expectations, significantly more trustworthy between pre-message (M = 3.56, SD = 1.60) and post-message measures (M = 4.62, SD = 1.46), M_{diff} = - 1.06, p < .001, *95% CI* [- 1.42, -.695]. As expected based on Hypothesis 2, there was no significant change in perceptions of environmental source trustworthiness in the congruent message condition in which the environmentalist source advocated the pro-environmental message (M = 5.27, SD = 1.34 versus M = 5.37, SD = 1.37, p = .426). However, contrary to Hypothesis 2, perceptions of source worthiness of the corporate source significantly decreased in the congruent message condition in which the corporate source advocated the pro-business message (M = 3.01, SD = 1.16 versus M = 2.40, SD = 1.03), M_{diff} = .609, p = .018, *95% CI* [.113, 1.11], see Figure 4.

The various source-message combinations also produced significant changes in the evaluations of trustworthiness of the source's outgroup. For example, when the environmental source advocated the pro-environmental (congruent) message, evaluations of trustworthiness of the corporation (outgroup) significantly decreased between pre-message (M = 3.70, SD = 1.79) and post-message measures (M = 3.34, SD = 1.75), M_{diff} = .353, p = .01, *95% CI* [.079, .627]. However, when the environmental source advocated the pro-business message, evaluations of corporate trustworthiness did not change between pre-message (M = 3.18) and post-message (M = 3.10) measures, p = .615. When the corporate source advocated the pro-business message, evaluations of trust in the outgroup environmental organization significantly increased between pre-message (M = 5.26, SD = 0.86) and post-message measures (M = 5.52, SD = 1.01), (M_{diff} = -.266, p < .05, *95% CI* [-.514, -.018]. When the corporate source advocated the pro-environmental message, evaluations of trustworthiness of the environmental organization (outgroup) also increased between pre-message (M = 5.29, SD = 0.89) and post-message

measures (M = 5.46, SD = 0.99), though it did not quite reach statistical significance (M_{diff} = -.171, p = .07, *95% CI* [-.354, .013].

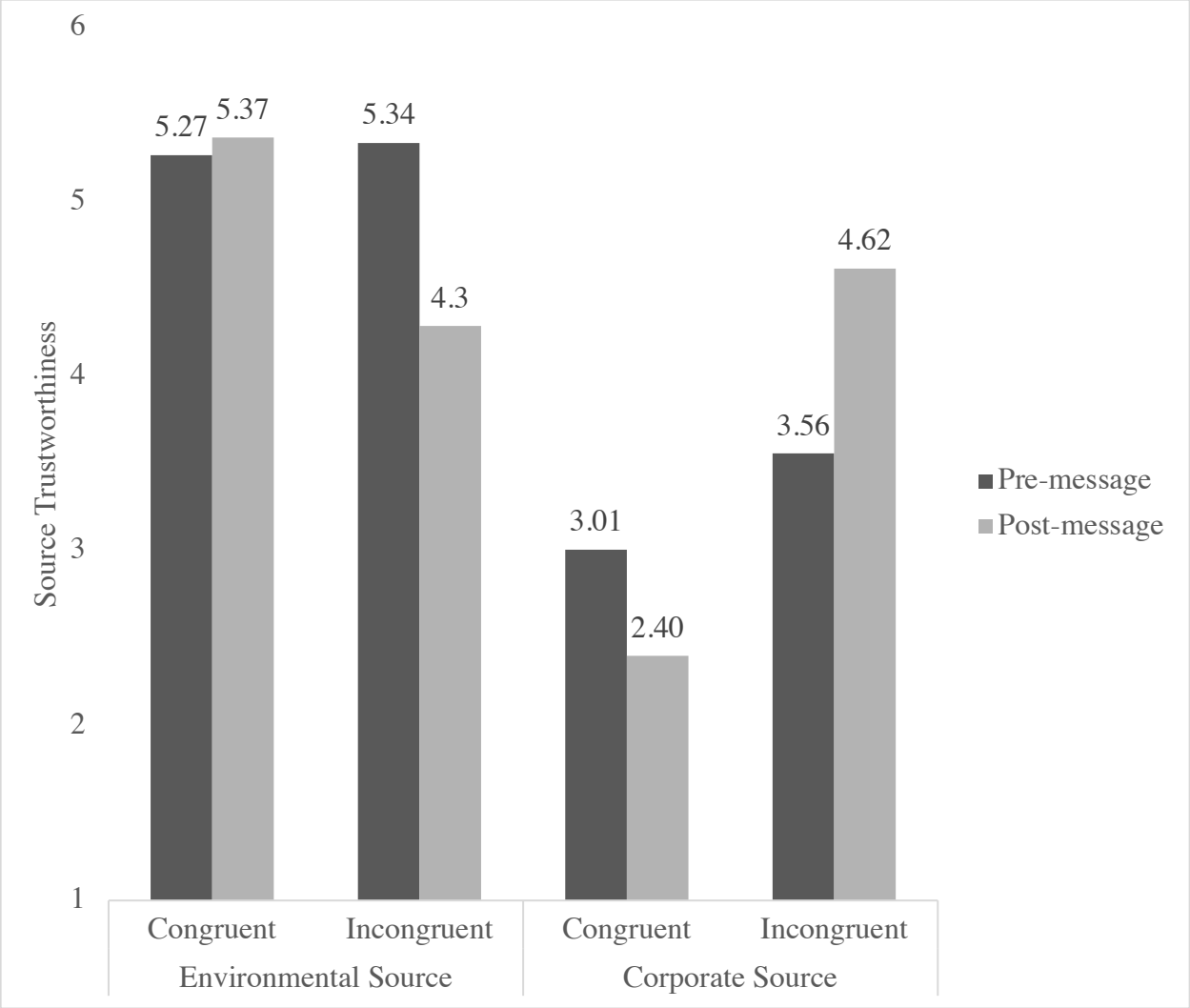

Figure 4. Source trustworthiness as a function of source, message, and time. Note: higher scores indicate higher levels of trust.

Support for Risk Management

Results also revealed a two-way interaction between source and time for support for risk management. Overall, regardless of message advocated, the corporate source elicited an significant increase in support for risk management between pre-message (M = 3.26, SD = 1.55)

and post-message measures (M = 3.61, SD = 1.80), M_{diff} = -.341, p = .03, *95% CI* [-.646, -.035]. The environmental source did not lead to a change in reported support for risk management between the pre- and post-message (M = 3.22, SD = 1.64 versus M = 3.12, SD = 1.62, respectively, p = .35).

Simple effects test of the two-way interaction between message and time revealed that when the pro-environmental message was advocated, support for risk management significantly increased between pre-message (M = 3.60, SD = 1.72) and post-message measures (M = 3.91, SD = 1.74), M_{diff} = -.314, p = .01, *95% CI* [-.561, -.067]. When the pro-business message was advocated, regardless of the source, there was no change between pre-message and post-message measures of support for risk management (M = 2.82, SD = 1.31 versus M = 2.69, SD = 1.45, respectively, p = .36).

The significant three-way interaction between source, message, and time subsumes and clarifies the two-way interactions. In the incongruent condition in which the corporate source advocated the pro-environmental position, support for risk management significantly increased between pre-message (M = 3.65, SD = 1.66) and post-message measures (M = 4.45, SD = 1.61), M_{diff} = -0.80, $p < .001$, *95% CI* [-1.14, -.456], supporting Hypothesis 4. However, contrary to what was expected in Hypothesis 4, in the incongruent condition in which the environmental source advocated the pro-business condition, there was no change between pre-message and post-message measures of support for risk management (M = 2.86, SD = 1.38 versus M = 2.85, SD = 1.75, respectively, p = .94). As expected, neither of the congruent conditions produced significant changes in the support for risk management between pre-message and post-message measures (M = 2.76, SD = 1.25 versus M = 2.50, SD = 1.42, p = .28 for the corporate source/pro-

business message condition and $M = 3.55$, $SD = 1.81$ versus $M = 3.38$, $SD = 1.73$, $p = .24$ for the environmentalist source/pro-environmental message condition). See Figure 5.

