

## ABSTRACT

Title of dissertation: TESTING THE INFLUENCE OF VARIOUS  
“LICENSES” IN MOTIVATING CORPORATE  
ENVIRONMENTAL BEHAVIOR

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In this dissertation, I test a framework of corporate environmental compliance put forth by Gunningham, Kagan, and Thornton in their 2003 book called *Shades of Green*. However, this dissertation moves beyond a mere test of theory by integrating the corporate-level license framework with the individual-level Rational Choice Theory. In doing so, this integration portrays how individuals within corporations decide to comply or overcomply with environmental regulations while accounting for the organizational context.

Specifically, external pressures from the legal, social, and economic domains as well as corporation-wide policies and culture impact individual-level cost-benefit analyses. In turn, these cost-benefit calculations impact the decisions made by corporate managers. I propose five hypotheses based on this integration and test them using an environmental vignette survey of individuals as well as meta-analytical data.

The vignette survey provides a randomly-generated hypothetical scenario and asks respondents (here, environmentally-minded business people) to predict their likelihood of offending or overcomplying as the depicted manager in the scenario did. Results provide mixed support for the impact of the external license pressures and more

support for the rational choice theory measures. I also compare similarities and differences between the offending and overcompliance models.

I conducted a test of the robustness of hypothesis 1 results using meta-analysis of studies collected through 2006. These studies use actual firm-level behaviors as their outcomes and therefore overcame some of the limitations of the vignette study. I found additional support for the relationship between external pressures and offending, although more analysis is needed to assess how effects differ by study methodologies and samples.

Overall, this integrated theory is worthy of further empirical testing and has important implications for both theories of corporate crime as well as prevention and control policies. Future research should examine the interactions between factors affecting the corporation, those affecting the individuals in charge of the corporation, and interactions between these factors and levels. The theory proffered here provides a clear, comprehensive, yet fairly parsimonious foundation for doing so.

TESTING THE INFLUENCE OF VARIOUS “LICENSES” IN MOTIVATING  
CORPORATE ENVIRONMENTAL BEHAVIOR

by

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## **Dedication**

In memory of my brother Michael, who has always been and will remain my hero. I miss you so much.

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I feel as though I have lived multiple lives in the seven years since I started my graduate school career. During that time, many people have touched my life and left it for the better—too many people to mention in an already lengthy dissertation. So, before I acknowledge specific individuals, I'd like to thank everyone who has shared a kind word, advice, a beer or a hug. Even the seemingly small gestures of support have kept me going through a tumultuous time.

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## Chapter 1: Introduction

*"Only after the last tree has been cut down... the last river has been poisoned... the last fish caught, only then will you find that money cannot be eaten."* - Cree Indian Prophecy

Noncompliance with environmental laws can have a devastating impact on human life and wildlife. As just one example, cost-cutting efforts by Transocean and British Petroleum led to an oil spill that was “unprecedented in size, location, and duration.” (National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, 2011, p. 182) The National Commission report on the BP oil spill documented how management failures at British Petroleum, Transocean, and Halliburton led to inadequate understanding of the issues and disregard for the potential risks involved in the oil drilling operation of the *Deepwater Horizon*. The resulting blowout and oil spill, lasting for 152 days, left over 650 miles of the ecologically rich and diverse Gulf coast affected. The damage to birds, fish, oysters, plants, mammals, as well as the consequences for human and economic health, will be unknown for years and may even be incalculable. As of the time of this writing, federal agencies have begun pursuing civil and criminal charges against the parties involved, including manslaughter charges against executives (US Department of Justice, 2012). Sadly, this is only one of many examples of corporate negligence and oversight leading to harm.

To prevent future harm, it is imperative that policymakers and scholars understand how corporate managers react to environmental regulations—that is, how they make decisions to be in noncompliance, to comply, or even to overcomply with the

rules put forth by regulatory bodies such as the Environmental Protection Agency (EPA). Prior research intimates that regulations themselves have an impact on corporate behaviors, but most scholars note that the law by itself is insufficient to explain compliance. Instead, we need to consider the impact of other extra-legal factors (social controls, economic constraints, and characteristics of top-level managers) when determining how corporations react to environmental policies.

Since the 1970s, the EPA has been the key regulatory agency creating environmental policy and enforcing environmental laws. Most scholars acknowledge that environmental outcomes such as air pollution have been markedly reduced since this time period, but little is known about how much of this reduction is due to fear of legal consequences, normative considerations (i.e., corporate managers see environmentalism as a moral obligation), or community pressures. Debates even exist about the appropriate method by which to regulate—e.g., whether regulators should take a more strict “command and control” approach when dealing with environmental offenders, or whether a more cooperative “self-regulation” approach (in which companies are assumed to be acting responsibly until otherwise proven) is more appropriate. By gaining a more complete understanding of what motivates corporations to be in compliance with environmental regulations, we can better inform policy to create more effective and efficient solutions.

Prior research identifies many different factors that predict noncompliance with environmental regulations and/or other environmentally-relevant outcomes (e.g., oil spills). Most of the research lacks structure, and to this point few scholars have attempted to tie the identified factors together into a cohesive framework from which we

can work to create theories of corporate environmental behavior<sup>1</sup>. Furthermore, many prior studies focus on only one factor (e.g., the impact of a specific law) without including, or examining interactions with, other factors (e.g., pressures from environmental non-government organizations). An exception to this scattering of research findings is the “license framework” put forth by Gunningham, Kagan and Thornton (2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009) which describes three domains external to corporations that guide firm decisions. Specifically, they argue that corporate behavior is constrained by external domains they refer to as the legal license, the social license, and the economic license. The legal license is the impact of regulations and enforcement. The social license includes pressures from community groups as well as from the public. The economic license includes, for example, constraints on corporate environmental advances because of the expense of new technology or a lack of demand for environmentally-friendly products.

In addition to these external licenses, Gunningham et al. (2003) argue that perhaps the most salient factor, and the one by which all of the external domains are ultimately filtered to culminate in corporate environmental performance, is the attitude of the corporate manager (and of the corporation itself) towards environmentalism. In their research, they note that companies facing the same external constraints often respond in different ways. Specific responses are driven by whether top management perceived environmental compliance to be important, whether top management seeks out new

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<sup>1</sup> Although this specific study looks at environmental behavior, I expect that the theory developed here will apply to other forms of corporate compliance (e.g., antitrust, fraud, etc.).

information about environmental practices and the potential benefits of such practices, and other attitudes or practices.

While the “license framework” is a huge leap forward in conceptualizing corporate environmental behavior, it has not been subjected to much empirical testing. Gunningham et al. (2003) and Kagan et al. (2003) offer limited empirical evidence (namely correlations and difference testing) that support their hypotheses, but researchers have yet to test this framework using a large-scale database and controlling for various confounders in tests. Given the substantive, moral, and practical appeal of developing and testing theories of corporate environmental behavior, a strong empirical test of the license framework is long overdue.

In addition to the lack of statistical rigor in prior tests, the framework is limited in three other ways. First, the framework is presented as a general approach to explaining corporate environmental behavior; the authors do not state their expectations in terms of formal propositions, which may be why empirical testing of the framework is limited. In this study, I take the basic ideas of the framework but state them more formally. Second, it does not clearly explain how factors predicting offending versus overcompliance may differ. Those companies who engage in environmental behavior above what is required by law may have different internal mechanisms in place, or face unique external pressures. The vignette data used in the first part of this study allows me to examine environmental offending as well as overcompliance to determine whether the predictors of each behavior differ. Third, the license framework emphasizes factors acting on the corporation itself and doesn't clarify how the individual characteristics of managers (aside from environmental attitudes) may impact managerial decisions and thus corporate

behavior. For example, social pressures are conceptualized as community or NGO pressures on the corporation, but it may be that managers within the corporation are informally socially controlled by their friends, family, and social status. The vignette data allows me to assess the influence of factors at both the individual and firm levels. Similarly, the framework discusses the concept of “managerial attitudes” but groups the attitudes of the CEO/top management together with corporate policies. In the following study, I create a clearer (and broader) theory by integrating the license framework’s emphasis on corporate-level factors (the legal license, economic license, social license, and corporate culture) with a rational choice framework that models how individual perceptions and attitudes mediate or moderate corporate-level concerns. In this integration, corporate-level pressures/incentives impact individual-level cost/benefit considerations. These individual-level considerations ultimately influence the individual’s decision to comply or overcomply.

The Gunningham et al. (2003) “license framework” is an important step in creating a cohesive theory of corporate environmental behavior. Yet, the approach must be subjected to more empirical and quantitative testing in order to determine whether key concepts and research hypotheses accurately depict corporate behavior. Furthermore, empirical testing can help us determine which factors are more or less important in guiding behavior and may illuminate under what circumstances various factors become salient. Using individual-level data will also provide a test of the importance of managerial attitudes and individual characteristics in moderating or mediating the impact of external social, economic, and legal factors. A second data source will allow me to

assess whether the results of a survey utilizing a hypothetical situation are similar to studies that use actual firm-level behavior as outcomes.

This study will contribute to knowledge about corporate decision-making, an important venture in society's attempts to mitigate the amount of future noncompliance and consequent impact on wildlife and human life. Only through creating a comprehensive (but clear) theoretical framework that looks beyond the legal domain can we hope to make changes in organizational behavior that reduce harms resulting from noncompliance with environmental regulations. In the next chapter, I present background information about environmental offending and overcompliance, what has been shown empirically to predict such behaviors, and review prior research on the license framework and rational choice theory as applied to corporate managers.

## Chapter 2: Literature Review

### I. Introduction

Research on corporate and individual environmental behavior has proliferated since the 1960s and 1970s when the environmental movement of that time spread awareness of corporate environmental crimes and negligence (Burns et al., 2008; Friedrichs, 2010; Hagan, 2011; Ruckelshaus, 1985). However, this research investigated a multitude of factors without organizing them into a systematic framework until Gunningham and colleagues developed the idea of the “license framework” (Gunningham et al. 2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009)<sup>2</sup>. The “license framework” describes various domains external to the corporation (legal, economic, and social) that constrain or allow corporations to behave in a particular way. It also describes how internal management affects the corporate response to such licenses and ultimately predicts the environmental outcome. Despite making a major contribution to the literature on corporate environmental behavior by clarifying how factors work individually as well as with each other, the license framework concept has received little quantitative attention. The framework also does not clearly distinguish the mechanism by which corporate-level concerns are filtered through individual-level attitudes and perceptions.

This study addresses these deficiencies in the literature by integrating the license framework with an individual-level rational choice approach and quantitatively testing the entire model. However, before quantitative tests can be performed I will situate the

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<sup>2</sup> Although I argue that Gunningham and his colleagues developed the first holistic approach to corporate environmentalism, it is important to note that Huisman (2001) puts forth a similar conceptualization of corporate behavior (both in the environmental and occupational safety domains) in his dissertation, which was written in Dutch and not widely disseminated to American audiences.

license framework and rational choice theory in the context of what is known about environmental behavior by companies and their managers. To this end, this chapter will define environmental compliance and introduce a relatively new concept—“overcompliance”—to this discussion. The chapter continues by describing the theories in more detail and use previous empirical research to support the various components of the framework as well as the cohesive model. This chapter concludes by identifying five hypotheses that will be tested in the remainder of this dissertation.

## **II. Defining the Outcomes of Interest**

### **a. Definition of Environmental Crime**

There are two outcomes of interest in this paper: 1) corporate crime and 2) corporate overcompliance, both under the domain of environmental regulation. Corporate crime is a specific type of white-collar crime committed by a representatives of the corporation, on behalf of the corporation<sup>3</sup>. It occurs “in the context of complex relationships and expectations among boards of directors, executives, and managers on the one hand, and among parent corporations, corporate divisions and subsidiaries on the other” (Clinard and Yeager, 1980, p. 17). The majority of corporate offenses are handled by regulatory agencies, like the U.S.’s Environmental Protection Agency (EPA), rather than by criminal or civil justice agencies. Thus, a focus on strictly criminal behaviors

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<sup>3</sup> It is important to note that a corporation is considered a “juridical person” (d’Errico, 1997, p. 99) that acts independently of its members. I do not discount the corporation as an independent actor. In the integrated theory described below, I predict the behavior of the corporation *and/or* its agents who act “for its sake, to achieve its objectives and according to its constraints.” (Finney and Lesieur, p. 264) The corporation and its agents are subject to unique but interrelated influences that need to be delineated clearly.

would be too limiting and would miss a great deal of corporate misconduct. According to Clinard and Yeager (1980), corporate crime is “any act committed by corporations that is punished by the state, regardless of whether it is punished under administrative, civil, or criminal law” (p. 16). Since the current study focuses specifically on *environmental* crime, I define my offending outcome using the EPA’s definition<sup>4</sup>:

“... cases that involve negligent, knowing or willful violations of federal environmental law. Generally speaking, knowing violations are those that are deliberate and not the product of accident or mistake. Knowledge of the specific statutes or regulations that prohibit the wrongful conduct is not required. When a violator is aware that the wrongful conduct is prohibited by law, the violation is said to be ‘willful.’” (United States Environmental Protection Agency, 2011, 1<sup>st</sup> paragraph)

Note that this offense-based definition includes cases that can fall under criminal, civil, or administrative law. All of the noncompliance behaviors examined in the vignette surveys and in the meta-analysis conform to this definition.

### **b. Definition of Environmental Overcompliance**

Corporate environmental behavior can be thought of as a behavioral continuum—on one end is environmentally harmful behavior (*environmental crime*) and the other is environmentally protective behavior. Corporate *overcompliance* (also called “extreme

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<sup>4</sup> Note that the EPA definition only allows for federal violations. The present study’s outcome encompasses violations of environmental law regardless of jurisdiction or nationality.

volunteerism”) with environmental laws can be thought of as lying on the protective end of the continuum, on the opposite side from environmental offending. Scholars note that some companies and managers take actions that safeguard the environment in the absence of regulatory requirements or that some corporations’ environmental records far exceed what is required by regulations (Gunningham et al., 2003; Magat and Viscusi, 1990). For example, some companies reduce pollution discharges to levels far lower than the legal limit.<sup>5</sup> Others voluntarily reduce non-regulated pollution sources by enrolling in programs sponsored by the EPA such as Green Lights (which later partnered with Energy Star Buildings Program), Toxic Release Inventory (TRI) 33/50, and Wastewise. Relatively little is known about why corporations and managers adopt these types of behaviors.

Bringing these kinds of behaviors into focus, especially in contrast to noncompliance, has implications for both theory and practice. Going back to Hirschi’s (1969) theory of informal social control, it may be more useful to ask “why *don’t* people offend” as opposed to why they offend. That is, given the low likelihood of formal sanctions and the fact that committing crime is often the most efficient method to get what we want, one might expect more offending than is generally observed. This is particularly applicable to corporate crime, which traditionally has not been subjected to formal law enforcement efforts and sanctions. Despite the small likelihood of detection and punishment and the lack of resources available to the EPA and other regulatory agencies, many companies not only comply but go above and beyond what they have to do.

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<sup>5</sup> In a sample of mostly water treatment plants, Bandyopadhyay and Horowitz (2006) found that plants pollute, on average, only 60 percent of their permitted levels.

It is also important to realize that, unlike street crime, corporate compliance is not merely a “yes/no” question, particularly in the environmental realm. Offending is often decided based on where the firm’s behavior falls on a continuum (e.g., pollution levels); furthermore, the point at which a firm is labeled as “noncompliant” is subject to negotiations between the firm and regulators. Relatedly, there is literature that suggests a temporal aspect to overcompliance—larger companies may overcomply with regulations and then lobby for more stringent regulations that their less-profitable competitors will be unable to meet (Bernauer and Caduff, 2004). Therefore, in a sense, overcompliance *is* compliance.

That said, the discussion thus far makes it sound like overcompliance occurs only due to instrumental considerations—increasing competitiveness, negotiating regulatory stringency, etc. There is evidence, however, that companies overcomply due to a sense of social responsibility and environmental attitudes of managers (Gunningham et al., 2003). Teasing out the motivations for overcompliance is important for both theory and policy. For example, if extreme volunteerism is motivated by corporate culture or managerial normative values while offending is predicted by instrumental considerations, then programs that attempt to incentivize overcompliance may be ineffective because such companies would already be behaving in pro-environmental ways. To the extent that “extreme volunteers” look quite different from noncompliant firms, we can learn more about the mechanisms that produce different behavioral outcomes and leverage that knowledge for more efficient and successful regulation.

### **III. Theoretical Background**

#### **a. Gunningham et al.'s License Framework**

Theories of environmental corporate behavior often contradict each other regarding the influence of various parties on corporate environmental behavior. For example, the green consumer theory of overcompliance and rational choice theory of compliance both emphasize profit motives. In the first case, corporations overcomply because of consumer preference for environmentally-sound products, while rational choice theory argues that offending will occur when an illegal behavior will generate profit with a low likelihood of sanctions (Arora and Gangopadhyay, 1995; Paternoster and Simpson, 1993, 1996; Wu, 2009). In contrast, the strategic behavior theory of overcompliance argues that companies overcomply in anticipation of stricter regulations or even to leverage stricter controls that would disadvantage competitors (Arora and Gangopadhyay, 1995; Wu, 2009). In yet another model, corporate behavior is driven by internal company resources (e.g., return on assets) as well as opportunities in the external environment (e.g., industry characteristics; Russo and Fouts, 1997). Yet another approach argues that overcompliance occurs for normative reasons, attributable to the environmental attitudes of top management (Gunningham et al., 2003; Kagan et al., 2003). The contradictions among these theories are due to what is or is not specified/emphasized or because the theories do not examine the interactions between various domains and levels of analysis. The review of the literature that follows demonstrates that there are numerous predictors of environmental compliance and overcompliance. This implies that theories of corporate behavior should account for the

role of various influences such as: formal sanctions and procedures, informal sanctions and rewards, economic factors, and managerial styles/attitudes (Gunningham et al., 1998; Paternoster and Simpson, 1993, 1996).

The best framework that accomplishes this task is one put forth by Gunningham, Kagan, and Thornton (2002, 2003, 2004; Gunningham et al. 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009), which explains both environmental compliance and overcompliance. Neil Gunningham first emphasized the role of third parties in regulation since 1997 when he studied biodiversity conservation in Australia (Gunningham and Young, 1997) but developed a more structured framework in his work with Robert Kagan and Dorothy Thornton. This more structured framework (which included informal regulatory actions by third parties) was based on interviews with environmental and mill managers at 14 pulp and paper mills in Canada, the United States, and Australia/New Zealand (Gunningham et al., 2002, 2003; Kagan et al., 2003). In these studies as well as in other projects, the authors emphasized that multiple stakeholders are relevant in developing regulatory strategies. Specifically, they described three external “licenses” that allow or restrict a corporation’s operations—legal, social, and economic. They also described an internal “license” affecting corporate behavior—the style and attitudes of corporate management. Each of these licenses will be explained in turn.

The **legal license** is predominantly composed of regulatory regimes, but includes formal criminal justice sanctions as well. Regulatory agencies and criminal justice agencies are often perceived as taking a “command and control” approach to corporate crime, meaning that they seek to deter misbehavior through surveillance and harsh sanctions. However, there is much evidence that regulatory agencies (the predominant

method by which environmental crime is addressed) take a more conciliatory approach and attempt to induce compliance through cooperative means (Gunningham et al., 1998; Gunningham et al., 2003; Kagan et al., 2003).

The **social license** involves the influence of the media, politics, and the public (e.g., organized non-government environmental groups) on environmental actors. The authors argued that public pressure on corporations can affect behavior in three ways: it directly punishes or rewards the firm by allocating/withdrawing its reputational capital, it indirectly affects it by giving extra weight to existing enforcement strategies and legislation, and it can indirectly affect it by putting pressures on regulatory agencies to tighten controls (Gunningham et al., 1998; Gunningham et al., 2002, 2003, 2004).