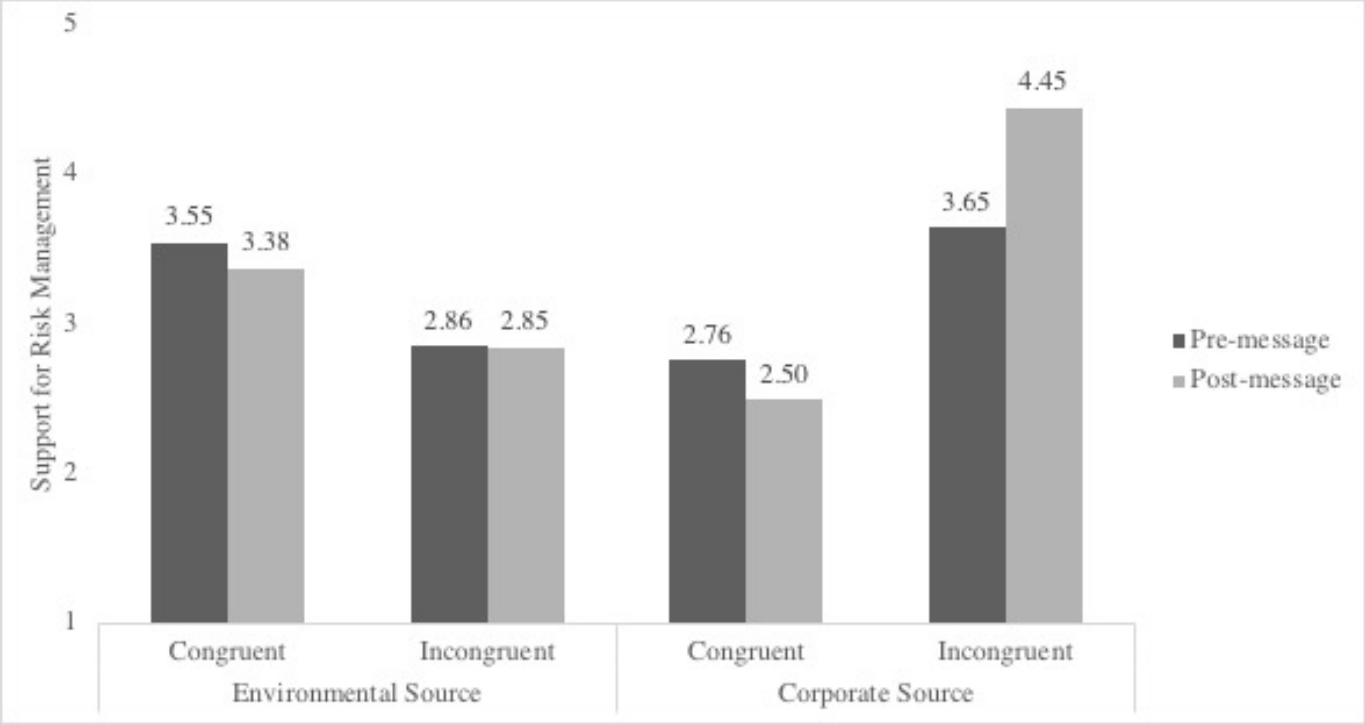

Figure 5. Support for risk management as a function of source, message, and time. Note: higher scores indicate more support for risk management.

Discussion

The purpose of Study 1 was to examine the influence of source-message incongruence on attitudes, perceived risk, corporate and environmental source trustworthiness, and support for risk management. Results of correlational analyses revealed some notable relationships among the dependent variables. In line with prior research in the risk management and communication literatures, there was a positive relationship between attitudes and perceived risk. Additionally, affirming what risk communication literatures have established regarding the relationship between trust and perceived risk, results indicated perceived risk was positively correlated with

environmental source trustworthiness, and negatively correlated with corporate source trustworthiness and support for risk management. Attitudes and political ideology were negatively correlated, such that the more conservative one's political ideology, the less they aligned with the pro-environmental position regarding Superfund (and, thus the more they aligned with the pro-business position). In addition, participants with more environmental concern. Similarly, there was a significant positive correlation between political ideology and both corporate source trustworthiness and support for risk management: participants reporting more conservative political leanings reported more trust in the corporate source, and more support for risk management.

Study 1 hypothesized that that sources advocating incongruent message positions (i.e., environmentalist advocating the pro-business message and corporate source advocating the pro-environmental message) would lead to more positive attitudes toward their message position, and be rated more trustworthy than sources advocating congruent messages. It was also expected that perceptions of risk would decrease, and support for risk management would increase in the incongruent, compared to the congruent conditions.

The data support Hypothesis 1—the incongruent source-message conditions (for both source-message combinations) were more persuasive than the congruent source-message conditions, and led to significant attitude shifts in the expected directions. As expected, when the corporate source advocated a pro-environmental message, there was a significant change in attitudes: respondents' attitudes toward the Superfund designation significantly increased, i.e., moved toward the advocated, pro-environmental message position, though the difference was only marginally significant ($p = .08$). Likewise, when the environmental source advocated the pro-business, position, attitudes toward the Superfund designation decreased, i.e., moved toward

the pro-business position. Comparisons of Time 2 measures did not show a significant interaction between source and message type on attitudes—in other words,

Hypothesis 2 only received partial support. In the incongruous condition in which a corporate source advocated a pro-environmental message position, source trustworthiness was enhanced, as expected, However, in the incongruent source-message combination in which an environmentalist source advocated the pro-business message position, evaluations of source trustworthiness decreased between time points, rather than increased as hypothesized.

Hypothesis 3 was not supported—perceptions of risk associated with the Wagner Laboratory site did not differ across the various source-message conditions, either when comparing Time 1 and Time 2 measure, nor when examining only Time 2 measures across conditions.

Hypothesis 4 was only partially supported. The corporate source advocating the pro-environmental (incongruent) message influenced (increased) reported support for risk management but the incongruent message from the environmentalist source did not similarly affect support for risk management. This make sense since the corporate source in this scenario was also part of the risk management.

Because respondents evaluated the trustworthiness of both the corporate and environmental organizations, regardless of the source who delivered the experimental message, it was possible to examine the evaluations of trustworthiness for the organizational "outgroup." The newspaper article described the environmental group as a critic of the cleanup that was underway by the corporation, setting up the environmental group and corporation as being at odds with each other. Exploratory analyses were conducting to examine these effects. In line with the pro-environmental bias observed in this study, when the environmental source

advocated the pro-environmental message, evaluations of corporate source trustworthiness significantly decreased. Yet, when the corporate source advocated the pro-business message, evaluations of source trustworthiness of the environmental group were enhanced. Interestingly, when the corporate source advocated the pro-environmental message, not only were evaluations of his own (corporate source) trustworthiness significantly enhanced, but trust in the environmental source also increased significantly between pre-message and post-message measures. It is possible that when trust in a communicator is bolstered by incongruent source-message pairings, the sense of trust may be strong enough to influence evaluations of trust of other relevant parties.

These results suggest that violations of expectancies -- or unexpected source-message pairings -- can enhance persuasiveness. However, they may only increase perceptions of trustworthiness when their message is positive, or in accord with existing attitudes. In cases in which the message is negative, incongruent source-message pairings may have a boomerang effect and lead to significantly reduced perceptions of trustworthiness.

CHAPTER FOUR:
Study 2

Previous research examining the effect of incongruent source-message pairings on message processing has produced mixed results. Some studies have found increased elaboration associated with surprising or unexpected source-message combinations; others have observed decreased elaboration. The primary purpose of Experiment 2 was to provide evidence to help clarify how incongruent messages impact processing in an environmental risk communication context. In addition, it provided an opportunity to replicate re-test the impact of congruent and incongruent messages on attitudes, source trustworthiness, and support for risk management. Study 2 utilized the same risk management scenario as Study 1.

Hypothesis 5: Taking into account the covariates (environmental concern and political beliefs, and need for cognition), participants in conditions in which sources advocate incongruous messages (i.e., corporate source advocating pro-environmental message and environmental activist advocating a pro-business message) will be more persuaded by the message regarding the Superfund designation, compared to congruous message conditions.

Hypothesis 6: Taking into account the covariates, participants in conditions in which sources advocate incongruous messages will report significantly more positive source trustworthiness evaluations compared to congruous message conditions.

Hypothesis 7: Taking into account the covariates, participants in conditions in which sources advocate incongruous messages will report significantly stronger support for risk management compared to when congruous messages are advocated.

Hypothesis 8: Taking into account the covariates, a statistically significant interaction between source type and message type on cognitive elaboration is expected, such that

participants exposed to sources advocating incongruous messages are expected to report significantly different levels of cognitive elaboration than participants exposed to sources advocating congruous messages. Based on the conflicting findings in past research regarding message processing, no predictions were made as to the direction of the difference.

Method

Participants

Participants included 240 adults (aged 18 and over) recruited from Amazon's Mechanical Turk to participate in a study hosted by Qualtrics, an online survey platform. They were offered $1.00 for their participation and told it would take approximately 10-15 minutes of their time. The sample was restricted to U.S. citizens because two of the three independent variables were delivered in a scenario-based manipulation related to U.S. environmental policy. From the initial sample of 240 respondents, 72 cases (30%) were removed from the analyses: 29 respondents (12.0%) were removed because they did not complete the survey, three respondents (1.1%) were removed because they were located outside of the U.S., seven people (2.9%) responded to the data quality measure that their data should not be used in the analysis, and 33 people (13.8%) were excluded for failing the manipulation checks. The final data set was comprised of 168 respondents.

The final sample (N = 168) was heavily male (62.7%), and predominantly Caucasian (74.6% Caucasian, 7.7% Hispanic/Latino, 6.5% Black/African American, 4.7% Asian/Pacific Islander, 4.1% Native American/Alaskan Native, and 2.4% Mixed Race). The average age was 39 (M = 39.08, SD = 12.89) and most participants had at least some college experience (8.9% high school diploma, 16.6% some college no degree, 14.8% Associate degree, 47.9% Bachelor's degree, 8.9% Master's degree, 1.2% Doctoral degree, and 1.8% professional degree). In terms of

political ideology, the sample leaned somewhat left (M = 3.02, SD = 2.19) and 47.3% identified as Democrat, 29% as Republican, 21.9% as Independent, and 1.8% as Other.

Design and Procedure

The study employed a 2 (source type: corporate risk manager vs. environmental activist) X 2 (message position: pro-environmental versus pro-business) between-groups factorial design. Participants were randomly assigned to one of the four source-message conditions via a scenario-based manipulation.

Participants were told they would participate in a survey regarding environmental contamination and cleanup. They were told about the Wagner Laboratory's potential designation as a Superfund site, as in Study 1, and read the same newspaper article and background information about Superfund, and received the same experimental manipulations.

Manipulated Variables

Source type. Steve Fields, was described as either the cleanup project manager for the Wagner Aerospace Corporation, owner of the potential Superfund site, or the president of Friends of the Environment, a nonprofit organization committed to the protection of the environment and public health.

Message position. Steve Fields was quoted as either strongly supporting (pro-environmental) or strongly opposing (pro-business) the Superfund designation of the Wagner Laboratory.

Measures

Environmental concern. Prior to reading the experimental messages, respondents were asked to answer a series of questions about their thoughts and feelings toward the Earth and the environment. Participants completed the 15-item (α = .91) revised New Environmental Paradigm

scale (NEP; Dunlap, Van Liere, Mertig, & Jones, 2000). Sample items include "Humans have the right to modify the natural environment to suit their needs," "Humans are seriously abusing the environment," and "The so-called "ecological crisis" facing humankind has been greatly exaggerated."

Need for cognition. Because previous research (e.g., Priester & Petty, 1995) suggests that an individual's tendency to engage in and enjoy thinking (i.e., need for cognition) influences the extent to which they engage in the cognitive elaboration of messages, participants completed an 18-item ($\alpha = .93$) Need for Cognition Scale (Cacioppo & Petty, 1982; Cacioppo, Petty, & Kao, 1984). Participants completed this measure after completing the NEP scale, prior to being exposed to the experimental messages.

Cognitive elaboration. After reading the entire newspaper article, participants were asked to respond to a 12-item Likert Scale (1-7; *Strongly Disagree to Strongly Agree*) modified from Reynolds (1997), assessing how much effort they expended in processing Steve Fields' message ($\alpha = .91$). This method was chosen over other common measures of elaboration to simplify the measure given the online research context (see Barden & Tormala, 2014; Wegener, Downing, Krosnick, & Petty, 1995). The scale items included: "When I was reading Steve Fields' statement on the Superfund designation, I was…" (1) attempting to analyze the issues in the message, (2) not very attentive to the message, (3) deep in thought about the message, (4) unconcerned with the message, (5) extending a good deal of cognitive effort, (6) distracted by other thoughts not related to the message, (7) not really exerting my mind, (8) doing my best to think about the message, (9) reflecting on the implications of the message, (10) resting my mind, (11) searching my mind in response to the message ideas, and (12) taking it easy. Items

Source trustworthiness. Respondents completed a six-item, 7-point semantic differential scale evaluating the trustworthiness of both Friends of the Environment (α = .96), and Wagner Aerospace Corporation (α=.96) organizations. Scale anchors were: negative/positive, does not care about me/cares about me, not credible/credible, biased/unbiased, bad/good, and untrustworthy/trustworthy.

Attitudes. To measure attitudes, participants then gave their opinion about the Superfund designation by responding to a 7-point scale ranging from 1-"oppose Superfund designation" to 7-"support Superfund designation." In addition, they responded to a six-item, 7-point semantic differential scale with the following anchors: bad/good, unfavorable/favorable, harmful/beneficial, worthless/valuable foolish/wise, and unfair/fair. The seven items were combined into a single measure (α = .97).

Manipulation check and data quality measures. After reading the newspaper article containing the experimental manipulations, participants were asked to report (depending on condition) either Wagner Aerospace Corporation or Friends of the Environment's position regarding the Superfund designation on a Likert-type scale (1-7; *Oppose Superfund designation* to *Support Superfund designation*). Participants also reported whether their attention to the study was adequate to produce accurate responses. It was acknowledged that some people get distracted during surveys and are not able to respond thoughtfully, and participants responded to the following yes/no question: Without penalty (you will still receive compensation for your time), please tell us -- should we use the data from your responses?"

Support for risk management. Participants rated their trust in "Wagner Aerospace Corporation management" to effectively manage the contamination from Wagner Laboratory site. Responses were given on a scale ranging from 1-"strongly disagree" to 7-"strongly agree" (α =

.97). The six scale items were: "I trust Wagner Aerospace Corporation management to: (1) effectively manage the contamination from the Wagner Laboratory site, (2) provide the best available information on the contamination from the Wagner Laboratory site, (3) provide me with enough information to decide what actions I should take regarding the contamination from the Wagner Laboratory site, (4) provide me with truthful information about the contamination from the Wagner Laboratory site, (5) provide me with timely information the contamination from the Wagner Laboratory site, (6) to make wise decisions regarding the cleanup of the Wagner Laboratory site.