The **economic license** is the ability to profit or the likelihood of suffering financial setbacks as a result of certain behaviors. For example, research implies that stock market prices may be affected by regulatory reports of pollution or by environmental catastrophes that make headlines (Hamilton, 1995; Konar and Cohen, 2001, Shane and Spicer, 1983). It may also be feasible to offer economic incentives in the form of tax subsidies for adopting more environmentally-friendly technologies or meeting compliance goals (Gunningham et al., 1998). Overall, the ability to reduce compliance costs or enhance profits is thought to be a strong motivator in compliance and overcompliance (Gunningham et al., 2003, 2004; Thornton et al., 2007, 2008, 2009).

The **style and attitudes of corporate management** involves the commitment by management to seek out environmentally relevant information (e.g., looking into cost-effectiveness of environmentally-friendly strategies), respond to information about environmental policies (e.g., from regulators), and the institutionalization of

environmentally-relevant policies in the company (e.g., audits, training). The style and attitudes of management generally interact with the external licenses. For example, managerial attitudes will often affect how firms respond to regulatory regimes, or may mediate the influence of economic slumps on corporate noncompliance (Gunningham et al., 2002, 2003, 2004; Kagan et al., 2003).

It is important to note that the license framework was developed to explain corporate-level behavior. As such, it has only been studied at the corporate level. The present study uses individual-level data (but asks individuals about consequences to the corporation as well as themselves) and therefore has the advantage of being able to distinguish between individual- and corporate-level influences. It is likely that individual and firm-level factors have different effects on corporate compliance and overcompliance (Paternoster and Simpson, 1996; Piquero et al. 2005, Simpson et al. 1998; Simpson et al., 2013). Therefore, an important contribution of the present research is specifying how the licenses operate on the corporation and how that relates to individual-level considerations. Although the economic, social, and legal licenses remain conceptually the same in my theoretical model, I think it is important to take the license framework's "managerial attitudes" concept and distinguish between two factors: 1) managerial attitudes about environmental behaviors and 2) corporate cultures regarding compliance. I believe that the environmental attitudes of managers is better conceptualized as a factor included under the rational choice component of the integrated theory (discussed below), but the corporate culture remains an important element of the license framework. Following Clinard and Yeager (1980, pp. 58 – 60), corporate culture can be conceptualized as guidelines for behavior within a firm or industry. Such guidelines or

cultural norms are affected by many factors, including top management goals and priorities, the monitoring of behavior and use of sanctions within the firm, the attitudes of supervisors towards company goals and methods used to meet such goals, the goals of the company themselves, behavioral patterns in the industry, etc. The key for this study is that corporate culture is diffused throughout the corporation, while managerial attitudes rest within an individual leader. The next section discusses concerns and characteristics that individual managers consider when deciding how to act on behalf of the corporation.

#### **b. Rational Choice Theory**

Rational Choice Theory stems from economics and argues that people act to maximize benefits and minimize costs. Related to criminal behavior, offenders seek to benefit themselves and weigh the “choice-structuring properties” of alternative actions (Cornish and Clarke, 1987, p. 935). After considering the skills required, potential benefits, and costs/risks, offenders make decisions to engage in a criminal act (or not) and the methods to employ. Cornish and Clarke argue that to understand and prevent crimes, one should look at the motives, opportunities, rewards, and costs offered by various activities. Importantly, choice-structuring properties not only provide information about the crime but also tell us about the offender (e.g., his/her needs, preferences, personal characteristics, and perceptions).

Corporate crime, including environmental crime, is thought to be particularly amenable to rational choice explanations as corporate managers are considered to be highly rational beings who make decisions to maximize profit and minimize damages to the corporation (Shover and Hochstetler, 2006; Weisburd et al., 1995). Paternoster and

Simpson (1993, 1996) explicitly applied rational choice theory to corporate crime, delineating nine factors that predict managerial offending. These factors are described below:

- 1) **Prior offending:** the individual's prior behavior hints at the person's bounded rationality or decision-making capabilities more generally.
- 2) **Formal sanctions:** the perceived certainty of getting caught and the severity of criminal, civil, or regulatory sanctions as well as those from internal compliance systems in the corporation. In Paternoster and Simpson, the individual manager's decision is influenced by concerns with legal sanctions against him/herself as well as against the corporation.
- 3) **Informal sanction threats:** the perceived certainty or severity of costs other than those in the legal domain. At the individual level, managers may fear losing the respect of peers, family, coworkers or losing their job. In terms of corporate costs, managers may fear the loss of customers or tarnishing the firm's reputation.
- 4) **Moral inhibitions:** the individual's ethical compass and internalized norms. Essentially, violating one's internalized norms is an internal cost. Evidence clearly shows that when people think a behavior is wrong, they are less likely to do it. However, external or company factors can override our moral compass or make the ethicality of a behavior ambiguous.
- 5) **Costs of compliance:** whether *not* offending will reduce your corporations' competitiveness with other companies. For example, sometimes new

regulations require the installation of new equipment which means that the company incurs more costs and decreased profits.

- 6) **Perceived legitimacy:** whether the offender feels that regulations/regulators are fair. If people don't think that the law is reasonable or fair, they may be defiant and thus more likely to ignore regulations.
- 7) **Benefits of noncompliance:** for example, whether the behavior leads to a promotion or to increased profits for the corporations.
- 8) **Loss of Self-Respect:** another internal and informal cost occurs when the person experiences internal guilt (versus externally-imposed shame).
- 9) **Situational characteristics:** the opportunity structure and other situational factors likely affect the perceptions of the costs and benefits of corporate offending or overcompliance. Such situational characteristics may include: the culture of the corporation, specific opportunities, or political/cultural/economic factors (e.g., how many plants you own, the dominant political party).

As you can see, there is some overlap between Gunningham et al.'s (2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009) license framework and Paternoster and Simpson's (1993, 1996) rational choice framework. Specifically, individual managers base decisions not only on individual-level concerns but also on factors impacting the corporation (i.e., the licenses). The next section seeks to distinguish between the license framework and rational choice theory, but then integrate them into a broad conceptual model that will encapsulate relevant interactions at and between the corporate level and the individual level.

### c. The Integrated Theory of Environmental Corporate Behavior

Although there is clearly overlap between Gunningham et al.'s (2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009) license framework and Paternoster and Simpson's (1993, 1996) rational choice framework, the fundamental difference is that Gunningham et al. are attempting to explain the behavior of *corporations* while Paternoster and Simpson attempt to explain the behavior of *individuals*. What both theories fail to explicitly clarify is that the decisions of individual leaders in corporations (who are responsible for corporate policies) are *the same* as corporate behaviors. That is, those individuals located in top management are making decisions (again, on behalf of the corporation) and such decisions are generally translated into corporate policies and behaviors (Hambrick and Mason, 1984; Pinto et al., 2008).

Although both the license and rational choice approaches blend corporate and individual-level factors in predicting behaviors, each approach emphasizes one unit of analysis over the other. The license framework more strongly emphasizes how factors affect the corporation as a whole (and provides a better conceptualization of the interactions among these pressures), while rational choice theory is focused more on individual-level perceptions and pressures. As such, it is important to clearly delineate that measures of the license framework include measures of the *legal license*, the *social license*, and the *economic license* that operate on the firm, as well as *corporate culture*. Measures of the rational choice framework include managerial level attitudes and perceptions of risk to the individual, including *environmental attitudes*, *attitudes towards regulations and compliance*, and *risks of punishment to oneself*. I argue that corporate-

level factors are filtered through individual-level perceptions to influence managerial decisions (and thus corporate behaviors).

One of the strengths of this integration is its attempt to explicate the relationships between the various external licenses and internal factors. However, this strength also necessitates a level of complexity. To assist comprehension, Figure 1 below is a diagram that depicts the hypothesized relationships. For example, the three external licenses are depicted in the bracketed section of diagram on the left. The arrows within the bracket represent expected interactions between the external licenses. I expect that the external licenses will impact (and be impacted by) the culture of the corporation; as such, I expect measures of the corporate climate to render external license measures nonsignificant when included. The variable most proximal to environmental decisions are individual-level factors—those reflecting the rational decisions of the individual based on risk of sanctions to the corporate manager as well as his/her attitudes towards the behavior. I think that all of the other variables will (to some extent) be filtered through individual considerations and thus the rational choice variables will prove to have the most important impact on the outcome. However, the external licenses likely have some direct effect on the behavioral outcome as well.

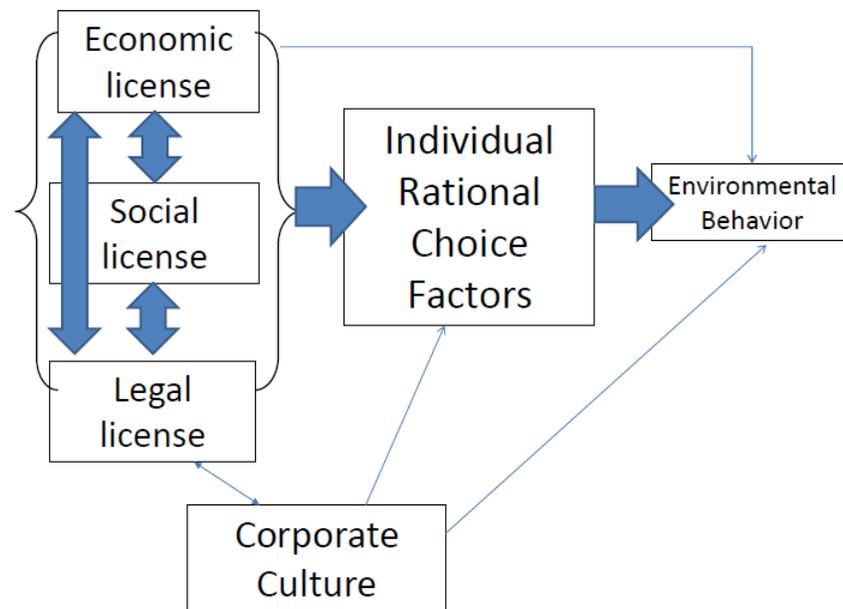
There are many benefits of this integration. By more clearly separating corporate- and individual-level considerations using these two different frameworks, we can determine if inconsistent findings in the research are due to the unit of analysis being used. For example, we may be able to better disentangle how instrumental and normative influences impact corporate policy.<sup>6</sup> Furthermore, the integration allows for testing using

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<sup>6</sup> Scholars argue that offending and overcompliance are due to either normative or instrumental considerations, both of which receive empirical support. It may be that managers are concerned with

data sources at either level of analysis—with corporate-level outcomes (e.g., official pollution data, failed inspections) you can exclusively use license framework measures as predictors. With individual-level survey data, you can determine how corporate characteristics and firm-level factors impact the perceptions of the individual and drive individual-level decision-making.

**Figure 1: Diagram of the Integrated Theory of Corporate Environmental Behavior**



#### **IV. Empirical Support for the License Framework and Rational Choice Theory**

Although prior research rarely examines the license framework itself, support for the framework can be inferred by looking at how the licenses have been operationalized and studied in environmental research. Prior research on environmental crime generally uses official data on toxic releases, company self-reports, or survey research on intentions

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normative considerations themselves but consider more instrumental factors impacting the corporation as well.

to offend by individuals. Overall, research indicates that pollution has been reduced since the late 1970s (Ruckleshaus, 1985; Vandenberg 2001, 2004; Yeager and Simpson, 2009) and that most of this decline has been among large corporations (Vandenberg 2001, 2004). However, despite improvements, noncompliance with environmental regulations continues to pose a significant threat to public and environmental health (Burns et al., 2008; Friedrichs, 2010; Hagan, 2011; White, 2008). This section uses such research to explain the efficacy of each type of license and their interactions. In addition to quantitative tests of these constructs, Raizada's (1998) case study on pulp and paper manufacturers can help me demonstrate how each of the licenses function in reality. Specifically, I use her description of the MacMillan Bloedel corporation's navigation of legal, social, and economic pressures to describe how the licenses may work. She describes four different eras of operation from 1983 – 1997: Survival Mode (1983 – 1986), Maintaining Competitiveness (1987 – 1990), Environmental Issues Gain Momentum (1991 – 1993), and Crisis Management (1994 – 1997). I will describe how the relevant license evolves throughout these time periods.

In the following section, empirical support for the impact of corporate culture is reviewed, followed by the empirical research on the actual license framework (predominantly by Gunningham, Kagan, and Thornton, with one notable exception). I then describe the support for RCT's application to corporate crime. This section concludes by providing a summary of the empirical research and then specifying the present study's hypotheses.

### **a. Empirical Research on the Legal License**

Research on corporate offending produces mixed findings about whether regulatory enforcement and other legal sanctions are sufficient to deter offending. Proponents of legal approaches assume that increased monitoring of behavior, coupled with certain and severe sanctions for offending, will promote compliance. Cohen (1999) reviewed the economics literature on environmental enforcement and found that government monitoring and enforcement mechanisms generally produce compliance. Gray and Shimshack (2011) reviewed the empirical research on environmental monitoring and enforcement behaviors—they found that regulation of the Clean Air and Clean Water Acts by the EPA consistently produces compliance with pollution standards and often promotes overcompliance among those companies who already meet the standards. In specific examples, Cohen (2000) demonstrated that Coast Guard inspections and monitoring reduce oil spills. At the state level, Flatt and Collins (2009) examined compliance with the Clean Air Act and the Clean Water Act; they found that when states provide more funding to environmental regulations, companies spend less time in noncompliance with Clean Air Act regulations. Gray and Shadbegian (2005) found that states with more stringent environmental enforcement and implementation of the EPA's Cluster Rule reduced toxic releases.

Studies consistently demonstrate that regulations and sanctions directed against the firm can discourage offending (Deily and Gray, 1991; Ervin et al., 2008; Gray and Deily, 1996; Laplante and Rilstone, 1996; Magat and Viscusi, 1990; Nadeau, 1997; for a summary see Cohen, 2000). LaPlante and Rilstone (1996) found that inspections and threats of inspections of pulp and paper manufacturers in Quebec predict reductions in

pollution emissions and promote more frequent firm reports of pollution. Gunningham et al. (2005) interviewed managers of electroplating and chemical manufacturing plants and found that when inspections and enforcement actions are sustained over time, such actions promote “implicit general deterrence” and lead to a “culture of compliance” (see below for more details). Magat and Viscusi studied pulp and paper firms under the EPA’s jurisdiction and found that EPA inspections and enforcement action improve pollution and reporting practices at firms. Gray and Shadbegian (2005) also examined pulp and paper mills in the 1980s and found that, after controlling for endogeneity issues, increasing the number of regulatory actions by one inspection or one other type of action increases the likelihood of a firm being in compliance by 10 percent. They did note, however, that firm characteristics affect how reactive firms are to regulatory pressure. Short and Toffel (2008) found that when companies participating in the EPA’s Toxic Releases Inventory program are subject to regulatory enforcement or are provided immunity from prosecution, they are more likely to report violations. Simpson, Gibbs, and Slocum (n.d.) noticed that formal sanctions against the firm decreased intentions to offend. Stafford (2008) observed that firms experiencing an increased frequency of inspections are more likely to self-report to regulators for instrumental reasons (i.e., they are trying to decrease the frequency of inspections in the future). Thus, the author argued that its possible firms will disclose only minor violations as a strategy to reduce regulator attention. Simpson et al. (2007) analyzed EPA data and found that inspections are *positively* associated with the number of violations; they note that larger facilities (who have more opportunities for violations) are targeted for inspections. Overall, the authors

argued that EPA sanctions are not effective at the firm level; instead, it seems that more violations lead to more EPA monitoring and enforcement efforts.

Regarding the effect of regulations or legal sanctions on extreme volunteerism, prior research indicates that companies may overcomply because they anticipate stricter regulations in the future (Taylor et al., 2005; Wu, 2009). Porter and van der Linde (1995a, p.128; 1995b, p. 99 – 100) warned that companies generally will not choose to innovate without regulatory pressure because of cost and time constraints. Ideally, regulation provides the necessary pressure to motivate companies, improves environmental quality in those cases where innovations do not completely offset the cost of complying with regulatory orders, provides technical assistance and education to companies, and ensures that competing companies are on a level playing field as an industry transitions to more environmentally-friendly policies. Wu (2009) found that regulatory pressures are marginally significant predictors of overcompliance.<sup>7</sup>

Many people assume that fear of detection by enforcement agencies and consequent formal/informal punishments are the most important factors encouraging compliance, particularly for corporate or white-collar crimes which seek to maximize profit (Braithwaite and Makkai, 1991). However, this assumption is questionable since offenders face a low risk of detection and formal punishments tend not to be severe. For example, the Office of the Inspector General conducted six audits of the EPA's enforcement of the Clean Air Act and found that enforcement programs were deficient. Specifically, many state enforcement agencies either did not want to report violators or

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<sup>7</sup> As mentioned above, certain scholars find, instead, that normative considerations drive overcompliance. These factors will be reviewed in the discussion of corporate culture and rational choice literatures. Given that support exists for both models, I hope that this study can inform this debate especially given the unique measurement of such factors.

inspections were not adequate to detect violations (Office of the Inspector General, 1998). In many countries, the responsibility for environmental regulation is delegated to local authorities who may be less inclined to punish businesses that contribute to the local economy, opting to take a cooperative approach instead. Local politics also play a role in determining available resources for environmental enforcement which influences agencies' abilities to detect infractions (Yeager and Simpson, 2009). Furthermore, enforcement efforts generally target large industrial sites. While this strategy has resulted in pollution reductions over time, Vandenberg (2001, 2004) argued that such targeted enforcement has created social norms castigating large firms but absolving small business owners and individuals from responsibility. Small business owners and individuals are more often portrayed as victims of industrial pollution and may not see how they contribute to the problem. Thus, they do not believe they are subject to sanctions and a significant source of pollution is unhindered.

Given that companies (and individuals within them) do not face particularly certain or severe punishment, fear of regulatory agency action may not be a strong explanation for environmental compliance or over-compliance. For example, Simpson et al. (2007) analyzed firm-level EPA data and found that EPA sanctions did not significantly affect violations; instead, firm-level characteristics were more important predictors of violations.

A potential reason for inconsistent results in the research on the legal license is that government agencies employ many different types of strategies to promote environmental compliance, making it problematic to compare research on different regulatory actions or agencies. It may be that certain approaches are more effective than

others, or the effect of law enforcement/regulation may be context-specific (Axelrad, 2000; Gezelius and Hauck, 2011; May, 2005; May and Winter, 1999; Welles and Enge, 2000). For example, May (2005) examined the effect of regulatory context on compliance in three different settings: farmers in Denmark, marine facilities in California and Washington, and homebuilders in Washington. He found that regulations can be framed in one of three ways: 1) as a “societal contract” in which industry members feel obligated to be responsible and are in turn met with a more accommodating regulatory approach; 2) as a “social contract” in which frequent and certain inspections lead to a common idea between the regulators and the regulates about the definition of compliant behavior, or 3) as “no contract” in settings with little interaction, resulting in few opportunities to negotiate the meaning of compliance or emphasize obligations. He argued that legal enforcement is most important for inducing compliance among those in the third setting. Overall, the study demonstrates that context matters and that you cannot make a general policy recommendation that will fit all environments or regulatory agencies.

In general, research indicates that regulators should employ multiple approaches when dealing with regulatees, a thought consistent with much of the literature on the increasingly popular “soft” regulatory approaches that seek to diminish the adversarial nature of the relationship between regulators and their clients. While much of the research on a soft approach is supportive in certain contexts, there is much literature that shows cooperative regulation is not enough. In support of a soft approach, Axelrad (2000) compared the interactions of one company’s subsidiaries with regulators in the U.S., the UK and in the Netherlands and found that the U.S. has more legalistic and

prescriptive regulations which then makes (because of increased costs/delays in the investigation stage) the process of remediating contaminated manufacturing sites slower. Dwyer et al. (1999) found the same thing in comparing automobile assembly plant paint shops in the U.S. and Germany—the U.S. regulatory process slowed adoption of new pollution controls and making production changes. Aoki et al. (2000) compared the firms of an electronic parts multinational corporation who had sites in the U.S. and in Japan; the authors argued that the U.S. firm is subject to more stringent regulations but that the rules are also more complex and uncertain. Although the U.S. firm operates under a stricter regulatory environment, this has not led to more compliance or environmentally-friendly behavior than in Japan. Verweij (2000) argued that the regulatory regime controlling pollution in the Rhine is more consensual and leads to more voluntary investments by corporations in that area as compared to the more adversarial regime in the Great Lakes basin; overall, the author argued that this is why the Rhine is much cleaner than the Great Lakes.