Political Ideology. Participants indicated their current political ideology on a 2-item Likert Scale (1-7; left/right and liberal/conservative; $\alpha = .90$). Lower scores indicate more liberal political leanings and higher scores indicate more conservative political leanings.

Demographics. Participant background information was collected, including age, sex, education level, and ethnicity. Participants also reported their political party affiliation (Democrat, Republican, Independent, Other). See Appendix C for all Study 2 Measures. See also Table 2 for descriptives and correlations among all scales.

Table 2
Study 2 Variables: Correlations and Descriptive Statistics (N=165)

Measure	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1 Attitudes	1	-.127	.605**	-.363**	.140	.149	.343**	-.490**
2 Corporate source trustworthiness		1	-.116	.836**	-.194	.106	-.381**	.120
3 Environmental source trustworthiness			1	-.233*	.234*	.017	.383**	-.333**

4 Support for risk management				1	-.247**	.048	-.498**	.228*
5 Cognitive elaboration					1	.294**	.329**	-.014
6 Need for cognition						1	-.005	-.093
7 Environmental concern							1	-.485**
8 Political ideology								1

Measure	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
M	5.48	4.13	5.23	4.00	5.51	4.57	4.86	3.28
SD	1.39	1.61	1.14	1.69	1.03	0.91	1.11	2.09
α	.97	.96	.96	.97	.91	.93	.91	.90

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Results

Correlational Analyses

As in Study 1, attitudes were significantly, positively correlated with environmental source trustworthiness ($r = .605$, $p < .01$). Attitudes and environmental concern were also positively correlated ($r = .343$, $p < .01$), indicating that the more environmental concern, the more positive their attitudes toward the Superfund designation (pro-environmental position). Additionally, attitudes significantly, positively correlated with environmental source trustworthiness, such that the greater the trust, the more positive the attitude toward the Superfund designation ($r = .605$, $p < .01$). There was also a significant, negative correlation between attitudes and political ideology, such that the further right, or more conservative

participants reported bring, the weaker their attitudes toward the Superfund designation (the pro-business position; $r = -.490$, $p < .01$). Unlike Study 1, there was a significant, negative relationship between attitudes and support for risk management: the more positive attitudes toward the Superfund designation, the less support for risk management. As expected, cognitive elaboration and need for cognition were positively correlated ($r = .294$, $p < .01$). Additionally, there was a significant negative relationship between environmental concern and political ideology, indicating that greater environmental concern was related to more liberal political ideology, as reported by participants.

Source and Message Effects

A two-way MANCOVA was performed in which source type (environmental activist vs. corporate risk manager) and message position (pro-environmental versus pro-business) were entered as fixed factors and scores on the NEP scale, the NC scale, and political ideology were entered as covariates. Dependent variables included attitudes, source trustworthiness, support for risk management, and cognitive elaboration. The overall multivariate test revealed a significant main effect of source type, $F(5, 153) = 6.60$, $p < .001$; Pillai's Trace = .178, partial $\eta^2 = .106$, and a significant main effect of message type, $F(5, 153) = 10.86$, $p < .001$; Pillai's Trace = .262, partial $\eta^2 = .262$. It also showed a significant interaction between source time and message type, whilst controlling for need for cognition, environmental concern, and political ideology, $F(5, 153) = 2.97$, $p = .004$; Pillai's Trace = .106, partial $\eta^2 = .106$.

Tests of between-subjects effects showed the main effect of source type was significant for corporate source trustworthiness, $F(1, 164) = 28.71$, $p < .001$, partial $\eta^2 = .155$, environmental source trustworthiness, $F(1, 164) = 4.45$, $p < .05$, partial $\eta^2 = .028$, and support for risk management, $F(1, 164) = 16.40$, $p < .001$, partial $\eta^2 = .095$. It was not significant for attitudes (p

= .63) or cognitive elaboration (p = .95). The main effect of message type, on the other hand was significant for attitudes, $F(1, 164) = 15.84$, $p < .001$, partial $\eta^2 = .092$, corporate source trustworthiness, $F(1, 164) = 14.42$, $p < .001$, partial $\eta^2 = .084$, environmental source trustworthiness, $F(1, 164) = 7.94$, $p < .01$, partial $\eta^2 = .048$, and cognitive elaboration, $F(1, 164) = 10.17$, $p < .01$, partial $\eta^2 = .061$. The effect did not reach statistical significance for support for risk management, $F(1, 164) = 3.23$, $p = .07$, partial $\eta^2 = .020$.

The interaction between source type and message type was significant for corporate source trustworthiness, $F(1, 164) = 17.31$, $p < .001$, partial $\eta^2 = .099$, and support for risk management $F(1, 164) = 6.79$, $p = .01$, partial $\eta^2 = .041$, but it was not significant for attitudes ($p = .49$), environmental source trustworthiness ($p = .71$), or cognitive elaboration of messages ($p = .71$).

Attitudes

A main effect of message type showed that the pro-environmental message produced significantly more support for the Superfund designation ($M = 5.88$, $SE = .134$) than the pro-business message ($M = 5.10$, $SD = .142$), $M_{diff} = .782$, $p < .001$, *95% CI* [.394, 1.17]. This effect is expected, given that the pro-environmental message advocated for support for the Superfund designation, whereas the pro-business message advocated against the Superfund designation. There was no main effect of source on attitudes ($p = .63$). Of central interest to this research was the question of whether incongruent versus congruent source-message combinations would produce differences in attitudes regarding the Superfund designation. Contrary to the expectations of Hypothesis 5, there was no significant interaction between source type and message type ($p = .49$) on attitudes. In other words, incongruent conditions were no more persuasive than the congruent message conditions.

Source Trustworthiness

Results revealed the main effect of source type was significant for both corporate and environmental sources. Regardless of message type, the corporate source produced significantly more trustworthiness in the corporate source (M = 4.04, SE = .146) than the environmental source (M = 2.95, SE = .140), M_{diff} = 1.09, $p < .001$, *95% CI* [.686, 1.49]. The environmental source, regardless of message type, also produced significantly more trustworthiness in the corporate source (M = 5.25, SE = .137) than the environmental source (M = 4.85, SE = .132), M_{diff} = .403, $p < .05$, *95% CI* [.026, .781]. Hypothesis 6 was only partially supported: the two-way interaction between source type and message was only significant for corporate source trustworthiness. Simple effects of this interaction effect reveal that a corporate source advocating a pro-environmental message was viewed as significantly more trustworthy (M = 4.88, SE = .202) than when advocating the pro-business message (M = 3.28, SE = .216), M_{diff} = 1.59, $p <$ .001, *95% CI* [.996, 2.19]. There was no significant difference in evaluations of corporate source trustworthiness when the environmental source advocated a pro-environmental message versus the pro-business message (p = .92).

Support for Risk Management

There was a main effect of source type on support for risk management, such that, regardless of the message advocated, the corporate source produced significantly more support for risk management (M = 3.92, SE = .161) compared to the environmental source, (M = 3.01, SE = .155), M_{diff} = .906, $p < .001$, *95% CI* [.464, 1.35]. Results also showed a significant interaction between source and message on support for risk management, providing partial support for Hypothesis 7: when a corporate source advocated a pro-environmental message, support for risk management was significantly stronger (M = 4.59) compared to the when the pro-business

message was advocated ($M = 3.36$). The incongruent condition with the environmental source, however, did not produce significantly different amounts of support for risk management.