However, Koutalakis et al. (2010) argued that soft regulations (that are less coercive, more flexible and simpler such that all mediums of pollutants are covered under one law) have not been effective in countries of the European Union because these countries have problems interpreting and enforcing them. They discussed the need to use the same resources to implement both “soft” regulations as well as more legalistic ones—the two approaches should be thought of as reinforcing each other. McCarthy and Zen (2010) came to similar conclusion in studying regulation of oil palm and rubber industries in Indonesia. Harrison (1995) compared environmental regulation in the pulp and paper industry in Canada (which is more cooperative) versus the U.S. (which is more

legalistic) and noted that compliance rates were lower among Canadian firms; this contradicts the general consensus in the literature which seems to favor cooperative approaches. Gunningham (1987) conducted a case study of the New South Wales Mines Inspectorate in Australia which demonstrated that the regulatory agency's cooperative approach at an asbestos mine in an Aboriginal community neglected to take appropriate enforcement actions to back up its advisory role. When enforcement actions are not a credible threat, he argues, regulated industries are not likely to take on the cost of implementing remedial actions. In Gray and Shimshack's (2011) review of the empirical literature on environmental regulation, they noted that the literature on voluntary, informational, cooperative, or compliance programs have inconsistent effects on compliance.

The notion of cooperative versus punitive regulation (and the need for both) is described more fully by Ayres and Braithwaite's (1992) concept of "responsive regulation." Responsive regulation is a prescription for regulatory policy that argues different people/corporations may have different reasons to obey the law (or one person/corporation may have multiple factors to consider). This implies that regulatory strategies must include both cooperative and punitive components to be "effective, efficient, and legitimate" (Nielsen and Parker, 2009, p.376). Ayres and Braithwaite illustrated such a strategy in their "enforcement pyramid" (Ayres and Braithwaite, 1992, p. 35) in which regulators initially respond to offenses with a cooperative strategy. Sanctions then become increasingly punitive as corporations resist regulation and/or continue to be out of compliance.

The importance of incorporating multiple types of regulatory responses receives support in previous research (Braithwaite, 2002; Braithwaite et al., 2007; Burby and Paterson, 1993; Flatt and Collins, 2009; Gunningham, 1987; Gunningham et al., 1998; Koutalakis et al., 2010; McCarthy and Zen, 2010; Mehta and Hawkins, 1998; Scholz, 1984; Short and Toffel, 2008; Simpson, 2002; Stafford, 2008; Winter and May, 2001, etc.). Burby and Paterson (1993) examined how enforcement systems and a coercive approach affected compliance with sediment and erosion control standards at construction projects in North Carolina. They found that both deterrent and cooperative approaches were influential. Interestingly, the salience of these two strategies may differ according to which type of standards the company is trying to meet. Deily and Gray (2007) compared OSHA regulation to EPA regulation in the steel industry and found some differences in how they respond to firm noncompliance; the likelihood of complying with one set of standards is not highly correlated with compliance with the other; however, enforcement by OSHA predicted enforcement actions by the EPA and vice versa. This implies that regulatory agencies differ in how they approach their regulatees and that firms may respond differently to different strategies.

In Raizada's (1998) case study on the MacMillan Bloedal (MB) pulp and paper company, the corporation's interactions with regulators and the government were inconsistent. In the Survival Mode time period, MB would only react to more coercive approaches by the government before cleaning up waste products. However, the government became fairly lenient to the forest industry as a whole when Canada entered a recession and therefore MB was not subject to very stringent legal actions. Most interesting, perhaps, is the fact that during this era (and generally for the decade

following) legal actions were the method of choice for both MB and environmental groups in their conflict over various natural areas. In the Maintaining Competitiveness era, the government stopped being as friendly to corporate interests; the Ministry of Forests and the RCMP both investigated and challenged various MB operations. During the election year in 1991 environmental issues became more salient to the public. The government responded by making penalties and controls for discharges much more stringent. Note that during this period, MB found that the government was no longer a consistent ally and, in fact, a more adversarial relationship developed. During the Environmental Issues Gain Momentum time period MB was subjected to a very different regulatory environment than what they had experienced before as a result of the elections of 1991—the new administration scaled back on cutting rights in some locations, revamped environmental laws, put a moratorium on logging in one area and reduce MB's logging area in the Clayoquot Sound. Facing legal pressures, MB began to invest in pollution reduction equipment in order to comply with regulations but continued to do the bare minimum and continued to use legal resources themselves to fight against interest group attacks. During the Crisis Management period, the government became much more stringent after finding significant noncompliance with fishing and forestry regulations; they implemented more inspections and increased enforcement for violations. MB was specifically targeted and charged for violating the Fisheries Act, and a chlorine dioxide spill in 1994 resulted in criminal charges. All of these actions show how legal pressures on a company may exert themselves.

## **b. Empirical Research on the Economic License**

In addition to regulatory mechanisms, prior research finds that economic factors such as financial strain, shareholder pressures, costs of compliance, and competitive pressures influence corporate behavior. Scholars have found that firms and plants may be encouraged to offend or pollute in the face of financial strain (Aoki and Cioffi, 1999; Alexander and Cohen, 1996; Clinard et al., 1979; Clinard and Yeager, 1980; Kagan et al., 2003; McKendall et al., 1999; Paternoster and Simpson, 1996; Simpson, 2002; Simpson and Piquero, 2002; for exceptions, see Hill et al., 1992, McKendall and Wagner, 1997; Simpson et al., 2013). Alternatively, firms may fear shareholder pressure. It has been noted that firm stock prices and profitability fall after the public release of a firm's environmental offending (Hamilton, 1995; Khanna, 2001; Konar and Cohen, 2001; Shane and Spicer, 1983) and firms may therefore be motivated to comply out of fear that shareholders will stop investing (Cohen, 1999; Ervin et al., 2008; Harford, 1997; but see Wu, 2009).

Indirectly related to economic incentives are characteristics of the company such as its size (operationalized in various ways such as the number of employees or profitability) or age. Research has found that larger firms and plants are more likely to violate regulations (Alexander and Cohen, 1996; Clinard and Yeager, 1980; Gray and Deily, 1996; Gray and Shadbegian, 2005; Hill et al., 1992; McKendall et al., 1999; Yeager, 1987; for an exception, McKendall and Wagner, 1997) and to have higher toxic release emission rates (Grant et al., 2002; Grant and Jones, 2003; Grant et al., 2004). The age of the facility may matter such that older facilities are less able to meet changing emission standards (Gray and Shadbegian, 2005; Yeager, 1987), or it may cost older

facilities more to come into compliance (Gray and Deily, 1996, Helland, 1998). Wu (2009) found that high costs of compliance (high upfront investments, day-to-day costs, risk of downtime/delivery interruptions) and the uncertainty of future benefits predicted environmental violations. However, vignette studies fail to replicate this effect (Paternoster and Simpson, 1996; Simpson, 2002).

The role of economic factors (e.g., financial resources) has an inconsistent relationship with extreme volunteerism. Some studies found no effect (Arora and Cason, 1995; Cohen et al., 1997; DeCanio and Watkins, 1998) while others found that good firm and industrial financial performance encouraged participation in EPA voluntary programs (Videras and Alberini, 2000). Overcompliers may gain competitive advantage over market opponents who are less able to meet stringent regulatory standards (Porter and van der Linde, 1995a, 1995b; Wu, 2009). More consistently, studies have found that larger companies are more likely to overcomply (Arora and Cason, 1995; DeCanio and Watkins, 1998; King and Lennox, 2000). Wu (2009) demonstrated that competitive pressure is a consistent predictor of both violations (competition deters violations) and overcompliance (competition promotes overcompliance). Lower costs and risks predicted an increased likelihood of overcompliance; if extreme volunteerism is a consequence of calculated self-interest, regulators may be unable to rely on these firms to “police” themselves because such behavior is generally not cost-effective (Gunningham et al., 2003; Zhu and Sarkis, 2007). Wu (2009) also found that when upper management believed that overcompliance behaviors would be good for business, the firm was more likely to engage in extreme volunteerism.

Economic factors also influenced MB's environmental strategy (Raizada, 1998). In the Survival Mode time period, Raizada notes that MB's desire for profit was inherently at odds with the preservation goals of environmental interest groups. During this time, MB was experiencing limited profitability and argued that their company could not change their policies because they would go out of business, which would result in a loss of jobs and damage the economies of the communities in which their facilities were located. In the Maintaining Competitiveness and Environmental Issues Gain Momentum eras, MB was forced by changes in legislation (the BC Forest Act), government actions, and potential boycotts to engage in equipment upgrades. Internal documents clearly demonstrate that MB management saw such environmental investments as a financial burden and were very reluctant to implement such measures. During the Crisis Management time period, MB experienced financial constraints and were also facing pressures from shareholders who saw the company as unresponsive to their needs. Furthermore, customers of MB were being pressured by interest groups to stop buying paper from them. Because of the pressures for profit and the financial constraint, MB had few resources to make changes and clearly saw such changes as providing very little potential for economic benefit.

### **c. Empirical Research on the Social License**

Informal sanctions by the public or non-government organizations have been cited as potentially salient factors in corporate decisions as well. Studies by Gunningham and his colleagues illustrated the importance of the "social license" for self-regulation in the pulp-and-paper industry—mills located in communities with more active environmental

groups and/or active campaigns have lower pollution emissions. The authors argued that legal or regulatory sanctions were inadequate for deterrence; environmental managers saw the environmental community pushing accountability more so than regulatory agencies, who were perceived as more forgiving than the public (Gunningham et al., 2002, 2003, 2004; Kagan et al. 2003). Some research indicates that extreme volunteers may be more amenable to persuasion and normative social influences than other companies, which has implications for the social control of corporations and regulatory strategies (see Simpson, Gibbs, and Slocum, n.d.; Wu, 2009). The social license takes many forms, but the empirical literature tends to measure the effect of non-government organizations (NGOs) and general collective action, as well as environmental labels.

Much research supports the impact that social groups and collective behaviors can have on environmental decision-making by corporations (Arora and Cason, 1999; Binder and Neumayer, 2005; Hamilton, 1993; Phuong and Mol, 2004; Sonnenfeld, 1996a, 1996b, 1998a, 1998b, 2002; van Alstine, 2007; Zamprile and Llorente, 2009; but see van Rooij, 2010a). Binder and Neumayer (2005) found that countries with a higher number of environmental NGOs per capita had less sulfur dioxide, smoke, and heavy particulate levels. Hamilton (1993) used the percent of the population that was of voting age to proxy for community capacity for collective action. The author found that higher voter turnout led to decreased intentions of hazardous waste firms to plan capacity expansions; in fact they were more likely to plan capacity *decreases* in those communities. Arora and Cason (1999) also found that political action can influence toxic releases in a desirable way and that political behaviors may be most important in rural Southern communities (those most vulnerable to environmental injustices). The authors argued that it would be

particularly helpful to educate residents in these areas about the consequences of toxic releases and assist them in resistance efforts.

The inclusion of the community was also important in the preliminary findings of Zamprile and Llorente's (2009) case studies of two mining sites in Latin America. The Alumbreira mining site in Argentina did not consider community factors when developing the project and failed to recognize its role in industrial accidents. This site encountered much societal resistance and protests and ultimately faced criminal charges for violating environmental laws. In contrast, the Michiquillay mine in Peru was mandated to get community approval before moving forward. This site met with community members and negotiated the terms of development, as well as communicating technical and impact information. This study was still in progress at the time of the article but preliminary results demonstrated that community input is helpful. Sonnenfeld (1996a, 1996b, 1998b) argued that the pulp and paper industry in Australia, Indonesia, and Thailand (countries not known for stringent environmental regulation) responded to Greenpeace and environmental activists in their adoption of cleaner technologies. However, van Rooij (2010b) studied citizen actions in China and argues that citizens need assistance from state or intermediary institutions (e.g., scientific experts, lawyers, media, or civic organizations); the main problem is that state institutions are likely to side with industrialists and impede political or legal actions by citizens. While a variety of groups (not just NGOs) employed different strategies to control environmental behavior in China, such attempts lacked the necessary support to be effective (see also Sonnenfeld, 1998b).

Environmental labeling programs are another form of the social license. Labeling programs seek to provide information to consumers about the environmental effects of certain products or services. Such programs allow an organization to verify that a corporation's products, services, etc. are not environmentally harmful or are actually benefiting the environment in some way. Labeling programs can involve either first or third parties, be product- or corporation- related, and can be either mandatory or voluntary (U.S. EPA, 1998). For example, many people recognize the EPA's "Energy Star" program in which the agency identifies energy-efficient appliances, computer parts, electronics, buildings and homes. (EPA, 2013)

I classify labeling programs as part of the social license because they are a means by which regulators or companies disseminate information to the public about their environmental performance. Fischer and Lyon (2008) modeled the impact of industrial labels compared to those put out by NGOs, and find that NGO labels improve environmental quality in the market. However, van Amstel et al. (2008) found that in the Netherlands, third party labels for arable farming failed to communicate accurate information to consumers—this might reduce the effectiveness of labels to promote environmental compliance or overcompliance.

We see how the social license may be one of the more salient influences on an organization's operations by looking at Raizada's (1998) case study on MB. Throughout all of the different eras, social pressures in the form of protests/civil disobedience by environmental and native groups, publicity campaigns, increased public awareness about environmental groups, boycotts, etc. caused MB to be on the defensive throughout the 1983 – 1997 period. They responded to such pressure by taking legal action, engaging in

publicity campaigns of their own, and changing their operations, but ultimately their emphasis on profits and general resistance to environmental group demands (although some collaboration began to emerge in 1997) meant that they faced more and more pressures (from multiple domains) without any sort of alleviation. When contrasting MB's reaction to social pressures to another organization's strategy, Raizada argues that achieving buy-in from community groups and local residents in the beginning would have eased the problems that MB faced.

#### **d. Interactions of External Influences**

It is important to note that the legal, social, and economic licenses are very difficult to isolate and more than one type of license is generally operating at the same time. For example, regulations that incorporate social or economic pressure can be thought of as combining legal and social/economic licenses in order to produce compliance. Much research has examined such policies. I will first look at research examining the combination of legal and social licenses. Second, I will look at the combination of legal and economic licenses. Third, I consider the interaction between the social and economic licenses. I conclude with a look at interactions among all three of the external licenses.

##### **i. The Interaction between the Legal and Social Licenses**

Evidence suggests that corporate-level environmental compliance may be influenced more by informal sanctions (e.g., community pressures, reputational concerns; Gunningham et al., 2002, 2003, 2004) than by formal deterrence strategies. However,

legal and regulatory strategies have received much empirical support in the literature. Scholars also argue that informal and formal sanctions may interact to promote compliance (Simpson et al., 2007; Williams and Hawkins, 1986) and much research notes that it is imperative to include other parties in the regulation of corporations (Grabosky, 1997; Gunningham et al., 2003; Gunningham et al., 1998).

Most of the literature that falls under the rubric of both legal and social licenses examines the effectiveness of regulatory programs that use public disclosure of violations to trigger social pressures on corporations. Public disclosure programs such as the EPA's Toxic Release Inventory (TRI) or Indonesia's Program for Pollution Control, Evaluation and Rating (PROPER) involve regulatory agencies publishing the environmental records of or criminal sanctions against corporations. The rationale behind such programs is that corporations feel pressure from consumers and public groups (e.g., NGOs) to operate in a socially responsible manner and that such groups can exert external pressures on the organization. Although the regulatory body has the legal authority to conduct inspections and sanction the corporation, the main "punishment" comes from the potential to lose legitimacy in the organization's social sphere. Much research on public disclosure regulatory programs finds that such programs have an effect but that there are limits as to what these programs can actually accomplish (e.g., Afsah et al., 2000; Arora and Gangopadhyay, 1995; Blackman et al., 2008; Brooks and Sethi, 1997; Bui and Helgeson, 2008; Lee 2010; van Erp, 2011; but see Baker et al., 2008; Coglianese, 2002). Only three studies seem to fully support disclosure programs. Grant (1997) found that states providing funding for disclosure programs or those with right-to-sue laws have lower rates of emissions over time; he argues that citizen participation programs are unlikely to

be effective unless the appropriate resources are put forth to support them. Blackman et al. (2008) found, using data from Oregon, that regulators can use public disclosure about contamination, as well as threats of formal regulation, to induce participation in voluntary cleanup programs. Arora and Cason (1995, 1996) used TRI data and found that companies with higher emission levels are more likely to overcomply in an attempt to maximize positive publicity.

Other studies offer conditional support for such programs. For example, Bui and Helgeson (2008) used data from the TRI in the printed circuit board industry in the United States and found that mandatory disclosure programs can be effective when they include a credible threat of formal (state) sanctions and provide information about pollution prevention/abatement strategies to corporations. This finding is similar to Afsah et al. (2000) and Lee (2010) who argued that participation mainly promotes compliance because of an educative effect—that is, it provides corporate managers with more information which motivates more actions to come into compliance. Afsah et al. (2000) surveyed plants participating in PROPER and found that while PROPER increased public pressure from community groups and company stakeholders, the main mechanism by which PROPER promoted emissions reductions was by educating managers about their plants' performance and potential areas for improvement. However, the authors noted that without the public disclosure aspect, managers may not be motivated to make improvements. Lee (2010) found similar results when he used a case study approach on 18 companies participating in PROPER. PROPER motivated compliance and overcompliance with regulations, but mainly because of the new information provided to managers. Lee noted shortcomings of the program, including that the data collection was

not transparent and that many community groups did not see the process as legitimate (i.e., it is possible that corporations are bribing the regulators for favorable ratings). The friction between government officials and community groups, coupled with a lack of awareness or interest by investors in environmental information meant that the program is not fully harnessing the potential for public castigation to motivate compliance. Finally, Brooks and Sethi (1997) developed a unique index that accounts not just for the level of air pollution in zip codes but also their toxicity. Community characteristics and collective action predicted air pollution levels; after controlling for these, TRI disclosures also reduced air toxicity over time.

Brooks and Sethi (1997) also argued that firms try to reduce the consequences of negative publicity by moving production sites to areas less capable of collective action and those with a higher minority population. In fact, others have argued that firms may care more about their reputation than their actual environmental performance; King and Lennox (2000) found that firms who joined the chemical industry's Responsible Care program made slower progress in performance improvement than non-participants, implying that the program is used to *appear* environmentally proactive but doesn't actually encourage such behaviors. van Erp (2011) conducted a case study of the Dutch financial and capital markets, whose regulatory authorities published sanctions as a method of deterring other organizations from offending. In the financial market, where companies are more directly involved with clients, publicity of sanctions promoted general deterrence. However, in the capital markets there was a lack of reputational damage and less media coverage, so publicity had less of a deterrent effect. The author noted problems with how the information itself was disseminated—respondents noted

that the publications only told them what NOT to do (not what the proper action is) and the publications emphasized sanctions for seemingly minor offenses which actually reduced the legitimacy of the regulators. The publishing of sanctions actually seemed to promote defiance because companies thought they would be punished despite their best efforts to maintain fulfill regulatory expectations.

Still other studies demonstrate that disclosure programs are ineffective for various reasons. Terlaak (2008) examined whether participating in the ISO 14001 program truly provides the public with more information about a corporation's environmental performance. The author argued that ISO 14001 has not been as effective as people have expected for two reasons: 1) it does not accurately inform the public about corporations with superior environmental performance, and 2) it does not truly improve the performance of laggard firms. Instead, the author argues that multi-plant companies may implement ISO standards only at its higher-profit facilities that can subsume the costs of compliance—this is a form of satisficing in order to appease the company's stakeholders. Baker et al. (2008) also used TRI data and find no evidence that companies newly disclosing information are more likely to reduce their toxic releases.