Cognitive Elaboration

The main effect of message type showed that participants exerted more cognitive effort in the pro-business message condition overall, in which they received a message arguing against the Superfund designation ($M = 5.75$, $SE = 0.10$) compared to the pro-environmental message condition, in which the message advocated in favor of the Superfund designation ($M = 5.30$, $SE = 0.10$), $M_{diff} = -.454$, $p = .002$, *95% CI* [-.735, .173]. There was no main effect for source ($F(1, 161) = .006$, $p = .940$, partial $\eta 2 = .000$) and no interaction between source and message ($F(1, 161) = .097$, $p = .76$, partial $\eta 2 = .001$), therefore Hypothesis 8 was not supported.

Covariate Effects

A multiple regression was run to predict self-reported cognitive elaboration from environmental concern, political ideology, and need for cognition. For self-reported cognitive elaboration, the multiple regression model statistically significantly predicted cognitive elaboration, $F(3,163) = 9.94$, $p < .001$. All three variables added statistically significantly to the prediction, $p < .05$. Regression coefficients and standard errors can be found in Table 3.

Table 3

Summary of Multiple Regression Analysis for Cognitive Elaboration

Variable	*B*	SE_B	β
Constant	2.29	0.609	
Environmental Concern	0.300	0.078	0.320**
Political Belief	0.083	0.040	0.174*
Need for Cognition	0.323	0.079	0.297**

Note. *$p < .05$, **$p < .001$, *B* = unstandardized regression coefficient; SE_B = Standard error of the coefficient; β = standardized coefficient

The multiple regression model statistically significantly predicted attitudes toward the Superfund designation, $F(3,163) = 18.65$, $p < .001$. Political belief added statistically significantly to the prediction, $p < .001$, as expected. However, contrary to expectations, environmental concern was not quite statistically significant, $t = 1.67$, $p = .10$.

The multiple regression model statistically significantly predicted corporate source trustworthiness, $F(3,163) = 9.75$, $p < .001$. Environmental concern added statistically significantly to the prediction, $t = -3.55$, $p = .001$, as expected. However, contrary to expectations, political ideology did not significantly add to the prediction, $t = .523$, $p = .60$. Similarly, the model predicted environmental source trustworthiness, $F(3,163) = 8.46$, $p < .001$. Environmental concern added statistically significantly to the prediction, $t = 2.94$, $p < .01$, as expected. However, contrary to expectations, political ideology did not significantly add to the prediction, $t = -1.04$, $p = .30$.

Finally, the multiple regression model statistically significantly predicted support for risk management, $F(3,163) = 17.81$, $p < .001$. All three variables added statistically significantly to the prediction, $p < .001$ Environmental concern added statistically significantly to the prediction, $t = -4.87$, $p < .001$, as expected. However, political ideology did not, $t = .570$, $p = .57$.

Discussion

The aim of this experiment was to provide clarity as to how much cognitive elaboration individuals undertake when exposed to (in)congruent messages of both environmentalist and corporate sources in an environmental risk communication context. It also sought to examine the predictive role of covariates, including environmental concern, political ideology, and need for

cognition on attitudes, corporate and environmental source trustworthiness, and cognitive elaboration.

Although Study 1 uncovered significant source-message incongruence effects on attitudes, such that incongruent conditions produced more attitude change than congruent message conditions, Study 2 was not able to support this finding. There was no difference in the persuasiveness of the four source-message combinations, therefore Hypothesis 5 was not supported. It is possible that the current study did not have the power provided by pre- and post-message measures to detect the effects of attitude change. Results only found partial support for Hypothesis 6. As predicted, when the corporate source advocated an incongruent message, perceptions of their source trustworthiness was enhanced. However, similar to Study 1 findings, the trustworthiness of the environmental source was not enhanced when advocating an incongruent message. This result suggests that positive violations of expectancies are superior to negative expectancy violations when it comes to changing attitudes. Similarly, Hypothesis 7 received only partial support: incongruent source-message pairings influenced support for risk management only in the incongruent conditions in which the corporate source advocated the pro-environmental message.

With regard to the effect of incongruous source-message pairings on elaboration of messages, the results contradicted expectations. The incongruous source-message pairings did not differ significantly from congruous combinations; therefore Hypothesis 8 was not supported. However, there was an unexpected, significant main effect of message type. Specifically, regardless of source type, participants engaged in significantly more cognitive elaboration when the pro-business message position was advocated compared to when the pro-environmental message position was advocated. This result suggests that message content may influence

cognitive elaboration more than source variables in certain contexts. In light of the initial bias in attitudes toward the environmental position, these results suggest the possibility that counterattitudinal messages are elaborated more deeply than proattitudinal messages. This is consistent with previous research suggesting that coutnerattitudinal information elicits more processing than proattitudinal messages because they can threaten the receiver's attitude (Cacioppo and Petty, 1979).

Results also demonstrate that environmental concern, political belief, and need for cognition are important predictors of cognitive elaboration in this context. Correlational analyses suggest that more environmental concern is significantly, positively correlated with self-reported cognitive elaboration: the stronger the environmental concern, the more cognitive elaboration reported by participants. This is consistent with previous research (e.g., Petty, Cacioppo, & Goldman, 1981). Also, as would be expected, participants with greater need for cognition reported more cognitive elaboration. Political ideology significantly correlated negatively with attitudes, support for environmental risk management, and environmental concern, indicating that participants reporting more liberal political leanings had stronger pro-environmental tendencies, while more conservative participants had more pro-business tendencies. Regression analyses of the covariates indicated that political ideology, but not environmental concern was a significant predictor of attitudes toward Superfund designation. Political belief was not a significant predictor of corporate or environmental source trustworthiness, or support for risk management, but environmental concern was.

CHAPTER FIVE:
General Discussion

The purpose of this research was to examine the impact of congruent versus incongruent messages on attitudes, source evaluation, perceived risk, and trust in risk management, associated with a hypothetical hazardous waste cleanup. The research also sought to shed light on the psychological processes behind the effects of source-message (in)congruence by examining how the source type and message congruence variables influence the self-reported cognitive elaboration of messages. An environmental risk management scenario was used to implement the research studies, extending the application of source-message incongruence effects into a new context. The findings help clarify some existing research as well as raise additional questions for future research.

Previous research suggests that incongruous source-message combinations can lead to attitude change by enhancing the credibility of the message (e.g., Koeske and Crano, 1968) or messenger (e.g., Eagly, Wood, & Chaiken, 1978; McPeek and Edwards, 1975; Petty, Fleming, Priester, & Feinstein, 2001; Priester & Petty, 1995). The first research question focused on how congruent and incongruent source-message pairings impact attitudes, and source trustworthiness. Previous research did not consistently find effects for both source trustworthiness and attitudes. The current research sought to clarify the conditions that led to both enhanced source trustworthiness and attitude change by measuring and taking into account environmental concern, via the NEP scale, and political ideology. In addition, given the relationship between trust, perceived risk, and support for risk management, this research aimed to test whether these variables would vary between incongruent and congruent source-message combinations. Based on previous research in this area and the AAP (Eagly & Chaiken, 1975; Eagly, Chaiken, &

Wood, 1981; Eagly, Wood, & Chaiken, 1978; Wood & Eagly, 1981), Study 1 hypotheses predicted that incongruent source-message combinations would elicit significant changes between time points along the following measures: attitude toward advocated position, source trustworthiness, perceived risk, and support for risk management. Specifically, participants were expected to display significant changes in attitudes toward the advocated message position, increased perceptions of trustworthiness of the source of the message, decreased levels of perceived risk, and higher levels of support for risk management in the post-message measures compared to the pre-message measures when receiving a message from an incongruous source, compared to a congruous source, while taking into account environmental concern and political ideology covariates. Study 1 tested these hypotheses.