Another form of community involvement in legislation can be seen in the notion of “negotiated rulemaking” whereby regulations are created through a process that involves government representatives as well as those from the private sector and public agencies. Coglianese (2002) compared the EPA's rulemaking processes (negotiated versus conventional) and found that both processes took about the same amount of time to produce regulations but that participants found the negotiating process to be burdensome. Furthermore, third-party participation in rulemaking did not reduce the

number of challenges to the rules, and there is no empirical evidence demonstrating that negotiated rules are superior. In fact, he argued that the process of negotiation may decrease the quality of regulation as some components may be sacrificed to make all the parties happy.

Instead of examining how legal mechanisms induce social pressures, other studies examine how community efforts (the social license) can impact regulatory efforts (the legal license) which *then* affect corporate behavior. Levine (1994) argued that it was community pressure and the creation of innovative social groupings that overcame the EPA's reluctance to address industrial odor problems in California and Arizona communities. Fredriksson et al. (2005) collected data from 22 OECD countries and 82 developing countries to demonstrate how the presence of environmental lobbying groups, participation in democratic elections, and the level of political competition in the election process affected regulatory stringency (measured as the maximum allowed lead content in gasoline in a country). They found that countries with more lobbying groups, more democratic participation, and more political competition had more stringent regulation—this demonstrates that both social groups and political factors impact regulatory processes. Earnhart (2004a) examined wastewater treatment facilities in Kansas from 1990-1998 and found that community characteristics impacted the number of regulatory actions taken against corporations which then influenced wastewater discharges; community characteristics also had a direct effect on facility performance. Sonnenfeld (1996a, 1996b, 1998b) argued that local activism efforts against the pulp and paper industry in Australia, Indonesia, and Thailand prompted changes in government regulations. Simpson et al. (2007) interviewed EPA inspectors and found that these

inspectors prioritized citizen complaints—about 20% of inspections are generated from citizen information. Similarly, Knowles and Espinosa (2009) argued that businesses in England were held more accountable because of social pressures on legislators. However, these businesses were only motivated to comply with regulations and would not go beyond because there are no incentives to do so; furthermore, innovation (and effective implementation) was discouraged because policies were communicated in a top-down manner in organizations.

## **ii. The Interaction between Legal and Economic Licenses**

There are five studies that examine the interplay between regulatory processes and a firm's economic license; two of these studies examined how both legal and economic pressures affected corporate behavior and the other three looked at how economic constraints limit corporate compliance or overcompliance with regulations.

To begin with research indicating that legal and economic licenses are independent but not sufficient in isolation, Khanna (2001) surveyed literature on non-mandatory regulation and found that firms are motivated to self-regulate and control pollution for both economic reasons (financial incentives/technical assistance, cost efficiency, competitive pressures) and legal reasons (regulatory pressure, influencing future regulation). Khanna and Anton (2002) further specified the reasons for adopting environmental policies, and found that environmental management systems were designed as a reflection of different pressures. Regulatory pressures predicted the adoption of internal environmental policies and environmental standards by organizations, as well as the administration of environmental audits. Economic pressures

(the potential for gaining a competitive advantage and improving relations with stakeholders, consumers, investors, and the public) predicted the corporation adopting total environmental quality management practices and reporting environmental information; these practices were seen as enhancements to mere regulatory compliance such that they enabled the firm to be more competitive (e.g., because they establish a better environmental reputation for the firm, make corporate practices more cost-effective, etc.).

In terms of economic constraints on compliant behavior, Zhu and Sarkis (2007) studied the adoption of Green Supply Chain Management practices and how such practices impacted the environmental and economic performance of Chinese manufacturing firms. They found that both pressures from investors and from regulators increased the adoption of GSCM practices and hence improved the environmental performance of firms. Competitive pressures improved the firm's economic performance but did not improve environmental outcomes. The authors argued that corporate managers need to recognize the financial investment that is required to make environmental improvements; regulatory pressures motivate environmental practices by firms, but may also hurt profits. Norberg-Bohm and Rossi (1998) explained the U.S. pulp and paper industry's preference for incremental (as opposed to radical) changes in environmental technologies. They suggested that regulatory uncertainty in the U.S., coupled with the economic investment required for radical changes, creates ambivalence toward the advantages of adopting new technology to improve environmental outcomes. Johnston (2006) evaluated the EPA's Strategic Goals program and found that regulations can change firm behavior (here, pollution in the metal finishing industry) but that

companies are often limited in how much they can comply because of economic constraints. He suggested that the U.S. government should consider offering financial assistance to promulgate changes. Thornton et al.'s (2007, 2008, 2009) work on the trucking industry in Texas and California further explicated how economics may suppress regulatory efforts as well as how regulators consider the economic impact of policies in enforcement decisions.

### **iii. The interaction between Social and Economic licenses**

A few studies examined the combination of social and economic licenses, predominantly by examining stock market reactions to public disclosure of corporate environmental behaviors. Generally, these studies find that stock markets punish those companies publicly identified as polluters and reward those with good performances. Hamilton (1995) demonstrated that high pollution figures in a firm's TRI report led to an increased probability of such numbers being reported in the media, and also to larger negative stock returns after the release of such information. Dasgupta et al. (2001) examined the capital markets in Argentina, Chile, Mexico, and the Philippines and found that markets in these countries react positively to announcements of superior environmental performance and negatively to announcements of citizen complaints. The authors argued that regulators should take advantage of such market reactions by implementing public disclosure programs. Lanoie et al. (1998) examined the impact of environmental announcements on future profits of firms in the U.S. and in Canada; they noted that capital markets reacted to announcements and that larger polluters suffered more consequences in the market than firms with less pollution. Gupta and Golder (2005)

found that in India, the announcement of poor environmental performance by firms negatively affected stock returns; they also found a generally positive correlation between environmental performance and abnormal stock returns (i.e., better performance is related to higher returns). The authors argued that capital markets may be an integral part of regulating corporate environmental behavior, particularly in countries with weak formal mechanisms for monitoring and enforcement. Konar and Cohen (1997) examined the EPA's TRI program. Firms experiencing the largest decline in the stock market following public disclosure of their environmental record reduced their emissions more than others in the industry without such large stock declines. Similarly, firms may be influenced by consumer willingness to pay for environmentally-friendly products and overcomply to establish a pro-environment reputation especially in the face of disclosure programs promulgated by regulatory agencies (Arora and Gangopadhyay, 1995; Wu, 2009).

Although the above articles demonstrate the potential for the social license and the economic license to work cooperatively, Thornton et al.'s (2007, 2008, 2009) study of 16 trucking firms in Texas and California showed how the economic license can sometimes mute the effect of social pressures and prevent compliance or overcompliance. The authors conducted field studies and examined mono-nitrogen oxides emissions in highly competitive but low-profit trucking firms. They concluded that economic pressures to maintain competitiveness may limit the effect of social pressures as well as regulatory ones.

#### **iv. Interactions Among All Three External Licenses**

In general, studies illustrate that it is not enough to use legal sanctions or economic motivations or social pressures in isolation to promote compliance or extreme volunteerism; instead, it is imperative to include all three external licenses to manipulate corporate behavior (Delmas and Toffel, 2004; Grabosky, 1995; Gunningham and Kagan, 2005). This is at least in part because corporations may have a different history or operate in certain industries/environments with different pressures (e.g., Sonnenfeld, 1998a). To begin a discussion of the external licenses overall, a seminal piece of literature is Gunningham et al.'s (1998) *Smart Regulation*, in which the authors proffered a strategy for (and emphasized the necessity of) incorporating third party actors (e.g., public interest groups, green consumers, investors, buyer-supplier relations, etc.) in regulatory enforcement. They argued that while various environmental crime policies are often seen as *alternatives* to one another, it is important to examine how various policies can *complement* one another. Specifically, the government should support third-party regulation through various strategies such as disclosing company activities, conferring private parties the right to enforce regulations, engaging private consultants as opposed to relying on organized interests, among others. Basically, Gunningham et al.'s goal was to describe how various instruments and policies can act synergistically to produce optimal policies in various situations; since many factors affect compliance and overcompliance a broad approach to regulation is necessary (see also Gezelius and Hauck, 2011; Grabosky, 1995; Wu, 2009). For example, Wu spelled out three necessary ingredients to promote environmentally-friendly behavior: 1) reducing firms' costs of environmental management, 2) maintaining a credible threat of regulation, and 3) training employees

and fostering upper managements' beliefs (pp. 3370-3371). In general, studies are supportive of legal, social, and economic pressures sparking improvements in the environmental behavior of companies (but see van Rooij, 2010a). However, these studies often contain caveats and demonstrate the nuances in the relationships between the external domains.

In support of all external licenses, Liu (2009) examined external pressures on firms located in the Yangtze River delta in China. In this study, the path analysis showed that all three forms of pressure (government regulation, market pressure, and community/NGOs) were related to improvements in three different kinds of environmental behavior (defensive, preventive, or enthusiastic). It seems that firms facing a high cost of implementation tended to engage in defensive behaviors, which were most influenced by formal government regulation—that is, legal requirements forced companies to make at least modest improvements in environmental management. Market pressure was important because companies wanted to attract green consumers, and therefore engaged in preventive behaviors. When companies were already compliant with regulations, pressure from the community and NGOs motivated “enthusiastic” behaviors by which the firm could sustain their profitability. The author argued that complementary measures are necessary to address varying needs of companies. Delmas and Toffel (2004) conducted a literature review to support their proposed model delineating how institutional pressures affect corporate overcompliance behaviors. They drew on institutional sociology and argued that firms within a particular industry were subject to similar institutional pressures but that unique plant and parent company

characteristics affected the firm's response to such pressures. While not an empirical test of the framework, the authors provided ideas for potential data collection efforts.

As mentioned above, most studies examining external pressures are only partially supportive. Cashore and Vertinsky (2000) examined forest companies in Canada and the U.S. and found that companies respond to legal, economic, and social pressures; differences in corporate responses were related to differences in external pressures (including environment groups, the media, business interests, and regulators). However, the authors noted that while firms responded to legal pressure and came into compliance, highly legalistic governance systems actually suppressed innovations and/or overcompliance. Thornton et al. (2007, 2008, 2009) illustrated how the economic license may supersede social and legal licenses in their study of small/medium-sized trucking firms; the lack of surplus funds in this industry meant that the costs of implementing better emissions control programs constrained the firms' ability to respond to legal and social pressures. Karpoff et al. (2005) compared the size of various financial costs resulting from environmental violations, including fines, damage awards, remediation costs, and market value losses. They found that market value losses are similar to, and related to, the legal costs imposed on the corporation; the authors concluded that environmental violations tend to be disciplined through legal/regulatory penalties, not reputational penalties. Khanna and Damon (1999) also examined the impact of the EPA's TRI and noted that companies participated in this program because they desired public recognition for their behaviors and wanted to avoid the potential costs of liabilities/compliance that occur under mandatory regulatory regimes. They found that, after controlling for motivations to participate, TRI involvement led to reduced

emissions. However, it also had a negative impact on profits in the short-term, although long-term profitability was positive.

van Rooij (2010a) offers a different take on external licenses. In his review of studies used by the World Bank to promote alternative forms of regulation, he identified inherent limitations of different models that emphasize third party regulation (grouped under economic, social, voluntary control, and state control). Starting with the economic license, he said that the use of discharge taxes is not clearly supported because reductions in pollution may not be due to the taxes so much as it is to extra inspections.

Furthermore, you would likely see changes only among those companies that can afford it. Stock market pressures are limited because 1) they are likely to affect only companies that deal directly with consumers, and 2) in states with weak enforcement it's unlikely that anyone will find out about crimes in order to publicize them.

Under the social license, community pressures are not clearly supported in the literature—it could be that community pressure is driving legal pressures which *then* impacts corporate behavior. Also, community pressure is not likely to occur in communities that rely on the corporation for much of their economic revenue. van Rooij noted that studies of public disclosure programs have generally relied on self-report data and concentrate only on a small group of firms (those that market directly to consumers). In terms of state controls, he noted that targeted law enforcement efforts are often biased towards more visible forms of pollution and on those complaints coming from more influential parties. Technical innovations in enforcement and monitoring are expensive and are easily tampered with by the company. Another form of state control is using

discharge fees to fund regulators, which is limited if such a practice leads to regulators becoming reliant on discharge fees for support.

The crux of van Rooij's argument is that in countries with weak law enforcement (e.g., developing countries), the potential of non-legal enforcement mechanisms is limited. Also, in developing countries there tends to be a lack of social and market pressures which means that public disclosure and public education systems will not be effective. Therefore, effective strategies will include state and non-state (legal, economic, and social) components.

In Raizada's (1998) case study of MB, social pressures consistently played a very important role but interacted with economic and legal pressures to shape MB's actions from 1983 – 1997. Environmental groups often used legal tactics (e.g., lobbying, lawsuits) to challenge MB's behavior. Also, public pressure (e.g., election platforms, publicity campaigns) led to the passage of stricter environmental regulations and more resources for inspections and enforcement. Raizada notes that the organization was under financial constraints for much of the time period, which constrained their ability to respond to public demands—however, regulations coerced the company to adopt new technology in order to meet compliance standards.

#### **e. Corporate culture**

Factors internal to the organization are also key to understanding compliance and overcompliance (del Rio Gonzalez, 2009). Individual-level managerial attitudes and the organizational culture can influence behavior within the corporation and ultimately the corporation's behavior overall. While Gunningham et al. (2003) discussed managerial

attitudes, they did not delineate the difference between a manager's *personal commitment* to the environment and *corporate culture* as defined by specific policies and directives that are disseminated throughout the organization. As mentioned above, a major contribution of this study is that it separates and examines corporate culture separately from factors salient to managers at an individual level.

When describing corporate climate, it may be helpful to start by thinking about how companies differ in their environmental strategies. Some scholars have developed typologies of corporations based on their willingness to comply or overcomply with environmental regulations. Gunningham et al.'s (2003; Kagan et al., 2003) typology of corporations is described in more detail below, but Haverkamp et al. (2010) also created categories of corporate environmental behaviors. Specifically, Haverkamp et al. defined four types of organizations in the Dutch Food and Drink industry based on environmental management practices: compliance-oriented, environmental transition, compliance-plus, and commercial/behavior excellence. These clusters are driven mainly by the influence of suppliers and on internal communication about environmental issues. *Compliance-oriented* companies are generally only meeting requirements and they don't face many external pressures. *Environmental transition* companies are those that face external pressures and have top management who are environmentally committed but cannot translate this commitment into corporate practices. *Compliance-plus* organizations face strong external pressures, have management that is committed to environmental policy compliance, and implement strategies to address environmental issues. *Commercial/behavior excellence* is a category occupied by organizations facing the strongest external pressures; these companies are also the most proactive (i.e., they

innovate without regulations telling them to do so) because they perceive that there are benefits in doing so.

Empirical studies often examine corporate culture (i.e., normative guidelines for behavior in the corporation; Clinard and Yeager, 1980) when they assess management-based regulation. Management-based regulation (MBR) is a strategy that requires regulated companies to examine their own procedures. This approach emphasizes the development of internal processes and analysis so that the company can improve its environmental performance and make sure it's in compliance with environmental regulations. The assumption behind such programs is that internal management of the corporation plays a critical role on the environmental outputs, an assumption reinforced in the literature (Coglianese, 2008). However, the effectiveness of MBR is not generally supported. Coglianese reviewed the MBR literature and noted that whether the government can effectively induce firms to improve management practices is questionable; such adoption may be symbolic at best. The most important impact of a management-based approach may be that corporate managers get more information about what is going on in the company and they can react to this new knowledge accordingly. Gunningham and Sinclair (2009) similarly reviewed the limitations of MBR in their survey and case studies of Australian mining companies. They noted that even when a corporation adopts a certain culture, this may not translate to individual firms because of resistance among the employees, a lack of trust in the larger organization, and failure to get buy-in from middle managers or corporate managers. MBR can be effective when the informal system *supports* a formal regulatory system and is not used to *replace* a formal system. Specifically, the management-based system should improve cohesion,

initiative, and morale at the workplace and motivate employees to engage in prosocial behaviors (in Gunningham and Sinclair's case, safety practices).

Borck and Coglianese (2009) reviewed the literature on voluntary environmental programs, under which organizations volunteer to reduce their environmental impact. Most of the literature they reviewed focused on why companies choose to participate in such programs<sup>8</sup> while fewer studies examined the impact of voluntary initiatives on company outputs. Overall, the research reported mixed results and generally modest reductions. The authors noted that volunteers in these programs are likely to be different from non-volunteers (i.e., they would have improved anyway) and that voluntary programs have a smaller reach than mandatory regulations. However, corporations like voluntary programs more than mandatory regulations because changes are less costly—if the same benefits can be accrued at a lesser cost under a voluntary program then such programs could be seen as beneficial. However, research has yet to compare voluntary programs to mandatory regulations to compare their efficacy and cost. Khanna et al. (2008) found that the adoption of environmental management strategies in a corporation increased pollution prevention techniques, even after controlling for regulatory pressure and other firm characteristics. However, this effect may be mainly related to procedural changes (not actual toxic releases). van Rooij (2010a) argued that educating corporations about their environmental impact may not be influential when the costs of compliance are too much for the company. He also noted that voluntary environmental management systems do not measure actual environmental performance, use only self-reported data that is easily manipulated, and that such programs need to be backed up with law enforcements efforts when the economic costs of compliance are high.

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<sup>8</sup> Generally, they do so for economic benefits as well as for leverage to negotiate formal regulations.

Vignette surveys have found that the ethical climate of a firm can motivate individual behavior. As one measure of the firm's climate, company authority structures are consistently found to affect offending and overcompliance intentions in vignette surveys. Managers who are told that offending is common practice in the firm or the industry are more likely to violate regulations (Paternoster and Simpson, 1996; Simpson, 2002; Simpson et al., 2013). Simpson, Gibbs, and Slocum (n.d.) and Simpson et al. (2013) found that overcompliance is more likely when the hypothetical manager is asked to behave that way by a supervisor. When individuals were told that ethics guide top management decisions in a corporation or that ethics are considered important but distinct from top management (compared to a reference measure of ethics being irrelevant to decisions), respondents reported decreased intentions to offend (Simpson, Gibbs, and Slocum, n.d.). In addition, the presence of internal compliance programs (e.g., hotlines or audits) that increase the likelihood of detection decrease offending intentions, although the findings are not always significant (Paternoster and Simpson, 1996; Simpson, 2002; Simpson and Piquero, 2002). Similarly, Primmer and Wolf (2009) found that an industrial norm about conservation motivated modest conservation behaviors in Finnish forestry firms, but this shared norm may also have prevented radical changes. Simpson et al. (2013) and Simpson, Gibbs and Slocum (n.d.) noted that corporate environmental offending was more likely when the individual's normative beliefs in ethical behavior were not reinforced by a compliance system within the organization. The authors also noted that corporate incentives systems (i.e., tying career benefits to compliant behaviors) may be an important way to motivate compliance with regulations. Extreme volunteerism is more likely when the acceptability of such behavior is communicated by

top management, when such behavior is seen as ethical, and among those individuals who plan to stay in their current positions for a long time (Simpson et al., 2007). Gray and Deily (1996) argued that the culture of the corporation and its relationship with compliance is indicated by findings that the compliance rate at plants owned by the same firm were strongly correlated with each other.

In addition to directly affecting outcomes, the license framework also posits that the corporation's internal culture can mediate or moderate the effect of external licenses on outcomes (Gunningham et al., 2002, 2003, 2004; Kagan et al. 2003). For example, Delmas and Toffel (2008) used data from high-pollution industries in the United States and examined how external pressures on corporate behavior were treated by firms with either a strong internal legal department or a strong internal marketing department. They found that firms with a strong legal department were less likely to adopt voluntary ISO 14001 standards<sup>9</sup> (likely because of the potential for increased liability) but were more likely to adopt voluntary programs put forth by the government. Firms with a strong marketing department were more likely to adopt ISO 14001 standards, likely because of the publicity advantage it gives them. Thus, it seems that the internal mechanisms of a corporation shape how external pressures affect corporate behaviors. Raizada's (1998) dissertation (used to provide examples of the licenses in prior sections) gathered information on two British Columbia-based pulp and paper manufacturers from 1983 - 1997 to examine the interactions between internal and external factors on environmental

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<sup>9</sup> The ISO 14000 standards are promulgated by the International Organization for Standardization (ISO). These standards offer guidance for companies desiring to implement an environmental management system (EMS) which can then be certified by ISO. More specifically, the company should "identify and control the environment impact of its activities, products or services, and to improve its environmental performance continually, and to implement a systematic approach to setting environmental objectives and targets to achieving these and to demonstrating that they have been achieved" (ISO, 2012).

behaviors. One company, Confor, was very environmentally conscious from the start. They were proactive in preventing problems, adopted a cooperative approach to regulation, and sought solutions to problems when they did arise. The previously-mentioned Macmillan Bloedel mill, on the other hand, merely reacted to crises as they emerged, did not adopt an environmental approach early on, met with much social resistance, and took a confrontational approach with regulators. Instead of seeking solutions to important problems, they tended to downplay or ignore them. She concluded that companies facing similar external pressures (here, pressures from government and environmental groups) may respond differently to such pressures because of internal organizational characteristics (e.g., the environmental commitment of the corporation; see also Gunningham et al., 2003).

Not only can internal licenses moderate the effect of external pressures, but external licenses may change corporate cultures as well. Aoki and Cioffi (1999) argued that different firms in different countries, even under the same corporate head, may adopt different “personalities.” A U.S. operation of a precision metalworking company was compared to the Japanese firm; they found that the regulatory regime in America is much more adversarial than in Japan. The authors argued that the adversarial nature of U.S. regulations promoted a defensive culture in the U.S. company and ultimately made regulatory efforts less effective as well as more costly (because of legal disputes). On the other hand, there was no antagonism between the Japanese firm and regulators which ultimately reduced the cost of regulation because individuals in the firm were responsible for (and motivated to make) decisions on how to reduce waste.

#### **f. Empirical support for Gunningham et al.'s License Framework**

While some research provides evidence about the salience of specific licenses, the main crux of Gunningham et al.'s framework (Gunningham et al. 2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009) is that environmental crime control and the promotion of overcompliance requires a holistic approach (see also Gunningham and Young, 1997; Gunningham et al., 1998). To examine the concept of the license framework as put forth by these authors, I will review their relevant works in chronological order. This is the best way to show how the idea has evolved over time and how the authors supported the concept. I will also review the only non-Gunningham et al. study I have found explicitly examining the license framework.

While not referring to it as the "license framework" specifically, this notion of holistically including multiple domains to regulate businesses can first be seen in Gunningham and Young's (1997) examination of biodiversity conservation in Australia. In this article, the authors outlined five types of policy instruments (regulatory, voluntary, price-based, property right, and motivational/informational incentives) that should be combined to create optimal policy for controlling corporate behavior. They reviewed the various pressures that can be exerted on corporations and specified circumstances under which certain policies would be most effective. They also discussed the optimal combinations that should be implemented in certain environments and situations. Overall, they argued that using a single approach for regulation is inadequate and that policymakers should draw on the ecological, political, social, and economic concerns of the community and corporations to make effective policy instruments. Gunningham et al.

(1998) expanded this notion into a book called *Smart Regulation*, in which they emphasized the utility of third party regulation (such as public interest groups, green consumers, financial institutions, etc.) in controlling corporate environmental behavior. Similar to the 1997 article, the authors explicated optimal instrument mixes as well as those that are counterproductive, including combinations of command and control regulation, self-regulation, voluntary strategies, education/information strategies, economic instruments, and mandated reporting.

While the above works emphasize the role of formal policy, in 2002 we see Gunningham et al. discuss more informal concerns of corporations. In this working paper, the three external licenses were explicitly labeled as “legal,” “social,” and “economic” and defined in terms of corporate pressures from multiple domains. The difference here is that the authors were not just describing how such pressures are useful to create policy, but argued that such pressures already exist in the corporation’s environment and may already drive decision-making. This paper, as well as Kagan et al. (2003) and the Gunningham et al. (2003) book *Shades of Green*, drew on interviews and data from 14 pulp and paper manufacturing firms in Australia, New Zealand, British Columbia, and the United States. In the 2002 working paper, the authors focused on the social license, and argued that most managers viewed the social license as more important than legal bodies. Corporate managers were more motivated to introduce environmental changes based on informal sanctions by the public and the media than by legal/regulatory threats. Managers also noted the need to build up “reputation capital” (p. 11). That is, by investing in relationships with community members and local stakeholders, the company’s reputation can be protected in the case of a serious incident

(e.g., a hazardous waste accident). The authors also described interactions between the social, economic, and legal licenses. For example, the corporation's compliance with regulations is often considered a yardstick by which the community judges the firm's efforts. Also, changes in regulations may provide stakeholders with more influence by improving access to corporate records, legally mandating that the company obtain community input on policies, etc. The community can also increase the coverage of the legal license as politicians respond to community members' concerns. Social efforts can also interact with economic concerns, as when boycotts or bad publicity leads to a decrease in sales or stock prices. Communities can sometime restrict the corporation's access to necessary resources or drive up the price of such access. Additionally, the influence of the social license might vary by such factors as the geographic location of the mill (i.e., whether located far away from communities) or the reliance of the community on the mill (e.g., for the provision of local jobs) can affect how much pressure the social license holders put on the corporation. Finally, management style matters for environmental outcomes as different managers have unique responses to social pressures.

Kagan et al. (2003) continued to use interviews from the pulp and paper mill managers, but also ran some basic descriptive comparisons and correlations on water pollution data and chemical spills. They examined the role of regulation versus other external licenses as well as the corporation's internal "environmental management style" (p. 57) in explaining compliance. The authors identified five "ideal types" of corporations with regards to their environmental strategies, listed here in order of environmental commitment (least committed to most committed): environmental

laggards, reluctant compliers, committed compliers, environmental strategists, and true believers. These types were constructed based on measures of how much managers sought out environmentally relevant information, the degree to which management responded to this information, and whether the firm has institutionalized procedures to promote environmental consciousness in its operations. Overall, the study indicated that the use of stringent regulatory approaches (the legal license) did not correlate highly with the environmental performance of the firm, that corporate profits (the economic license) predicted environmental performance a decade later, and that managers of companies labeled “environmental strategists” or “true believers” invested in better environmental technologies, were more dedicated to learning about environmental issues, and did a better job of building up reputational capital with both regulators and activists. The authors also noted that managerial attitudes were a better predictor of environmental performance than either the regulatory regime or economic factors, but that economic considerations may overrule managerial preferences. While the authors did not have quantitative measures of the social license, they used interview data to support the idea that the social license is the most influential pressure. Overall, the authors argued that while regulation did promote environmentalism, the social license and managerial attitudes were the most important factors promoting compliance or overcompliance; however, economic pressures limited even the most motivated managers.

Gunningham et al. (2003) expanded their research on the pulp and paper manufacturing firms into a full-length book. Based on the lack of true “laggards” in their research, they put more emphasis on overcompliance in this book. They argued that not only is there a lack of noncompliance in their data, but there is much evidence that

corporations attempt to go above and beyond regulations which belies the traditional view of corporations as “amoral calculators” only concerned with maximizing profits and not concerned about social welfare (see also Gunningham and Kagan, 2005). Reasons for overcompliance are grouped here according to the various licenses and internal factors. Economic reasons for overcompliance include increased cost efficiency, economic benefits of having a good reputation, and the desire to maintain competitiveness with other companies. Social reasons include the need to protect the firm’s reputation or enhance legitimacy, or responding to community pressures. Legal reasons include the anticipation of future regulations or the desire to maintain a good relationship with regulators. The authors argued that the social license is the most important in motivating corporations, followed by legal pressures, and then economic considerations. Internal to corporations, the existence of monitoring systems may promote overcompliance as might the adequate communication of environmental information throughout the company. Also within the company, the environmental values of managers were crucial in motivating firm overcompliance.

The book also explained the complexity of the license framework, specifically noting the interactions between the firm and its various stakeholders (see also Gunningham and Kagan, 2005). While improvements in emissions and overcompliance behaviors are due to stricter regulations and increased social pressures over time, economic pressures (e.g., costs of compliance and profit strain) may inhibit firms from going above and beyond. Furthermore, the regulatory license and the social license may be merging as time passes—for example, new regulations often mandate public disclosure of environmental data or require the corporation to have community input

about policies. In addition, the regulatory and economic licenses interact such that regulations often force companies to make costly environmental improvements that they are otherwise reluctant to implement. The social and economic licenses also interact, such as when consumers pressure the corporation or threaten to take their money elsewhere, or demand environmentally friendly products. There is also an interaction between external and internal licenses, such that some companies may be better/less able to respond to external pressures and emphasize that managerial attitudes mediate the influence of external licenses.

Gunningham et al. (2003) conducted a descriptive comparison with quantitative data similar to the work done by Kagan et al. (2003). Here, they find that external licenses explain some variation in environmental behaviors between firms, but that the external licenses alone do not completely explain such variation. Instead, external pressures are filtered through corporate manager's perceptions, attitudes, and interpretations. This filtering process leads to unique responses by the corporation. As such, the book explicated the impact of management style more fully, including measures of managerial attitudes as well as company policy efforts. Importantly, the typology is unclear about managers or firm types (discussed in more detail in the following section) and therefore it's necessary to delineate individual attitudes versus firm strategies. While there is certainly overlap in manager attitudes and firm policies, it's likely that policies are not solely determined by one manager. Gunningham et al. (2003) observed that the environmental management style of the firm is highly related to the firm's environmental performance and to its reputational capital. They also showed that economic constraints affect environmental performance; more profitable companies had better environmental

performance and efforts. Overall, Gunningham et al. concluded that the interactions of the various licenses are more effective than any of them operating in isolation. However, they noted that the license parameters are ambiguous and negotiable by corporations. They described the policy implications of each type of license but emphasized the need for a variety of approaches. They also admitted that they are unsure of how to impact managerial attitudes and the management style of corporations.

Gunningham et al. (2004) concentrated on the social license, again using the sample of pulp and paper manufacturers. They made many of the same arguments as above, but also made clear that firms may be responding to social license pressures and overcomplying for instrumental reasons—corporations may think that not responding to social pressures will lead to increased regulations or greater economic costs to the company. The authors more clearly delineated variations in the social license (e.g., how the geographic location of the company and the economic needs of a community may impact the strength of the social license). In addition, they outlined interactions between the social license and legal/economic pressures. For example, they argued that social license pressures are often exercised through the application of informal economic sanctions (e.g., bad publicity, calls for boycotts, denying the corporation access to local resources, etc.). The social license and legal license interacted in two possible ways: 1) the legal license can expand the social license (e.g., when regulations mandate community participation in corporate decision-making), or 2) the social license can expand the legal license (e.g., when politicians put more pressure on corporations in response to community concerns). They also pointed out that the social license faces three important limitations. First, members of the community may not recognize that

harm to the environment/humans is occurring or community members may not have the capacity to mobilize resources to address it. Second, legal and political representatives have to recognize community concerns as legitimate and as something that should be addressed. Third, economic concerns limit the ability of firms to go beyond compliance (pp. 332 – 336). They ended the article by detailing the potential for social license considerations to make for more effective policies.

Gunningham et al. (2005) examined the various licenses in a new sample, conducting interviews with employees of chemical manufacturers and electroplating firms in the United States. They were also able to examine the role of company size in this study, as the companies in the chemical industry were comprised of a mix of large and small firms. They found that the effect of licenses differed between the two industries and firm types—for example, the social license was not particularly important for electroplating firms overall but *was* important for larger firms in the chemical industry. It was less important for smaller chemical firms. In general, the legal license seemed to be most important in this sample, but not because the firms feared punishments for violations (specific deterrence). Instead, regulations reminded firms to check their compliance mechanisms, reassured firms that violators were not getting away with it, and created a “culture of compliance” (p. 44) embedded in the company’s operations as they responded to inspections and enforcement over time (see also Thornton et al., 2005). Regulations also set normative guidelines—laws remind corporations about the damage caused by noncompliance (see also Gunningham and Kagan, 2005). Most managers saw noncompliance as morally reprehensible, not just something to be avoided because of potential punishments. For large companies, regulation was salient mainly because

formal sanctions would lead to reputational damage and hence informal sanctions.

Smaller corporations generally felt that they were not subject to much public scrutiny and therefore didn't feel much social pressure.

Another way that regulations mattered was because of the economic costs related to compliance—small businesses generally reacted to regulations by doing just enough to be in compliance because that is all they could afford to do. Larger corporations overcomplied in order to avoid any possibility of being noncompliant. Overall, the authors argued that there is little support for specific and general deterrence preventing corporate crimes. Instead of calculating the costs and benefits of compliance, regulations themselves (not enforcement) create a culture of compliance that impacts behavior. Moreover, the law serves to define moral boundaries about acceptable and unacceptable behavior. Note that the effects of various licenses differ by the size of the corporation and the industry.

Thornton et al. (2007, 2008, 2009) conducted field studies of small and medium-sized trucking firms in California and Texas to further examine the license framework in an industry affected by unique considerations. Specifically, the trucking industry is one that is not highly visible to consumers yet is highly competitive (but with low profits). It is also one that is tightly regulated in California, but much less so in Texas. Due to the lack of profitability and high competition, trucking firms cannot easily pass on the costs of environmental innovations to consumers. Overall, the authors found that the economic license is much more important to trucking firms than in other industries and that the economic license is more important than the social license in this sample. Importantly, no firms in the sample had been targeted by community or environmental groups; instead,

most of the variation in environmental performance was due to economic pressures (especially the market niche in which the firm was located). Economic considerations limited the coerciveness of regulations (i.e., regulators realize that such an approach would put many firms out of business) but regulatory stringency remained associated with emissions and firm environmental performance. Even government subsidies for new technology were minimally effective. Interestingly, while overcompliance was highly related to managerial attitudes in the pulp and paper industry, the authors noted that in the trucking industry operating measures that go beyond compliance (e.g., controls on driving speed/idling times, engine maintenance efforts) were primarily driven by economic considerations—that is, they did not consider the positive environmental impact when making such a decision.

In Thornton et al. (2009), the authors noted similarities in their findings from the trucking industry to their findings from the pulp and paper industry. They argued that intensely competitive industries encourage firms to search for opportunities that would save money as well as improve environmental performance. Larger companies are more influenced by the social license, while in small firms the economic license is the most important. In highly competitive markets, the social license will not promote overcompliance in small firms but economic considerations will. Overcompliance is more likely among larger firms in general, because these firms can afford the initial cost of overcompliance. In terms of the legal license, the authors argued that regulations force all companies to implement certain policies and that these companies will likely pass off costs to consumers. However, size would still play a role because small companies find it more difficult to comply with costly regulations. In highly competitive markets,

legislators and regulators are reluctant to push demanding regulations on corporations because of the economic costs to firms. However, the authors noted that when businesses are subject to a demanding regulatory regime the social license and managerial commitments become more important for three reasons: 1) regulations and enforcement offer a clear criteria by which social groups can criticize company behavior, 2) regulations raise awareness of company officials and employees about social purposes and norms underlying regulatory requirements, and 3) regulations can generate publicity and raise consciousness of the general public about the problem which then leads to more activism (pp. 430 - 431).

One of the primary motivations for conducting the present study is a lack of empirical research examining the license framework in and of itself, despite its existence as a cohesive explanation for corporate environmental behavior for over 10 years. As evidence of this, I found only one article in my review of the literature empirically studying this concept aside from the work done by Gunningham and his colleagues (Gunningham et al. 2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009). Specifically, Howard-Grenville et al. (2007) used qualitative data from facilities participating in the EPA's National Environmental Performance Track program to examine how a company's social, economic, and regulatory licenses influence the decision to participate in a voluntary environmental program. The authors matched facilities participating in the program to those not participating, and found that the two groups were similar in how they perceived regulatory requirements (all companies saw compliance as non-negotiable) and economic pressures (not mentioned often, but when mentioned managers were generally concerned

with consumer pressures). Community pressure was salient to both groups as well although differences emerged in how important this relationship was to top management. What differed the most were factors internal to the organization: managerial incentives (e.g., support from superiors for participating in voluntary programs), organizational identity (e.g., the firm's commitment to environmental norms, their image), and organizational self-monitoring efforts (e.g., interactions with regulators, desiring recognition for compliance efforts). Overall, the authors argued that external pressures mattered but that factors internal to the corporation exerted independent effects on participation decisions.

It is these internal factors that receive more attention as I integrate this theory with the Rational Choice perspective. The decisions of people within the organization are driven not only by the licenses operating on the firm as a whole, but also by factors operating on those individuals responsible for company policies. In the next section, I describe the empirical support for Rational Choice in the context of corporate offending and demonstrate how this complements the license framework.

#### **g. Empirical Support for Rational Choice Theory, as applied to Corporate Crime**

There has been much work done on the factors impacting the decisions made by corporate managers. In addition to the corporate-level variables outlined above, factors impacting individual managers themselves have been shown to impact managerial decisions and therefore corporate behaviors. It is rare, however, that individual-level concerns act in isolation to predict behavior—often, managers are influenced by both

their own risks/benefits as well as those for the corporation. In this section, I focus on the cost/benefits to the individual him or herself.

In terms of legal sanctions, vignette studies demonstrate that managers tend to be more concerned about threats to themselves as individuals (although firm-level sanctions have also been shown to impact offending; Simpson et al., 2007). Simpson et al. (2013) found that legal sanctions directed at the manager deter intentions to violate environmental regulations. Gezelius (2007) found that compliance with fishing regulations is motivated by perceptions that the law is formally enforced and perceptions of high risk for detection and penalty.

Enforcement regimes may serve other purposes beyond deterrence. Enforcement activities remind managers to check their policies and equipment for compliance and/or reassure compliant managers that obeying regulations is the correct behavioral choice because the alternative can have undesirable consequences. The use of formal sanctions against offending companies also restores industry participants' confidence that deceit does not necessarily give competitors an advantage in the competitive market (National Research Centre for OHS Regulation, 2004; Thornton et al., 2005). Additionally, scholars have found that regulations and enforcement behavior (e.g., inspections) can create social norms about the immorality of pollution behaviors (Vandenbergh, 2001, 2004). Regulations may also motivate most environmental managers to comply because they see regulatory adherence as normatively desirable—that is, it is the “right thing to do” (National Research Centre for OHS Regulation, 2004, p. 23; Thornton et al., 2005).

As discussed in the section on the legal license, decisions to comply may depend on the specific enforcement style used by regulators. Winter and May (2001) used a mail

survey to examine inspectors' enforcement styles when interacting with Danish farmers. They found that inspectors who were more formal (i.e., were focused on rules and were less flexible) enhanced compliance with four agro-environmental requirements among farmers. This is due to the approach providing 1) more information about regulations to farmers, and 2) an increased sense of certainty about potential consequences. However, use of a highly coercive approach resulted in less compliance overall. This is supported by studies examining individuals' perceptions of legal or regulatory processes. Gezelius and Hauck (2011), in their study of fishing communities, found that a lack of participation in regulatory-making processes was the predominant explanation for noncompliance (see also Tyler, 2006).

In addition to the legal license, economic incentives/costs to the manager are also important. Gabel and Sinclair-Desgagne (1993) modeled the relationship between monetary incentives for managers and corporate environmental policy. They found that managers were more likely to comply when environmental performance was incentivized, but not under all conditions. Furthermore, accurate monitoring of environmental performance was necessary to make economic incentives effective. In vignette studies, the potential for individual profit (e.g., receiving a promotion, enhancing one's job prospects) predicts intentions to commit environmental offenses (Simpson, Gibbs, and Slocum, n.d.).