The results provided only partial support for the hypotheses. When the corporate source advocated a pro-environmental message position, respondents' perceptions of the source's trustworthiness significantly increased between pre- and post-message measures compared to when he advocated the pro-business (congruent) message. Respondents' attitudes also changed in the direction of the advocated message, though the result only reached marginal significance. Participants' support for risk management also significantly increased with this source-message combination, though there was no change in perceived risk.

Results were slightly different for the incongruent condition in which the environmental source advocated the pro-business message position. With this combination, respondents' attitudes changed significantly between pre- and post-message measures in the direction of the advocated message compared to when the source advocated the congruent message, as expected, but their evaluations of trustworthiness also decreased significantly. This was opposite of what

was expected with regard to source trustworthiness where an enhancement effect was hypothesized.

One possible explanation for this result of no enhanced trustworthiness is that the corporate message was viewed more negatively than the environmental message. Although evaluations of the messages themselves were not measured, an overall bias toward the environmental position was revealed in pre-message attitudes measures. The mean attitude score was 5.65 on a 7-point scale, where higher scores indicated more support for the environmental message position. Analysis of pre-message evaluations also indicated a bias in favor of the environmentalist source compared to the corporate source. Pre-message measures of both corporate and environmental sources indicated that the environmentalist source was perceived initially as more trustworthy than the corporate source. Thus, when a (trustworthy) environmentalist source advocates the corporate message, in addition to being incongruent, it is rather undesirable. It is possible that for incongruence to enhance source trustworthiness, the message advocated must be viewed as positive, or desirable. In the communication literature, expectancy violation theory (Burgoon, 1993, Burgoon & Jones, 1976) distinguishes between positive and negative expectancy violations. The theory suggests that violation valences depend on the evaluation of an enacted behavior (in the current context, the message) and whether the discrepancy between the expected and actual behavior (message) is toward a more favorable or unfavorable position. In the context of this research, the more favorable position would presumably be the one in line with prior attitudes. Expectancy violation theory research indicates that negative expectancy violations are associated with reduced liking and credibility (J. Burgoon & LePoire, 1993); however, source-message incongruence studies, including the AAP, have not similarly taken into consideration message valence.

It is also possible that evaluations of trustworthiness of the environmentalist source decreased, rather than increased when advocating the incongruent, corporate message due to the advocacy of the corporate message being viewed as a violation of a group's interest, rather than individual interest. Petty et al. (2001) showed that only a violation of self-interest is associated with increased perceptions of trustworthiness. When a communicator violates the interest of his or her group, although at some level they are violating their own self-interest, the group violation may be viewed as disloyalty to the group. Because shared group identity is an important basis for trust (e.g., Kramer, Brewer, and Hanna, 1996), it is plausible the perception of disloyalty may decrease perceptions of trustworthiness. In the context of the current study, it is possible that when the environmental source advocated the corporate message position, that advocacy was seen more as a violation of the group's (Friends of the Environment's) interest. After all, the group was described as an environmental advocacy group. There was perhaps less distinction between the corporate source as an individual and the larger corporate organization (Wagner Aerospace Corporation). In this way, the corporate source's advocacy for the environmental position could be viewed more as a violation of their own interest, and thus explain how corporate trustworthiness increased in the incongruent condition.

In spite of the questions raised by this research about the effects of source-message incongruence on source trustworthiness, the impacts on attitudes are remarkable: sources advocating incongruent versus congruent message positions were more persuasive, regardless of message valence, and regardless of whether source trustworthiness was enhanced. Study 1 results indicated that the most persuasive source-message combination was the environmentalist source advocating the pro-business message --the same combination that reduced, rather than enhanced evaluations of source trustworthiness. The next most persuasive message condition was the other

incongruent combination in which the corporate source advocated the pro-environmental message—similar to what Koeske and Crano (1968) found, and suggests that source trustworthiness is not necessary for attitude change to take place.

When a communicator (either source) advocated an incongruent message, respondents did not significantly alter their perceptions of risk, even when source trustworthiness was enhanced, as predicted. This is somewhat surprising considering the consistent association between trust and perceived risk that has consistently been found in the risk management literature (e.g., Flynn, Burns, Mertz, & Slovic, 1992; Leiss, 1996; Ryu, Kim, & Kim, 2018; Siegrist, Cvetkovich, & Roth, 2000), Indeed, perceived risk was positively correlated with environmental source trustworthiness, and negatively correlated with corporate source trustworthiness and support for risk management, as prior research has indicated, but corporate source trustworthiness only accounted for about 8% of the variance in perceived risk. Apparently the enhancement of credibility of the corporate source, and even support for risk management (i.e., the corporation's handling of the cleanup) when advocating an incongruent message is tapping into a different psychological aspect of trust than that related to perceived risk.

The second experiment attempted to replicate the findings from Study 1 regarding source-message (in)congruence on attitudes and source trustworthiness, as well as extend the investigation by examining the effects of source-message effects on reported cognitive elaboration. It was expected that the incongruent source-message combinations would elicit significantly different amounts of cognitive elaboration than participants exposed to sources advocating congruous messages. The effects of source-message incongruence matched Study 1 for the condition in which the corporate source advocated the pro-environmental message, however, unlike with Study 1, there was no "boomerang" effect for the environmental source

advocating the pro-business message. Study 1 found source trustworthiness significantly decreased in this scenario, but in Study 2, there was no difference. The attitudes results also failed the replication test. source message incongruence did not influence attitudes. The lack of replication with attitudes may be due to the fact that Study 2 did not have pre- and post-message measures like Study 1 and thus did not have as much power to detect differences.

Contrary to expectations there was no significant interaction between source and message on cognitive elaboration. Respondents in the two incongruent source-message conditions did not differ significantly in their elaboration compared to the two congruent conditions. It is possible that the reduction in sample size resulting from participants failing manipulation checks or not meeting qualifications inhibited the ability to detect interaction effects. Furthermore, given previous mixed results, it is possible that individual differences or other psychological processes predispose some people to elaborate more when encountering an incongruent message, and others to elaborate less. Null results would be expected if this were the case.

Although no interaction effect was found, unexpectedly, a main effect for message type emerged, such that regardless of the source, when the corporate message position was advocated, participants engaged in significantly more cognitive elaboration than when the environmental message position was advocated. Study 2 did not have pre-message measures that could be used to measure baseline attitudes, as in Study 1, but given the similar sampling method, it is likely that the participants overall held similar initial attitudes toward Superfund. If that were the case, it could be speculated that the significantly more elaboration for the corporate message were due to the negative valence of the advocacy. Indeed, prior research suggests that counterattitudinal information elicits more processing than proattitudinal messages (Cacioppo and Petty, 1979).

Correlational analyses suggest that more environmental concern significantly correlated with self-reported cognitive elaboration: the stronger the environmental concern, the more cognitive elaboration reported by participants. This is consistent with previous research (e.g., Petty, Cacioppo, & Goldman, 1981) suggesting personal involvement enhances elaboration.

Conclusions

The findings from this research suggest that source-message incongruence can lead to attitude change and increased perceptions of trustworthiness, but an audience's initial attitudes and the valence of the message contents must be considered. In situations where a source advocates an incongruent message that is in line with prior attitudes, perceptions of source trustworthiness can be enhanced; however, if the message is counterattitudinal, it can significantly decrease perceptions of trustworthiness. Notably, this dissertation shows that attitude change can still effectively occur when the trustworthiness of the source is diminished, and despite source-message incongruence not influencing the elaboration of messages. This dissertation also highlights the importance of taking into account the personal relevance of an issue for the audience.