The rational choice framework emphasizes the importance of managerial norms as a potential factor in the decision to behave in a certain way. This is supported by much research on individual managerial attitudes. For example, Kuperan and Sutinen (1998) found that deterrence variables did not sufficiently explain why Malaysian

fisherman complied with environmental regulations; including measures of moral obligation and social influence improved their models greatly. Notably, Kuperan and Sutinen also found that violations were more likely when regulations were perceived to benefit one group of fishermen more than others. They attributed this to a decrease in the perceived legitimacy of such regulations. Research by Kagan et al. (2003) implied that industrial plants may overcomply because of a strong moral commitment by environmental managers which, in turn, encourages a strong environmental management system (see also Ervin et al., 2008). In their study of Finnish foresters, Primmer and Karpinnen (2010) found that the normative beliefs about how relevant others would expect them to behave and general attitudes towards overcompliance with regulations predicted whether foresters were willing to go beyond Finnish Forest Act regulation when planning their operations. Wu (2009) found similar results in his study of Oregon firms; overcompliance was much more likely when management believed that they had a moral responsibility for conservation (see also Braithwaite and Makkai, 1991). The author concluded that the attitudes and environmental beliefs of upper management are strong influences on compliance. For offending, Simpson et al. (2007) found that individuals with strong anti-regulatory feelings and who were defiant to authorities were more likely to offend. Other vignette surveys examining beliefs about the ethicality of environmental behaviors consistently find that such beliefs predict compliance and volunteerism (Rorie et al., n.d.; Simpson et al., 2007; Simpson, Gibbs, and Slocum, n.d.).

It is important to note that while external pressures are filtered through existing managerial attitudes, external influences also impact managerial attitudes. Vandenberg (2003) argued that deterrence from legal sanctions is unlikely unless people feel there is a

normative or moral justification for the norm—that is, the content of law activates individual moral norms by describing the consequences of illegal actions and the individual’s responsibility for preventing these outcomes. Law should go beyond describing likely sanctions to describe the potential harms to human and environmental health that can be avoided by complying with regulations (see also Simpson, Gibbs, and Slocum, n.d.). Feldman and Perez (2009) found that *how* the legal license is portrayed and perceived influences people’s moral perceptions and their willingness to engage in civic enforcement of environmental regulations. Results from their environmental vignette survey suggested that how a legal instrument is framed (in regards to their governance technique, the process by which they were enacted, and their allocation of enforcement responsibilities) has a strong impact on people’s moral and emotional attitudes toward corporate polluting behavior as well as whether they would engage in civil strategies to stop the polluting behavior. This study implied that managerial attitudes toward environmental regulations may be influenced by how the regulation is presented and thus may affect corporate policies.

#### **h. Summary of Research on the License Framework and Limitations of Previous Research**

Prior research has identified various factors that prove important for corporate compliance and overcompliance (e.g., economic incentives, legal sanctions, pressures from community groups). This accords with Gunningham and colleagues’ (Gunningham et al. 2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009) interviews with pulp and paper manufacturers, electroplating and

chemical industry members, and trucking companies. Formal regulations (the “legal license”) appear not to be the main influences on corporate environmental behavior; the legal license seems to matter mainly because it educates management, impacts corporate cultures and forces a minimal level of environmental effort. Instead, a corporation’s “social license” (i.e., pressure from environmental groups and the public) or “economic license” (e.g., competitor behavior, profit maximization) are more important, but which one is most salient depends on the industry. Internal factors (managerial attitudes/corporate culture) are also important in explaining compliance and overcompliance, and may mediate or interact with the three external licenses to explain corporate behavior.

Although Gunningham and colleagues’ description of the various licenses is a useful framework for understanding how corporations are affected by their environments and management, the empirical support for these ideas to date is mainly qualitative, although Kagan et al. (2003) and Gunningham et al. (2003) produced some limited quantitative work. A necessary step in developing a cohesive theory of corporate environmental behavior is to test measures of the relevant constructs more rigorously (i.e., to better rule out other potential predictors) than what has been done before as well as quantitatively examine the relative impact of each construct and interactions among them<sup>10</sup>.

This study also seeks to improve upon previous corporate crime research through a more direct assessment of individuals’ opinions about salient factors and then using

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<sup>10</sup> Some literature indicates that the effect of external pressures on corporations may depend on the sequence in which such pressures are applied (Milstein et al., 2002). While this is an interesting addition to the license model that should be investigated further, the nature of our instrument and methodology will not allow us to empirically test how corporate behavior is affected by temporal ordering.

such measures to predict behavior. While most of the quantitative research used official and firm-level data, this does not get at the decision-making made by individuals within corporations. Although looking at individual-level decision-making and then interpreting such decisions in terms of corporate behavior outcomes may seem problematic, it is important to realize that at certain levels of the corporation, individual decisions *are* corporate behaviors when those individuals are able to influence corporate policies. Our vignettes ask the respondents to imagine themselves as a manager in a corporation who is directly responsible for corporate offending or overcompliance. In this case, when it is the individual who is deciding how the corporation should act, he/she will be subject to both individual-level concerns as well as factors influencing the corporation. Therefore, the external licenses affecting a corporation will also be the predominant influences on those people within the corporation who dictate its policies and actions and who are concerned with the corporation's well-being.

Furthermore, scholars have long noted the lack of data on corporate crime (Clinard and Yeager, 1980; Friedrichs, 2010; Simpson et al. 1995; Sutherland, 1949) and more recently have documented the problems with currently available environmental crime data (Borck et al., 2008; Gibbs and Simpson, 2009; Simpson et al., 2007; more detail provided in Chapter 3). The proposed study will avoid the inherent biases in official crime data through the use of two methods. First, I employ data from a randomized vignette survey that correlates respondents' actual opinions about legal, regulatory, economic, social, and cultural aspects involved in corporate decision-making and link that to intentions to offend or overcomply. The sample from the vignette survey also improves upon previous research because it focuses on environmental managers

located in a wide variety of settings. The current study is based on a nationwide sample of organizations (sampling environmental decision-makers within them) which makes the results more generalizable than previous studies focusing on only a few corporations, a small geographic area, or employing case-study methodologies.

Second, I also assess how the license framework is supported in prior quantitative research using data from a meta-analysis of studies on environmental crime prevention. Given the inconsistency in previous research about the impact of many factors (likely related to measurement difficulties and complexities as well as varying operationalizations), it is imperative to use multiple methods to inform knowledge about how the various licenses predict environmental behavior. Chapter 3 will describe the survey and the meta-analysis in more detail.

## **V. Hypotheses**

This section will consider the body of prior literature in its entirety and will derive hypotheses to be tested using the vignette data and/or the meta-analysis data. First and foremost, there is much literature that supports Gunningham et al.'s (2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009) idea that influences external to the corporation impact decision-making within the corporations and therefore the actions of the corporation. The legal, economic, and social pressures that an organization and its managers face are likely to play a large role in environmental decision-making—either inhibiting offending or promoting overcompliance.

**Hypothesis 1: If managers/corporations are subject to greater external license pressures, they are less likely to offend and more likely to overcomply with environmental regulations.**

Second, Gunningham et al. (2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009) postulate that those external licenses will be filtered through internal corporate processes and policies. They lump the concept of managerial attitudes and corporate culture into one concept which I have separated.

Therefore, hypothesis 2 deals explicitly with corporate culture and predicts that internal corporation-wide norms/policies will be predictive of offending and overcompliance. I will also examine how the inclusion of corporate culture measures impacts the magnitude of the coefficients for the external licenses; I expect the impact of the external licenses to be somewhat mitigated when corporate culture is accounted for.

**Hypothesis 2: If the corporation's culture is favorable to environmental compliance, then managers are less likely to offend and more likely to overcomply.**

**Hypothesis 2B: After accounting for corporate culture, the external licenses will be less salient in managers' behavioral decisions.**

Third, I argue that individual-level considerations should be conceptualized separately from the license framework factors; specifically, I use rational choice theory to explain how factors affecting the environmental manager him/herself impact decision-making by the manager on the corporation's behalf. However, as Gunningham et al. (2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009) and others point out, individual managerial attitudes are likely affected by

their environment and that of the corporation (Dimaggio and Powell, 1983; Sharma, 2000).

**Hypothesis 3: Measures of the external licenses and corporate culture will predict individual-level perceptions of risks and benefits to the corporation and to the managers themselves.**

Much of the literature on rational choice predicts that individuals base decisions on the costs and benefits of potential actions and outcomes. Therefore, I argue that the individual-level perceptions of risks and benefits to the managers themselves will predict managerial behavior. Since these factors are the most proximal to the decision to offend or overcomply, I expect that the inclusion of these measures will make firm-level factors insignificant in the decision-making process.

**Hypothesis 4: When managers perceive low risks and high benefits to themselves, they will be more likely to offend and more likely to overcomply.**

**Hypothesis 4B: After accounting for individual-level considerations, firm-level factors will be less salient in managers' behavioral decisions.**

Another goal of this dissertation is to examine whether the same factors that predict offending also explain overcompliance. The research that is out there is equivocal as to whether instrumental variables guide overcompliance as they seem to guide offending, or whether overcompliance is due more to normative considerations. To test this exploratory question, I will argue that the predictors will be the same for both behaviors.

**Hypothesis 5: The predictors of offending behavior are the same as those for overcompliance.**

### Chapter 3: Sample and Methodology

As mentioned in Chapter 2, a main impetus for this dissertation is the lack of quantitative tests on the license framework explanation for corporate environmental behavior. Although much research exists testing various programs and measures that fall under one of the five constructs outlined in Chapter 2, these studies do not test all of the concepts using a common dataset and thus cannot offer a holistic look at the various factors as recommended by Gunningham and colleagues (2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al., 2007, 2008, 2009). Furthermore, much of the research examines environmental behaviors using official data or self-report data, which suffer many limitations (Borck et al., 2008; Gibbs and Simpson, 2009; Simpson et al., 2007).<sup>11</sup>

The present research improves on previous studies of environmental behaviors by using two different datasets and two different methods. First, I employ a factorial vignette survey (containing both randomized and non-randomized elements) of environmental managers to assess influences on individual offending and overcompliance intentions—such individual-level decisions are directly related to corporate behaviors when made by a person responsible for corporate behaviors. Second, I use meta-analytical techniques to examine the impact of the external licenses using a different method. I will discuss the two methods separately, but for each will examine the

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<sup>11</sup>Some common criticisms of existing corporate environmental crime data include: the data is incredibly complex and of poor quality, there is no review process to improve the quality, there is no uniform data collection and standardization of measures (making comparison across agencies and studies difficult), there is little data on corporate culture and relationships with stockholders, data on actual environmental performance (as opposed to management approaches) is lacking, it is difficult to calculate a corporate crime rate that is not overly biased by firm size, the data is not easily accessed, and funding for this type of data collection is sparse (Borck et al., 2008; Gibbs and Simpson, 2009; Simpson et al., 2007).

advantages/limitations of the approach, the procedure employed, measures used, and the appropriate statistical treatment of the data.

## **I. Vignette Surveys**

### **a. Advantages and Limitations of Vignettes**

To more directly assess managers' perceptions of the law as well as instrumental considerations, I use data from a web-based factorial vignette survey of environmental managers. Factorial surveys combine hypothetical scenarios (vignettes), in which certain statements are randomly assigned, with survey questions to measure respondent intentions, decisions, attitudes, or judgments (Rossi and Nock, 1982). With such a design, researchers can inquire about the individuals' attitudes, perceptions, or likely behavior under various circumstances. This allows researchers to examine more complex and nuanced situations yet maintain empirical rigor (Wallander, 2009; Weber et al., 1988). Unlike other research designs, which are limited by temporal ordering problems and fluctuating individual perceptions and opinions, factorial designs allow us to measure offending decisions at the same time that relevant circumstances are presented (Saltzman et al., 1982).<sup>12</sup> Vignette surveys may also reduce social desirability bias for two reasons: the vignette dimensions are randomized and the respondent is not aware of how the elements are varied, plus the respondent is answering questions about a hypothetical

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<sup>12</sup>Not all of the analyses in this dissertation use randomized measures as independent variables. In these cases, the benefits of randomization are lost and the results should be interpreted as merely correlational, not causal. As discussed in the results, these methodological issues may be why we find fewer significant relationships using the randomized dimensions.

person (not about his/her own behavior). Since individuals are not generally aware of how they form opinions and intentions (i.e., they don't know what exactly is influencing their thinking), vignette surveys are considered ideal for examining determinants of individual estimates of their feelings or intentions. Additionally, vignette surveys can allow researchers to disentangle the effects of variables that may be too correlated in normal survey research (e.g., race and socioeconomic status; Wallander, 2009).

Although the ability to disentangle such variables is often cited as an advantage of this method, other scholars argue that certain hypothetical situations may create contexts that you would rarely or never see in real-life—in other words, the hypothetical scenarios created through randomization may be unrealistic which leads people to respond in a similarly unrealistic way (Auspurg et al., 1999). Even if the scenario is viewed as realistic, some scholars question whether behavioral intentions would accurately translate to real-life behavior overall (Durham, 1986; Hughes and Huby, 2004; but also see Alexander and Becker, 1978; Hughes, 1998; Pogarsky, 2004; Rahman, 1996). Loewenstein et al. (2003, p. 1210) examine what they call *projection bias* which occurs when people “exaggerate the degree to which their future tastes will resemble their current tastes.” In other words, I may truly believe that I would engage in a certain behavior depicted in the scenario in the manner in which I answered, but when placed under the same circumstances in reality would act very differently. To help account for such issues and reduce bias in the regression estimates, I include a measure of scenario realism in the survey as a control variable and use an alternative method to assess the robustness of the test of hypothesis 1.<sup>13</sup>

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<sup>13</sup> I also ran the models separately for respondents who said they found the situations to be realistic versus those who didn't. There were not enough people who found the offending scenarios to be unrealistic to

## **b. Creating and Administering the Vignette**

To create the hypothetical scenarios presented, the researcher must first determine the relevant “domains” likely to influence decision-making. For example, one may think that the potential for public knowledge of the company’s environmental performance will affect the respondent’s decision to offend or overcomply with environmental laws. To assess the role of public disclosure one would then include a sentence within the scenario that presents the company as either 1) mandated to report emissions data, or 2) not mandated to do so. One-half of respondents would see a scenario depicting the first sentence while the other half would see the second sentence—who sees which sentence is randomly determined. In corporate crime research, pushes and pulls toward crime can be conceptualized to operate at the individual *and* company-level so both kinds of risk are incorporated into the vignette design. All vignette dimensions included in this study can be found in Appendix A.

The survey instrument contains three “offending” vignettes. One of the noncompliance scenarios describes a failure to act on an Environmental Protection Agency compliance order, another depicts an employee ignoring hazardous waste labeling regulations, and the third depicts the intentional release of a toxic substance into a local waterway that exceeds permitted levels by 200% (a more serious pollution event). The survey instrument also includes two scenarios depicting “overcompliance” behaviors. One describes an attempt to keep pollution emissions at 40% below the

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obtain accurate estimates, but dropping respondents who deemed the scenarios as unrealistic did not change the results found with the full sample. For the overcompliance scenarios, there were some differences between the two samples but substantively the results were consistent. I have begun to examine the effect of realism on overcompliance intentions (Rorie, 2012) and will explore this in future research.

required levels and the second describes voluntary counter-terrorism measures (enhancing security around toxic storage sites). The vignettes are followed by a series of questions that 1) relate to the specific scenario, 2) measure respondents' opinions and beliefs more generally, and 3) inquire about the respondent's demographic information and business experience.

### **c. Sample**

My sample includes a large and diverse set of environmentally-minded business people. TMone (a company that provides targeted databases, database processing, and database appends to customers for mail and telesales campaigns) provided us with a database of contacts—this was the sampling frame. The company produced a list of 7,292 individuals who were environmental decision-makers within organizations of all sizes and every industry in the United States. The list from TMone contained the individual's name as well as information on the organization by which he/she was employed. Information included the company's name, address, telephone number, webpage (if applicable), and the name of the company's owner.<sup>14</sup>

From December 2008 – March 2009, Vanderbilt University and the University of Maryland sent letters to each individual on the list informing him/her that they had been selected for participation. The letters also provided a link to the web-based factorial survey. Of the 7,292 contacted, 1,373 letters were returned as undeliverable, leaving a

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<sup>14</sup> A reviewer noted that letting one person represent an entire corporation may be problematic. However, we are asking the respondents to put themselves into the position of a hypothetical manager, in charge of acting on behalf of a hypothetical corporation; the person is assumed to be responding based on the information in the scenario. In these scenarios, we provide a detailed description of the environment in which the manager and the corporation are located. Given that high and mid-level managers are often expected to make decisions that directly affect corporate behavior (see Chapter 2) and that most of our respondents report being in high-level positions in their organizations (see footnote 18), I believe that the responses to the survey are adequate representations of how a corporate player may act in these situations.

potential sample pool of 5,919. To increase response rates, Vanderbilt researchers sent out follow-up postcards about three weeks after the initial letter was sent (from January 2009 – April 2009).

Seven hundred and seventeen individuals logged into the survey site, for a response rate of about 12%. This response rate is not atypical of that seen in previous studies on web-based surveys (Porter and Whitcomb, 2003; Ranchhod and Zhou, 2001). Scholars have long noted that web-based surveys lack certain aspects that would increase the likelihood of response. For example, researchers cannot include tangible incentives (e.g., pens, stickers), the formatting of web surveys may make the questionnaire appear longer and less professional, respondents may be concerned about the data not being kept secure, and/or potential respondents may encounter technical issues (Ranchhod and Zhou, 2001; Sax et al., 2003).

The data collectors received about 30 contacts from individuals about the surveys, including reasons for participating/not participating. Most of the individuals who said they would not respond to the survey mentioned that they lacked the technical skills to navigate the web survey or that they did not own a computer; others mentioned that they simply were not interested or did not feel like they were an appropriate respondent because of their work experience. The team provided technical assistance to individuals who wanted to respond to the survey but had trouble accessing the website and encouraged those who felt they were inappropriately contacted to respond with the understanding that their job description and experience would be taken into consideration when interpreting results.

Low response rates do not necessarily equate to nonresponse bias. If respondent characteristics are similar to those of non-respondents, then the survey responses can reasonably be attributed to the larger target sample (Sax et al., 2003). To assess nonresponse bias, a random sample of 500 individuals was chosen from the 5,919 who received the invitation to participate. For these people, more information was gathered on the type of business (publicly or privately-owned corporation, government agency, NGO or civic association, law firm, private consulting firm, or other) and the type of profession (environmentally-related or not), the size of the company, and the gender of the individual.<sup>15,16</sup> We compared respondents to non-respondents on these dimensions and found that the only significant difference between the two groups was in the size of the company. Respondents came from slightly larger companies (mean = 14.04 employees) than non-respondents (mean = 9.59 employees). Considering that the average size of the company is fairly small for both groups, this significant difference is not likely to affect results to a great extent.

Finally, it is important to note that each respondent received (and thus could potentially answer) three scenarios. Since the scenario (not the individual) is the unit of analysis for our research, our sample size is actually much larger than 717. Of the 717 respondents, 517 responded to all three scenarios, 63 responded to two scenarios, and 137 responded to one scenario<sup>17</sup> which equates to a potential sample size of 1,814. However,

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<sup>15</sup> Specifically, this was done by checking company websites or looking in the *Business and Company Resource Center* database for more information.

<sup>16</sup> Although we only use one individual-level variable to examine response bias, this should not be interpreted as us thinking that corporate-level factors are more important in guiding response behavior. The choice of variables here reflects the data available from TMone.

<sup>17</sup> Using ANOVAs for each type of scenario, we analyzed whether the order in which the scenarios were presented (i.e., whether the scenario was seen first, second, or third) had any effect on the number of scenarios the respondent completed. We found one significant test for the enhancing security scenario, but the effect was nonsensical and the significance likely due to the large sample size.

we dropped all people who did not have data on the dependent variable, leaving us with a final sample of 1,465 scenarios (879 offending and 586 overcompliance) from 548 individuals.<sup>18</sup>

#### **d. Measures**

The vignette data contains both vignette dimensions and survey questions that can be used to tap into the effect of various licenses and organizational climate. Furthermore, the measures allow us to examine the effect of both individual manager considerations and at the level of the organization. This section describes the independent variables, the control variables, and then the dependent variable of interest. All variable names, descriptions, ranges, and alphas (where relevant) can be found in Appendix A, along with a histogram showing the distribution of the overcompliance dependent variable.

*Independent variables.* Regarding the *legal license*, respondents indicated how certain/how severe a problem it would be for the following to occur: having the firm be criminally prosecuted, having the firm be investigated by a regulatory agency, and having the firm be sued. Each item's score ranged from 0 (representing "no chance" or "not a problem") to 10 (representing "100% chance" or "very severe problem"). I combine the certainty items into one scale (FIRM LEGAL CERTAINTY; alpha = 0.91) and the severity items into a second scale (FIRM LEGAL SEVERITY; alpha = 0.94) by adding

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<sup>18</sup> The sample was chosen by TMone to represent environmentally-involved individuals in corporations. While there may be some concern that the individual responding to the survey cannot provide an accurate assessment of the corporation's behavior, we think that this is addressed in two ways. First, the individuals are responding to a hypothetical scenario—we do not ask them to discuss the likelihood of the behavior in the context of their own corporation. Second, the respondents are highly knowledgeable and influential in terms of environmental decision-making in their organization (75.7% of those who provided demographic information were top management, 85.1% were "routinely involved" in environmental decision-making in their organization, and 69.1% were both top management and routinely involved).

the scores of the three items. I then standardized the scales for ease of interpretation. Note that the legal sanctions measures are only relevant for the offending scenarios.

To assess the impact of the *social license* there is one vignette dimension depicting whether the firm was mandated to report its actions publicly or not (MANDATED). Note that the vignette scenario dimensions are the same for both types of behaviors. To examine the social license in noncompliance scenarios, we have one survey question asking about the certainty of tarnishing the reputation of the firm (FIRM SOCIAL CERTAINTY) and another question asking how much of a problem that would be (the severity component; FIRM SOCIAL SEVERITY). In the overcompliance scenarios, we have survey questions asking about how likely and rewarding it would be if overcompliance enhanced the reputation of the firm (FIRM SOCIAL CERTAINTY (OVER); FIRM SOCIAL REWARDS). All of these questions are measured on an 11-point Likert-type scale where 0 represents “no chance”, “no problem at all”, or “not beneficial at all” and 10 represents “100% chance”, “a severe problem”, or “very beneficial”. We also include a vignette dimension indicating whether the firm is publicly or privately owned (PUBLIC).

In terms of the *economic license*, we have vignette dimensions detailing economic constraints of the firm (FOREIGN COMP., ECON HEALTHY), the firm’s competitive position (STRENGTHENS COMP.), the firm’s environmental marketing strategy (GREEN MARKET), and the firm’s economic status (DECLINING REVENUE). There were no survey questions about perceived certainty or severity/benefits of firm-level economic sanction/rewards.

To measure the construct of *corporate culture*, we have vignette dimensions that assess corporate culture—specifically, whether the depicted behavior is common in the firm (COMMON FIRM), whether it is common in the industry (COMMON INDUSTRY), or no description about culture. We also have vignette dimensions depicting whether the firm has previously exceeded or met EPA compliance standards as opposed to violating them (EXCEED STANDARDS, MET STANDARDS), whether the firm voluntarily participates in an EPA program (VOLUNTARY PARTICIPANT), whether a prior employee acting in the same way had been punished (REPRIMAND, FIRED), the presence of internal compliance structures (HOTLINE, ETHICS CODE, AUDITS, SELF REPORTING), whether the manager in the scenario was asked by a supervisor to behave in a certain way versus the hypothetical manager asking someone else to do it (SUP. ASKED), and whether ethics are important to managerial decisions (ETHICS GUIDE, ETHICS DISTINCT).<sup>19</sup>

The individual-level *rational choice measures* encompass many different domains. In terms of legal sanctions, the survey accompanying the offending vignettes ask about the likelihood and severity that the individual him or herself would personally be sued, be arrested, or be personally investigated by a regulatory agency. Each item is measured using an 11-point Likert-type scale similar to those at the firm level. The certainty measures were combined into one scale (IND. LEGAL CERTAINTY; alpha = 0.90) and the severity items made up a different scale (IND. LEGAL SEVERITY; alpha

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<sup>19</sup> A reviewer pointed out that people choose to be in various professions and therefore there may endogenous relationships between the corporate-level factors and individual-level factors. To assess the potential for this, I ran regressions that included controls for the type of organization in which the respondent was located. There were no significant effects of these variables and the results of the models did not change. Therefore, for the sake of parsimony, I dropped those variables.

= 0.90). Each scale was standardized for ease of interpretation. There are, for obvious reasons, no questions about legal sanctions following overcompliance scenarios.

For social sanctions (in the offending scenarios), the respondents are asked about the likelihood and severity of: losing the respect and good opinion of business associates, being dismissed from the company, losing the respect and good opinion of close friends, and jeopardizing future job prospects. Each response uses an 11-point Likert-type scale where 0 means “no chance” or “not a severe problem” and 10 means “100% chance” or “a very severe problem.” The items are then summed to create a scale reflecting the certainty of individual-level social sanctions (IND. SOCIAL CERTAINTY;  $\alpha = 0.85$ ) and the severity of such social sanctions (IND. SOCIAL SEVERITY;  $\alpha = 0.88$ ).<sup>20</sup> In the overcompliance scenarios, respondents are asked about the likelihood and benefit of social rewards that may result from the behavior. Specifically, they are asked about the likelihood and benefit of: gaining the respect and good opinion of business associates, gaining the respect and good opinion of close friends, advancing future job prospects, and being promoted in the company. These items were also measured on an 11 point Likert-type scale. The certainty items were combined into one scale by summing the scores (IND. SOCIAL CERTAINTY (OVER);  $\alpha = 0.88$ ) and the same method was used to combine the perceived benefit items (IND. SOCIAL REWARDS;  $\alpha = 0.95$ ). All social sanctions/benefits scales are standardized for ease of interpretation. In both the offending and overcompliance behaviors, we ask two questions about the certainty and

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<sup>20</sup> Some scholars argue that social sanctions will not have salience unless they become known. In an alternative version of the social sanctions variables, each item was multiplied by the respondent’s answer to the question “What is the likelihood that this would become known within then firm?” before the scales were created. However, there was no analogous chance of discovery question in the overcompliance scenarios. Therefore, I decided to run the social sanctions regressions using variables that did not include the chance of the action becoming known in the firm. Running the regressions using the original scale does not produce substantively different results.

benefit of advancing one's career (CAREER) as a result of engaging in the behavior (measured on an 11-point Likert type scale where 0 means "not a great deal" and 10 means "a great deal").

As conceptualized by Paternoster and Simpson (1994, 1996), decision-making by corporate managers also entails considerations of managers' normative and deontological stances regarding behaviors. For both the offending and overcompliance scenarios, we asked respondents to evaluate the ethicality of the depicted act using a multi-dimensional ethics scale (MES) developed by Reidenbach and Robin (1990, see also Smith & Cooper-Martin 1997). Out of the nine measures of ethicality, we created three scales following Reidenbach and Robin's (1990) analysis of the items. The first factor, "*broad-based moral equity*" contains four items pertaining to justice (whether the behavior was fair or just), deontology (behavior was morally right), and relativism (behavior is acceptable to my family). This scale (BROAD MORALITY) had alphas of 0.86 for the offending scenarios and 0.95 for the overcompliance scenarios. The second ethicality factor is related to the idea of a *social contract* (SOCIAL CONTRACT), and includes two items testing whether the behavior violates an unspoken promise or an unwritten contract ( $\alpha = 0.78$  for offending;  $\alpha = 0.91$  for overcompliance). The last dimension produced by the ethicality measures is one describing the *relativism* of the behavior (RELATIVIST); it contains two items about whether the behavior is traditionally or culturally acceptable ( $\alpha = 0.72$  for offending;  $\alpha = 0.73$  for overcompliance). All ethics scales are standardized for ease of interpretation. We also ask a separate question about how ethical the depicted behavior is perceived to be (ETHICAL). In addition to the ethics scale, we ask two

questions about one's opinion of how thrilling it would be to engage in the behavior (THRILL) and how desirable the behavior is (DESIRABLE).

*Control variables.* In addition to theoretically-relevant measures, it is important to control for individual characteristics that may influence behavioral intentions and/or the five main constructs. As such, I include 20 variables in the regressions that depict the amount of time the individual has been working (YEARS EXP.), the importance of religion in their life (RELIGION), how involved they are in environmental decision-making in their organization (COINVOLVE), whether they've had a personal experience with a situation similar to those depicted in the scenarios (PERSONEXP\_YES, PERSONEXP\_NO), how environmentally committed their organizations are (ENV. COMMIT), whether they see the situation as realistic (SIT. REALISTIC), the ethics policies present in the respondent's own organization (CODE OF ETHICS, MAND. TRAINING, RANDOM AUDITS, ANON. HOTLINE, TOP MAN. ETHICS, COMPANY POLICY), and the number of employees in the respondent's organization (SIZE). I also control for the specific scenario depicted in the vignette (DISCHARGE TOXINS, HAZ. LABEL; POLLUTION 40), and whether the vignette depicted the hypothetical manager as an upper-level manager (UPPER LEVEL) versus a middle manager.

Before describing the dependent variable, it is important to emphasize that not all of the independent variables are randomized vignette dimensions—many of the measures are based on respondents' answers to survey questions posed after the scenario that are used to predict the measure of the dependent variable (which is also a survey question). In those cases where a survey question is used to predict a survey question, some benefits

of the vignette methodology are lost—i.e., causality cannot be inferred and these relationships are best described as correlational.

*Dependent variables.* The dependent variable of interest for both offending and overcompliance is the survey taker's willingness to behave the same way as the hypothetical manager given the circumstances laid out in the vignette (OFFEND; OVERCOMPLY). This is measured on an 11-point scale, where the value of 0 indicates no chance of offending or overcompliance, a value of 1 indicates a 10% chance of offending/overcompliance, and so forth until the value of 10 which implies a 100% chance of behaving as the scenario suggests.<sup>21</sup>

#### **e. Statistical procedures**

*Multiple imputation.* Although I dropped individuals who did not respond to the dependent variable,<sup>22</sup> data were still missing on our predictor variables. In both the

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<sup>21</sup> Although the literature often discusses offending-overcompliance in terms of a continuum (e.g., one decreases the amount of pollution until they cross the threshold at which they become overcompliant), our instrument construction depicts very specific types of behaviors in independent scenarios—either offending behaviors or overcompliance behaviors. Each individual saw each hypothetical scenario in its own context and therefore could only evaluate their intentions for one type of behavior (not whether they would offend *or* overcomply in that particular scenario). Our analyses, therefore, look at offending intentions separately from overcompliance intentions. Future research should explore using different conceptualizations and operationalizations of these behaviors.

<sup>22</sup> Correlational analysis performed between an indicator of the missing outcome variable and the independent variables revealed few variables to be significantly related to missing outcomes, although the presence of various compliance programs in the respondents' own organization were negatively related to missingness. It may be, then, that our respondents are more educated or cognizant about environmental ethicality or drawn to organizations that demonstrate a dedication to ethics. Sample bias may occur if these respondents prioritize environmental values over instrumental perspectives (or if they expect a hypothetical manager to do so). However, in the offending regressions, missing outcome values were also predicted by perceived desirability of the behavior (perceiving the behavior as desirable was associated with non-missing values) and personal experience with the scenarios (having experience was associated with non-missing values). This implies that our respondents may be *less* environmentally motivated. In the overcompliance scenarios, missingness was also predicted by age (older respondents were less likely to report overcompliance intentions) and relativism (viewing the behavior as violating an unwritten contract/promise is associated with responding to the question) which, again, indicates that respondents may be less environmentally inclined. Overall, the inconsistent relationships with missingness (and the

offending scenarios and overcompliance scenarios, missing data ranged from 1% to a little more than 9% per variable (see Appendices B and C). If analyses were conducted using complete-case analysis, 26% of the offending scenarios and 21% of the overcompliance scenarios would have been lost. Not only would this reduce power, but it's likely that the cases with no missing data are different in some way from those with missing data. Using only cases with complete data would likely produce biased results (Graham, 2009; Tsikrikitis, 2005). Diagnostic tests (e.g., using logistic regressions to predict missingness, correlations among missingness indicators) indicate that data are not "missing completely at random" (MCAR) because some variables significantly predicted missing values, or the missingness indicators exhibited significant correlations amongst themselves (Tsikrikitis, 2005). The question becomes whether the data are "missing at random" (MAR) as opposed to "missing not at random" (MNAR). Data that are MNAR imply that some unmeasured condition is producing missing data patterns and consequently will provide biased results regardless of controls or methods employed by the researcher (Brame and Paternoster, 2003; Graham, 2009; Stuart et al., 2009; Tsikrikitis, 2005). In logistic regressions predicting missing values, most variables were nonsignificant or were significant for only a few of the measures and no variable consistently predicted missingness. Based on these diagnostic tests, I address missing data issues by performing multiple imputation.<sup>23</sup>

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small correlation coefficients) indicate that dropping cases with missing outcomes is unlikely to result in a strong sample bias, although these research questions should certainly be re-tested using different methods.<sup>23</sup>With more than 10% missing data, Tsikrikitis (2005) recommends imputation using hot-deck or maximum-likelihood models. However, maximum-likelihood assumes that the observed data are a sample drawn from a multivariate normal distribution. Since we don't know much about how our sample is created, it is better to take a conservative approach. I would have used the hot-deck procedure available in STATA, but STATA's hot deck imputation replaces the entire row of values with the values from a complete case. Since the pattern of missingness is not consistent, in this case multiple imputation is a more conservative approach.

Multiple imputation uses regression equations specified by the user to estimate missing values based on what you expect from the data present. The regression models should include all of the variables of substantive interest to the researcher as well as any other variables that appear to predict missingness. In the present study, my imputation models included all of those used in the analyses as well as a few auxiliary variables found to be related with three or more missingness indicators. Per White et al.'s (2011) recommendations, all cases with missing data on the dependent variable were dropped and missing values were not imputed on that variable—it is not proper to impute the outcome values when the variables used in imputation are the same as those in the main analysis. When this is the case, the imputed dependent variables are essentially predicted by the analytical models and therefore will not add any new information to the actual analysis. Non-linear regression models (e.g., logistic regression for binary variables and ordinal regression for categorical) were used to impute missing values for variables not normally distributed.

As opposed to single imputation in which this process is done once, multiple imputation does  $n$  iterations. After creating the desired number of datasets with the imputed data, the original models are run using all of the datasets; the results are combined across data sets by using “combining rules.” This procedure not only produces reasonable estimates of missing values, but it also accounts for variability in the final estimates. By using multiple imputation methods, we are not “making up data” but are attempting to preserve attributes of the dataset in its entirety (Graham, 2009; Stuart et. al.,

2009). Using STATA 10.1's ICE procedure (Royston, 2009), I created 10 iterations of the dataset to use in the analyses.<sup>24</sup>

*Regressions.* All analyses are conducted in STATA 10.1, using the MICE program to combine the imputed databases. In examining the distribution of the dependent variable, it was notably skewed in the noncompliance scenario data (i.e., 62% of the respondents indicated a 0% chance of offending). Therefore, I dichotomize this outcome measure (the intention to offend) to reflect the values of 0 = no chance of offending and 1 = a 10% or more chance of offending. I then ran logistic regression for the offending models. The distribution of the overcompliance outcome was slightly skewed, but the scale measure provides important detail lost by a dichotomous variable so I decided to keep the 11-point scale and use Ordinary Least Squares regression<sup>25</sup>.

Given that the unit of analysis is the scenario (and not the respondent), it is important to consider clustering effects. Most individual respondents responded to more than one scenario and therefore those observations are not independent, violating an important assumption of multivariate regression. When this assumption is violated, coefficient estimates will be consistent (i.e., unbiased) but standard errors are no longer valid (Rabe-Hesketh & Skrondal 2005). I thus estimated robust standard errors using the Huber/White/sandwich estimator in STATA 10.1.<sup>26</sup>

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<sup>24</sup> I ran the regressions on the original dataset, without imputed data. As one might expect, there were changes in the significance of variables but all variables are consistent in magnitude and directionality regardless of the imputation procedure.

<sup>25</sup> I ran both scenario types using various models to check how robust my results are to different strategies; results were substantively the same.

<sup>26</sup> Alternative methods for handling lack of independence between observations would be to estimate either a random effects model or a multi-level model. The random effects model allows the intercept to vary across individuals. While estimating robust standard errors treats the correlation among time varying variables as a nuisance, random effects models explicitly model the lack of dependence and decompose the total residual into between- and within-individual components (Rabe-Hesketh & Skrondal 2005). Employing a multi-level approach similarly corrects the standard errors as well as disaggregating

In this section of the dissertation, I present my models for each hypothesis test. Again, note that logistic regression is employed for regressions using the binary offending variables and OLS regression is used for the overcompliance outcome. For the following equations, let  $Y_{off}$  be the probability of offending and  $Y_{over}$  be the likelihood of overcompliance. The external licenses will be represented by  $X$  for the vector of firm-level legal license variables,  $\Delta$  for the vector of firm-level social license variables,  $E$  for the vector of firm-level economic license variables,  $\Phi$  for the firm-level corporate culture variables,  $\Gamma$  for the vector of individual-level considerations, and  $\Theta$  for the vector of control variables. The subscript  $k$  represents individual respondents.

Hypothesis 1 argues that if managers/corporations are subject to greater external license pressures, they are less likely to offend and more likely to overcomply with environmental regulations. Therefore,

$$(1) \text{ Logit: } \Pr(Y[off]_k = 1) = \frac{\exp X\beta_k}{1 + \sum \exp X\beta_k}, \text{ where}$$

$$X\beta_k = \beta_{0k} + \beta_{1k}X + \beta_{2k}\Delta + \beta_{3k}E + \beta_{4k}\Theta + \varepsilon_k$$

$$(2) \text{ OLS: } Y[over]_k = \beta_{0k} + \beta_{1k}\Delta + \beta_{2k}E + \beta_{3k}\Theta + \varepsilon_k$$

Hypothesis 2 states that if the corporation's culture is favorable to environmental compliance, then managers are less likely to offend and more likely to overcomply.