Limitations and Future Research

Some limitations of this research are worth noting. First, the use of Mturk has inherent limitations in that respondents tend to be more educated, less religious, younger and higher in socioeconomic status than the general population (Buhrmester, Kwang, & Gosling, 2011; Goodman, Cryder, & Cheema, 2013), so the generalizability of results is limited. It is possible that the online platform impeded participant engagement, which would have impacts especially in relation to the message processing portions of the research. Another limitation is that the repeated measures were collected without much time in between. Future research should

examine whether the incongruence effects held up over a longer period of time. Another issue was the inherent problem that the corporate source was also the risk manager. Therefore, the support for risk management variable was not easily untangled from the corporate source trustworthiness variable.

In addition, despite the attempt to measure and take into account personal relevance via environmental concern, the central issue at hand--the designation of the fictional Wagner Laboratory site as a Superfund site--did not have personally relevant consequences. It would be beneficial for future research to examine or manipulate the vested interest of study participants to establish how it influences source-message incongruence. This would be especially beneficial for environmental risk management research, as real-world risk management scenarios typically involve individuals with some sort of stake in the environmental situation at hand. Finally, in light of the context of this research, and the presumed expertise of the sources, future research should test the ability of source-message incongruence to change attitudes when sources are clearly not experts.

Applications for Risk Management

The results from this dissertation may be useful for environmental risk managers and communication practitioners as they engage with and communicate with stakeholders. First, from a risk management perspective, this research illustrates the benefit of engaging with stakeholders and allowing them to be part of the decision-making process. This research showed that when people have positive attitudes toward a potential environmental solution, they were more likely to trust the source and support risk management, even when initially they evaluated a source to be untrustworthy. In spite of the research showing that trustworthiness is not an essential component to attitude change, environmental risk managers and communicators should

always strive to cultivate trust with stakeholders. In the long run, trust fosters an environment where an interactive exchange of information can take place between decision makers and stakeholders.

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Appendix A
Experimental Manipulation

All conditions received the same page 1, below

THE SPRINGSIDE DAILY

EPA holds meeting to discuss Superfund designation for Wagner Lab plume

By **Phillip Romero**

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The U.S. Environmental Protection Agency (EPA) held a community meeting last night to give Springside residents the opportunity to learn more about the potential designation of the former Wagner Laboratory as a Superfund site. Superfund is the common name given to a federal program that gives the EPA authority to evaluate and cleanup sites that have been polluted by hazardous substances.

The meeting was scheduled as part of EPA's effort to solicit public input on the proposed Superfund designation.

The now closed Wagner Laboratory located in south Springside was the site of missile defense systems and rocket engine testing and manufacturing between 1951 and 1994.

A groundwater plume located beneath the site contains industrial chemicals including trichloroethylene (TCE). TCE has been tentatively linked to a number of adverse health effects, including cancer. Over the past decade, four city drinking water wells have been shut down due to the contamination.

The EPA says in the short term the site poses no unacceptable risks to human health and that drinking water currently served to the community meets federal and state standards, but there is some concern that the contamination could migrate and impact more wells, putting the community at risk.

Wagner Aerospace Corporation has conducted a number of cleanup activities over the years, including constructing a treatment system to pump and treat the groundwater. Despite these efforts, Friends of the Environment, an environmental organization that has been active in ensuring the cleanup of the Wagner Laboratory, has been critical of the speed at which cleanup is occurring.

continued, see **SUPERFUND DESIGNATION**, page 2

Condition 1: Environmental Source-Corporate Message Position

SUPERFUND DESIGNATION, continued from page 1

During the meeting, local residents and stakeholders spoke out about equally in opposition and support of the Superfund designation. One of the most notable comments was made by Steve Fields, a representative for Friends of the Environment who was there to communicate the organization's position regarding the designation of the Wagner Laboratory as a Superfund site.

"I want to state for the record that Friends of the Environment strongly opposes the proposed listing of the Wagner Laboratory as a Superfund site," said Mr. Fields. "Our goal is to ensure the site and the surrounding community receive a swift cleanup that is fully protective of public health and the environment. We are encouraged by the progress that has been made and are confident in the current path forward. We believe a more cost-effective and timely cleanup can be accomplished without the regulatory oversight and public involvement processes that come with the EPA's involvement."

Steve Fields, a representative of the Friends of the Environment organization, speaks to attendees about the proposed Superfund designation of the former Wagner Laboratory.

Local residents still have the opportunity to weigh in on the designation via written comments. The EPA's public comment period runs through February 15.

Condition 2: Environmental Source-Environmental Message Position

SUPERFUND DESIGNATION, continued from page 1

During the meeting, local residents and stakeholders spoke out about equally in opposition and support of the Superfund designation. One of the most notable comments was made by Steve Fields, a representative for Friends of the Environment who was there to communicate the organization's position regarding the designation of the Wagner Laboratory as a Superfund site.

"I want to state for the record that Friends of the Environment strongly supports the proposed listing of the Wagner Laboratory as a Superfund site," said Mr. Fields. "Our goal is to ensure the site and the surrounding community receive a swift cleanup that is fully protective of public health and the environment. While progress has been made, it is not enough. We believe a more cost-effective and timely cleanup can be accomplished with the regulatory oversight and public involvement processes that come with the EPA's involvement."

Steve Fields, a representative of the Friends of the Environment organization, speaks to attendees about the proposed Superfund designation of the former Wagner Laboratory.

Local residents still have the opportunity to weigh in on the designation via written comments. The EPA's public comment period runs through February 15.

Condition 3: Corporate Source-Environmental Message Position

SUPERFUND DESIGNATION, continued from page 1

During the meeting, local residents and stakeholders spoke out about equally in opposition and support of the Superfund designation. One of the most notable comments was made by Steve Fields, a representative for Wagner Aerospace Corporation who was there to communicate the organization's position regarding the designation of the Wagner Laboratory as a Superfund site.

"I want to state for the record that Wagner Aerospace Corporation strongly supports the proposed listing of the Wagner Laboratory as a Superfund site," said Mr. Fields. "Our goal is to ensure the site and the surrounding community receive a swift cleanup that is fully protective of public health and the environment. While progress has been made, it is not enough. We believe a more cost-effective and timely cleanup can be accomplished with the regulatory oversight and public involvement processes that come with the EPA's involvement."

Steve Fields, a representative of Wagner Aerospace Corporation, speaks to attendees about the proposed Superfund designation of the former Wagner Laboratory.

Local residents still have the opportunity to weigh in on the designation via written comments. The EPA's public comment period runs through February 15.

Condition 4: Corporate Source-Corporate Message Position

SUPERFUND DESIGNATION, continued from page 1

During the meeting, local residents and stakeholders spoke out about equally in opposition and support of the Superfund designation. One of the most notable comments was made by Steve Fields, a representative for Wagner Aerospace Corporation who was there to communicate the organization's position regarding the designation of the Wagner Laboratory as a Superfund site.

"I want to state for the record that Wagner Aerospace Corporation strongly opposes the proposed listing of the Wagner Laboratory as a Superfund site," said Mr. Fields. "Our goal is to ensure the site and the surrounding community receive a swift cleanup that is fully protective of public health and the environment. We are encouraged by the progress that has been made and are confident in the current path forward. We believe a more cost-effective and timely cleanup can be accomplished without the regulatory oversight and public involvement processes that come with the EPA's involvement."

Steve Fields, a representative of Wagner Aerospace Corporation, speaks to attendees about the proposed Superfund designation of the former Wagner Laboratory.

Local residents still have the opportunity to weigh in on the designation via written comments. The EPA's public comment period runs through February 15.

Appendix B
Study 1 Measures

New Environmental Paradigm Scale (7-point, Strongly Disagree-Strongly Agree)

1. We are approaching the limit of the number of people the Earth can support.
2. Humans have the right to modify the natural environment to suit their needs. (Rev)
3. When humans interfere with nature it often produces disastrous consequences.
4. Human ingenuity will insure that we do not make the Earth unlivable. (Rev)
5. Humans are seriously abusing the environment.
6. The Earth has plenty of natural resources if we just learn how to develop them. (Rev)
7. Plants and animals have as much right as humans to exist.
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations. (Rev)
9. Despite our special abilities, humans are still subject to the laws of nature.
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated. (Rev)
11. The Earth is like a spaceship with very limited room and resources.
12. Humans were meant to rule over the rest of nature. (Rev)
13. The balance of nature is very delicate and easily upset.
14. Humans will eventually learn enough about how nature works to be able to control it. (Rev)
15. If things continue on their present course, we will soon experience a major ecological catastrophe.

Attitudes

Based on the information that you have been provided so far, please select the circle that most closely corresponds to your own view regarding the designation of the Wagner Laboratory as a Superfund site. (7-point)

I oppose the Superfund designation—I support the Superfund designation

Designating the Wagner Laboratory as a Superfund site is: (7-point)
Bad—Good
Dumb—Smart
Harmful—Beneficial
Worthless—Valuable
Unwise—Wise

Source Evaluation - completed for both environmentalist and corporate sources (7-point)

Negative—Positive
Does not care about me—Cares about me

Not credible—Credible
Biased—Unbiased
Bad—Good
Untrustworthy--Trustworthy

Perceived Risk (7-point, Strongly Disagree-Strongly Agree)

1. The Wagner Laboratory site poses negative impacts to human health.
2. Living near the Wagner Laboratory site is risky.
3. I would not be concerned about the contamination of the Wagner Laboratory site. (Rev)
4. Contamination from the Wagner Laboratory site is harming the environment.
5. It is unlikely that the local water supply will be further impacted by chemicals from the Wagner Laboratory site. (Rev)
6. If nothing is done about the contamination from the Wagner Laboratory site, bad things will happen.
7. The threat from contamination of the Wagner Laboratory site will extend to future generations.

Support for Risk Management (7-point, Strongly Disagree-Strongly Agree)

1. I trust Wagner Aerospace Corporation management to effectively manage the contamination from the Wagner Laboratory site.
2. I trust Wagner Aerospace Corporation management to provide the best available information on the contamination from the Wagner Laboratory site.
3. I trust Wagner Aerospace Corporation management to provide me with truthful information about the contamination from the Wagner Laboratory site.
4. I trust Wagner Aerospace Corporation management to provide me with timely information the contamination from the Wagner Laboratory site.
5. I trust Wagner Aerospace Corporation management to make wise decisions regarding the cleanup of the Wagner Laboratory site.

Political Ideology

Here is a 7-point scale showing political affiliations that people might hold, including Democrat (left), Independent (center), and Republican (right). Where would you place yourself on this scale?

Democrat—Republican

Here is a 7-point sliding scale on which the political ideologies that people might hold are arranged from extremely liberal (left) to extremely conservative (right). Where would you place yourself on this scale?

Left—Right

Study 2 Measures

New Environmental Paradigm Scale (7-point, Strongly Disagree-Strongly Agree)

1. We are approaching the limit of the number of people the Earth can support.
2. Humans have the right to modify the natural environment to suit their needs. (Rev)
3. When humans interfere with nature it often produces disastrous consequences.
4. Human ingenuity will insure that we do not make the Earth unlivable. (Rev)
5. Humans are seriously abusing the environment.
6. The Earth has plenty of natural resources if we just learn how to develop them. (Rev)
7. Plants and animals have as much right as humans to exist.
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations. (Rev)
9. Despite our special abilities, humans are still subject to the laws of nature.
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated. (Rev)
11. The Earth is like a spaceship with very limited room and resources.
12. Humans were meant to rule over the rest of nature. (Rev)
13. The balance of nature is very delicate and easily upset.
14. Humans will eventually learn enough about how nature works to be able to control it. (Rev)
15. If things continue on their present course, we will soon experience a major ecological catastrophe.

Need for Cognition Scale (7-point, Strongly Disagree-Strongly Agree)

1. I would prefer complex to simple problems.
2. I like to have the responsibility of handling a situation that requires a lot of thinking.
3. Thinking is not my idea of fun. (Rev)
4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities (Rev)
5. I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something. (Rev)
6. I find satisfaction in deliberating hard and for long hours.
7. I only think as hard as 1 have to. (Rev)
8. I prefer to think about small, daily projects to long-term ones (Rev)
9. I like tasks that require little thought once I've learned them (Rev)
10. The idea of relying on thought to make my way to the top appeals to me.
1 I. I really enjoy a task that involves coming up with new solutions to problems.
12. Learning new ways to think doesn't excite me very much. (Rev)
13. I prefer my life to be filled with puzzles that I must solve.
14. The notion of thinking abstractly is appealing to me.
15. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.
16. I feel relief rather than satisfaction after completing a task that required a lot of mental effort. (Rev)
17. It's enough for me that something gets the job done; I don't care how or why it works. (Rev)

18. I usually end up deliberating about issues even when they do not affect me personally.

Cognitive Elaboration (7-point, Strongly Disagree-Strongly Agree)

When I was reading Steve Fields's statement on the Superfund designation, I was…

1. …attempting to analyze the issues in the message.
2. …not very attentive to the message. (Rev)
3. …deep in thought about the message.
4. …unconcerned with the message (Rev)
5. …extending a good deal of cognitive effort.
6. …distracted by other thoughts not related to the message. (Rev)
7. …not really exerting my mind. (Rev)
8. …doing my best to think about the message.
9. …reflecting on the implications of the message.
10. …resting my mind. (Rev)
11. …searching my mind in response to the message ideas.
12. …taking it easy. (Rev)

Source Evaluation - completed for both environmentalist and corporate sources (7-point)

Negative—Positive
Does not care about me—Cares about me
Not credible—Credible
Biased—Unbiased
Bad—Good
Untrustworthy--Trustworthy

Attitudes

Based on the information that you have been provided so far, please select the circle that most closely corresponds to your own view regarding the designation of the Wagner Laboratory as a Superfund site. (7-point)

I oppose the Superfund designation—I support the Superfund designation

Designating the Wagner Laboratory as a Superfund site is: (7-point)

Bad—Good
Dumb—Smart
Harmful—Beneficial

Worthless—Valuable
Unwise—Wise

Support for Risk Management (7-point, Strongly Disagree-Strongly Agree)

1. I trust Wagner Aerospace Corporation management to effectively manage the contamination from the Wagner Laboratory site.
2. I trust Wagner Aerospace Corporation management to provide the best available information on the contamination from the Wagner Laboratory site.
3. I trust Wagner Aerospace Corporation management to provide me with truthful information about the contamination from the Wagner Laboratory site.
4. I trust Wagner Aerospace Corporation management to provide me with timely information the contamination from the Wagner Laboratory site.
5. I trust Wagner Aerospace Corporation management to make wise decisions regarding the cleanup of the Wagner Laboratory site.

Political Ideology

Here is a 7-point scale showing political affiliations that people might hold, including Democrat (left), Independent (center), and Republican (right). Where would you place yourself on this scale?

Democrat—Republican

Here is a 7-point sliding scale on which the political ideologies that people might hold are arranged from extremely liberal (left) to extremely conservative (right). Where would you place yourself on this scale?

Left—Right