Therefore,

$$(3) \text{ Logit: } \Pr(Y[off]_k = 1) = \frac{\exp X\beta_k}{1 + \sum \exp X\beta_k}, \text{ where}$$

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unexplained variance into two parts—at the level of the vignette and the level of the individual respondent. This allows you not only to examine whether respondents' judgments change as a result of vignette conditions, but also whether your respondents differ from one another with regards to their average scores on the outcome (Wallander, 2009). This is an interesting avenue for future research; however, in this study there are many cases in which the individual saw only one offending scenario (and two overcompliance scenarios) or only one/no overcompliance scenarios (and saw two or three offending scenarios). For the purposes of this research, the clustering option in Stata is employed to retain all scenarios in the analysis.

$$X\beta_k = \beta_{0k} + \beta_{1k}\Phi + \beta_{2k}\Theta + \varepsilon_k$$

$$(4) \text{ OLS: } Y[\textit{over}]_k = \beta_{0k} + \beta_{1k}\Phi + \beta_{2k}\Theta + \varepsilon_k$$

I also argue in Hypothesis 2B that after accounting for corporate culture, the external licenses will be less salient in managers' behavioral decisions. To test this, I will compare the results for (3) and (4) to the results for the following models:

$$(5) \text{ Logit: } \Pr(Y[\textit{off}]_k = 1) = \frac{\exp X\beta_k}{1 + \sum \exp X\beta_k}, \text{ where}$$

$$X\beta_k = \beta_{0k} + \beta_{1k}X + \beta_{2k}\Delta + \beta_{3k}E + \beta_{4k}\Phi + \beta_{5k}\Theta + \varepsilon_k$$

$$(6) \text{ OLS: } Y[\textit{over}]_k = \beta_{0k} + \beta_{1k}\Delta + \beta_{2k}E + \beta_{3k}\Phi + \beta_{4k}\Theta + \varepsilon_k$$

Hypothesis 3 states that measures of the external licenses and corporate culture will predict individual-level perceptions of risks and benefits to the corporation and to the managers themselves. Most of the models will look like this (but note that the legal license variables will not be included in the regressions of the overcompliance rational choice variables):

$$(7) Y_{\Gamma k} = \beta_{0k} + \beta_{1k}X + \beta_{2k}\Delta + \beta_{3k}E + \beta_{4k}\Phi + \beta_{5k}\Theta + \varepsilon_k$$

Note also that the rational choice variables of SHAME (in the offending scenarios), FEELGOOD, and PRIDE (in the overcompliance scenarios) are dichotomous in nature and therefore will require logistical modeling. For those variables, the model will look like this:

$$(8) \Pr(Y_{\Gamma k} = 1) = \frac{\exp X\beta_k}{1 + \sum \exp X\beta_k}, \text{ where}$$

$$X\beta_k = \beta_{0k} + \beta_{1k}X + \beta_{2k}\Delta + \beta_{3k}E + \beta_{4k}\Phi + \beta_{5k}\Theta + \varepsilon_k$$

Hypothesis 4 states that when managers perceive low risks and high benefits to themselves, they will be more likely to offend and more likely to overcomply. The test for this is as follows:

$$(9) \text{ Logit: } \Pr(Y[\textit{off}]_k = 1) = \frac{\exp X\beta_k}{1 + \sum \exp X\beta_k}, \text{ where}$$

$$X\beta_k = \beta_{0k} + \beta_{1k}\Gamma + \beta_{2k}\Theta + \varepsilon_k$$

$$(10) \quad \text{OLS: } Y[\textit{over}]_k = \beta_{0k} + \beta_{1k}\Gamma + \beta_{2k}\Theta + \varepsilon_k$$

I also believe that after accounting for individual-level considerations, firm-level factors will be less salient in managers' behavioral decisions. I will compare equations (9) and (10) to equations (11) and (12) shown below:

$$(11) \quad \text{Logit: } \Pr(Y[\textit{off}]_k = 1) = \frac{\exp X\beta_k}{1 + \sum \exp X\beta_k}, \text{ where}$$

$$X\beta_k = \beta_{0k} + \beta_{1k}X + \beta_{2k}\Delta + \beta_{3k}E + \beta_{4k}\Phi + \beta_{5k}\Gamma + \beta_{6k}\Theta + \varepsilon_k$$

$$(12) \quad \text{OLS: } Y[\textit{over}]_k = \beta_{0k} + \beta_{1k}\Delta + \beta_{2k}E + \beta_{3k}\Phi + \beta_{4k}\Gamma + \beta_{5k}\Theta + \varepsilon_k$$

The final hypothesis states that the predictors of offending behavior are the same as those for overcompliance. To test this, I will compare equation (11) to equation (12), looking for similarities and differences in significant predictors across the models.

## II. Meta-analyses

As mentioned above, vignette studies are limited in certain ways—most notably, people question the ability of scenario to create a realistic context and whether reported behavioral intentions would translate to actual behavior. Furthermore, much of the previous research on environmental crime produces inconsistent results, likely due to

differences in samples, measures, and methods. To address this, I reviewed all prior empirical and quantitative studies on environmental offending through the year 2006. I used meta-analytical techniques to obtain a statistical estimate as to the overall impact of prevention and enforcement strategies under the rubric of each license.<sup>27</sup> In doing so, I will also be able to assess the impact of the 3 external licenses using studies that rely on actual offending behavior.

Meta-analysis is a quantitative synthesis of research studies that examine the same conceptual idea (even if this idea is operationalized in different ways; Wilson, 2010). With this method, the research standardizes the statistical relationships found in prior studies by creating an “effect size statistic” for each study. The effect sizes of each study are then averaged to get a sense of the impact of a construct in the literature, and possibly compare the average relationship to other constructs of interest. The type of effect size that you calculate depends on the type of data that you have. There are three types of effect sizes that I was able to compute with these data: 1) the mean difference (or d-type) effect size, in which the mean scores of two groups are compared; 2) the product-moment correlation effect size, which is appropriate when you are looking at the relationship between two continuous variables; or 3) the odds-ratio effect type, which should be used when you are looking at dichotomous individual variable/dichotomous outcome and want to express the effect size in terms of the odds of an outcome.

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<sup>27</sup>The meta-analytical data used for this research comes from a larger project which reviewed all prior work on corporate crime prevention and enforcement for multiple crime outcomes up through 2003. Given the breadth of the research reviewed in the larger project, only articles reporting corporate compliance versus noncompliance were included; overcompliance outcomes were only included in the coding as they related to noncompliance and therefore were not coded separately. Thus, this section of the study is only examining the impact of programs/factors on corporate environmental offending.

### **a. Advantages and Limitations of Meta-analyses**

Meta-analysis was designed to overcome limitations of older review methodologies, such as “vote-counting” or literature review methods. Literature reviews seek to identify the body of research relevant to a particular topic and discuss the state of knowledge that exists based on the overall results of specific studies. Vote-counting methods take the literature review a step further and count the number of studies showing significant effects of the treatment of interests versus those that are nonsignificant (Bushman and Wang, 2009). Lipsey (2007) argues that vote-counting of significance tests is problematic *because* of the reliance on significance tests (see, e.g., McBride et al., 1993; Meehl, 1997). Specifically, the studies included in reviews tend to have small sample sizes and limited power to find significant results, but conversely scholars can get significant results merely by increasing their sample (McBride et al., 1993). Furthermore, the conclusions drawn by this method become even more inaccurate with the inclusion of more studies because you are not doing anything to overcome the lack of power and biases inherent in the selection of published articles/exclusion of unpublished articles. Meta-analysis deals with the limitations of traditional reviews and has many advantages over such reviews, including: 1) meta-analyses are more precise because they look at *both* the significance as well as the *magnitude* of relationships to inform judgments about the relationship, 2) each step of the meta-analysis is very public and open to scrutiny so that other scholars can assess and replicate the process, 3) the databases are dynamic such that as more relevant studies are identified they can be added in and the relationships can be re-examined with new information, 4) findings from a large number of studies (including unpublished studies) are organized and recorded in a

computerized database which facilitates analysis of the information, 5) the procedure has more statistical power than other methods and can demonstrate relationships or effects not found elsewhere, and 6) one can compare findings across studies to determine why differences exist across studies (Lipsey and Wilson, 2001, pp. 5 - 6; Pratt and Cullen, 2000; Wilson, 2010).

Although meta-analysis has advantages, it is not without limitations that need to be understood and addressed when discussing the results. Lipsey and Wilson (2001) note that meta-analysis is more complicated than traditional literature reviews and requires a lot of training and an understanding of the statistical underpinnings of the method. Also, because the approach provides a numeric summary measure and emphasizes quantitative testing of the data, scholars are not as likely to notice subtle or nuanced differences among a group of studies that would escape quantitative coding. There is also a problem in combining studies that measure the construct of interest with different operationalizations; researchers using ambiguous constructs that can be measured in a variety of ways risk comparing and combining effect sizes among studies that are essentially dissimilar. Finally, Lipsey and Wilson note that studies vary widely by methodological quality and that there is a lack of consensus about what the criteria should be for including a study in these meta-analyses. While it would be ideal to only include randomized experiments, the rarity of true experiments (especially for those topics of most interest to criminologists; see Farrington and Welsh, 2005; Lum and Yang, 2005; Weisburd, 2000) means that relying on this method alone would make meta-analysis impossible to do and would impede the generalizability of findings (Lipsey, 2007). The authors argue that we need to find a balance between excluding studies that are not

methodologically adequate versus learning from studies that may not be randomized trials—e.g., including all studies and coding methodological differences to examine why study results differ (Lipsey and Wilson, 2001).

More fundamentally, Berk (2007) argues that the meta-analysis method itself requires assumptions about the collection and inclusion of studies that are not verifiable and likely untenable. For example, scholars assume that within studies, the sample is a randomized group from a representative population and that the only differences between treatment and control groups arise from the treatment itself—in meta-analysis, you cannot observe whether this is true. Further, he says that effect sizes across studies included in a meta-analysis are assumed to differ only because you are looking at different samples of the same population; variation in the treatment effect is due to random measurement error. Berk says that we do not know the true population that is being measured when we collect a wide variety of studies (especially when various operationalizations of the independent variable is used) and therefore it is inappropriate to use meta-analytic methods to draw inferences about this unknown population of interest. He also argues that people assume the treatment is going to have the exact same effect in different studies—which is problematic especially since studies measure the “same” concept in many different ways. Even if researchers employ fixed effects methods to model differences in effect sizes, this does not adequately address the fundamental problem and instead introduces the limitations of regressions into the method. Another assumption of meta-analysis is that the studies included involve different samples and are thus independent from each other. In collecting meta-analysis data, scholars generally look for studies that have overlapping samples and combine the data from the studies in

such a way as to make this less of a problem (discussed in more detail below). However, Berk argues that even when study samples are composed of different subjects, the assumption of independent samples is violated because the “scientific community is built around a web of personal contacts, peer reviews, and funding competitions in which earlier studies guide later studies, senior researchers mentor junior colleagues, and academics train their students to carry on some traditions and challenge others” (pp. 261 – 262). Basically, Berk argues that the models used in meta-analysis do not appropriately represent how the included studies were actually conducted—when your model should not apply to the sample, then trying to infer anything through statistical analyses is improper.

Lipsey (2007) responded to Berk’s (2007) criticisms in support of the use of meta-analysis. First, he takes on Berk’s argument that meta-analysis leads to invalid conclusions, arguing that individual studies rarely involve random sampling strategies and even when a random sample is used the study still suffers from non-random attrition and non-response. Under Berk’s criteria of which methods can be trusted to provide accurate inferences, then we would be able to use hardly any existing studies to draw conclusions. Furthermore, a strength of meta-analysis is that it examines the magnitude of effects and de-emphasizes the statistical significance in assessing whether the effect is “real” or not. He also compares meta-analysis to simulation exercises. In fixed-effects models, we are essentially looking at whether the effect sizes we calculate from each study would be generated through random sampling of a population of studies similar to those included in the analysis but who have a mean effect size of zero. With regard to Berk’s concern about dependency, Lipsey argues that we can create models for such

dependencies as Berk describes and that there are methods to correct them (e.g., using multi-level models). Instead of disregarding the method completely because of this fear, scholars should be motivated to overcome limitations by developing better statistical methods or by making more conservative assumptions in their analyses.

It is important to realize the limitations of meta-analysis, but I feel that the advantages of this methodology outweigh the concerns of scholars. Meta-analysis is particularly well-suited for the study of corporate environmental crime because there is such a vast amount of literature that inconsistently supports prevention and deterrence efforts. I will consider the limitations of the strategy when interpreting my results, but overall I feel that I can make a strong contribution through analysis of research using this method.

#### **b. Identification and Coding of Studies**

One of the biggest advantages to the method is that it is very transparent, and calls for precise recording of the steps employed. The first step in conducting a meta-analysis is identifying the criteria you will use to collect the studies to be used. Data collection occurs in three steps: 1) searching various databases for published and unpublished studies that are empirical in nature and that examine your outcome of interest, 2) coding those articles gathered in the first step according to more stringent eligibility criteria to determine whether they will be included into your final database, and 3) coding the relevant information into a computerized database. In this section, I will describe in detail each of these three steps as they pertain to the data collection and coding.

*Searching databases.* The meta-analytic method emphasizes the need to review both published and unpublished and include relevant data from both types. It has been well-documented that studies with non-significant results are often subject to the “file-drawer” effect where such work is not submitted for publication. Scholars note that non-significant findings may be just as informative as studies finding effects—in other words, it is just as important to know that an intervention has no impact or even iatrogenic effects (Wilson, 2009). To this end, I have searched multiple bases that include both published and peer-reviewed articles as well as places where unpublished manuscripts are made available to the public. Below is a list of the 20 databases and web sources to be used:

**Published databases:**

- Social Work Abstracts
- ABI
- PsycINFO
- Sociological Abstracts
- ERIC
- CJA
- BSP
- EconLit
- PAIS International
- Worldwide Political Science Abstracts

**Unpublished databases:**

- Google Scholar
- Digital Dissertation databases
- Department of Justice website
- Securities and Exchange commission website
- Federal Trade Commission website
- Financial Crimes Enforcement Network website
- Australia Institute of Criminology website
- The World Bank website
- Environmental Protection Agency website
- United Nations Office on Drugs and Crime

In each database, I used 390 search terms (the list of search terms is provided in Appendix E) relevant to finding empirical studies of environmental crime behaviors. As I went through each search term, I recorded the number of “hits” that the search term brings up—for example, when I plugged in “community AND ‘environmental

compliance” into the EconLit database I retrieved 31 articles.<sup>28</sup> After recording the number of articles returned by the search, I then read each article’s abstract and coded whether it was: 1) empirical, 2) related to environmental crime, and 3) both empirical and related to environmental crime. For those studies that are both empirical and are related to environmental crime, I saved a copy of the study for further coding. This process produced a database with information on how many hits a search term got, how many of those were empirical studies, how many of those were related to environmental offending, and how many of those were both empirical and dealt with environmental crime (and thus potentially eligible for further coding). It is important to note that in the unpublished databases, search terms can bring up an impossible amount of information to go through with any hope of putting together a database of current articles (e.g., putting “community AND ‘environmental compliance” into Google Scholar produces 4,630 hits) and many of those studies were not likely to be relevant for our meta-analysis. A decision was made to randomly sample 50 studies from the unpublished databases to code for inclusion.

After collecting the articles that are empirical and deal with environmental crime, the second round of eligibility coding involved reading those gathered articles and determining whether they met five criteria relevant to my needs. Specifically, I went through each article and marked whether the article:

- Was an evaluation of a corporate crime prevention/control strategy in the legal, economic, or social domains.
- Includes a comparison group (or a pre-intervention comparison period in the case of pre-post studies) that did not receive the treatment condition. Studies may be

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<sup>28</sup> Note that the search terms come from a larger review that includes all types of corporate crime (Simpson et al., 2008). To make the search for articles more efficient I added the term “environmental” where the term was not already included. I recorded the initial number of hits as well as the hits returned by the more specific search.

experimental, quasi-experimental, or pre-post evaluations. If the study does not include a treatment *group*, does it report standardized regression coefficients/Pearson correlations if the treatment is measured continuously?

- Reports on at least one environmental crime/misconduct outcome. In accordance with our broad definition of corporate crime, the outcome of interest may be one of a wide range of criminal behaviors, regulatory violations, or civil violations.
- Is written in English, but may be cross-national.
- Was published in 2004 or later.<sup>29</sup>

Once an article met the above criteria and was deemed eligible for the review, I then looked through its reference list to see if there are other relevant articles that I did not find in my initial search. For this study, I have finished coding articles through the year 2006. I plan to continue coding articles through 2011 and hope to have a complete database by January 2014.

### **c. Coding the studies**

After collecting all of the relevant studies, coding of the data begins. We developed a coding protocol (see Appendix F) that identifies data needed to calculate effect sizes as well as examine how study factors may influence the treatment effects found in the research. I collected data on the source of the study (e.g., country of publication, whether it was a book or article), characteristics of the study (e.g., randomized experiment or not, whether the authors expressed concerns about validity), sample characteristics (e.g., whether made up of individuals or corporations), the methods and procedures used by the study authors (e.g., use of a survey), descriptions of the independent variable (e.g., construct and operationalization), descriptions of the

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<sup>29</sup> Note that this meta-analysis is an update to an earlier systematic review for the Campbell Collaboration, which covered all corporate crime research published before 2003 (see Simpson et al., 2008). I use the same databases as the prior review although I developed new search terms specifically focusing on environmental crime.

dependent variable (e.g., construct and operationalization), the data employed to calculate an effect size, and then conclusions made by the study authors (e.g., whether the treatment had a beneficial effect). There are also shaded boxes at the very end that describe the various types of effect sizes and relevant statistics needed for future analysis.

#### **d. Dependent variables**

In meta-analyses, the “dependent variable” is the effect size (ES) calculated for each study. These ESs from various studies are combined to get a sense of the overall effect of the intervention. For the purposes of this dissertation, I calculate effect sizes to represent each of the three licenses. Specifically, I calculated an ES to represent the legal license (including studies that look at the effects of laws, official sanctions/fines, or regulatory policies), the economic license (e.g., the cost of compliance, experiencing abnormal stock returns after publication of reports), and the social license (e.g., bad publicity or NGOs). Given that the conceptualization of each license is so broad, I broke the ESs down into more specific examples of the licenses. The six constructs I present in the results section include: 1) the legal license (command-and-control approach), 2) the legal license (persuasive/cooperative approach), 3) the legal license (resources available to regulators), 4) the economic license (compliance costs), 5) the economic license (size/profitability of the company), and 6) the social license.

As mentioned above, various study designs yield different types of effect sizes. After completing the meta-analyses, there was never more than one odds-ratio effect sizes representing one construct. For brevity’s sake, I will not discuss this type of effect size further since a meta-analysis necessitates more than one study be analyzed. For our

purposes, two types of effect sizes are relevant: the mean-difference ( $ES_d$ ) and the product-moment correlation ( $ES_r$ ). The mean-difference effect size standardizes categorical group differences (e.g., treatment vs. control) among studies. This effect size can be calculated using the  $N$ , means and standard deviations of the groups; a  $t$ -test value and  $df$ , plus  $N$ s; an ANOVA  $F$ -value and  $df$ , plus  $N$ s; an exact  $t$ -test of the ANOVA  $p$ -value, plus  $N$ s or total sample size; or a categorical  $p$ -value of  $t$ -test or ANOVA and  $N$ s or total  $N$ . Basically, you need to have the scores of two groups and/or a difference test.

The product-moment correlation  $ES$  is a bit different in that it is not comparing group differences; instead, it is describing the covariation among variables; that is, how does one continuous variable change as another continuous variable changes?

Calculating this  $ES$  requires knowledge about the covariance between  $x$  and  $y$ , the sample size, and the standard deviation of  $x$  and  $y$ ; recently, other calculations have shown that you can derive  $ES_r$  using standardized beta coefficients (Lipsey and Wilson, 2001; Wilson, 2010).

In addition to calculating the effect sizes, it is important to adjust the effect size and then calculate the standard error and inverse variance weights for each average  $ES$ . All of these calculations weight the effect size according to the study's sample size in an attempt to give more weight to more precise estimates. I will now discuss how to calculate each type of effect size and associated statistics more specifically.

*Calculating the mean difference effect size and associated statistics.* As mentioned above, the mean difference effect contrasts two groups on a continuous dependent variable, while adjusting the effects based on the pooled standard deviation. Therefore, the most common formula to calculate this effect size is as follows:  $ES_{sm} =$

$\frac{\bar{X}_1 - \bar{X}_2}{s_{pooled}}$ . Here,  $\bar{X}_1$  is the mean for Group 1,  $\bar{X}_2$  is the mean for Group 2, and  $s_{pooled}$  is the pooled standard deviation (Lipsey and Wilson, 2001, p. 48). It is important to note, however, that there are ways to calculate the mean difference effect size from a variety of statistics (see Lipsey and Wilson, 2001, pp. 198 – 200); this study will use the most appropriate formula based on the data available.

The mean difference effect size from each study should be adjusted to correct for differences in sample sizes using the “small sample size bias correction” (Lipsey and Wilson, 2001, p. 49) such that more precise estimates are given more weight in the calculating the average. This is calculated using the formula:  $ES'_{sm} = (1 - \frac{3}{4N-9})ES_{sm}$ . In this formula,  $ES'_{sm}$  is the adjusted effect size,  $ES_{sm}$  is the effect size prior to the adjustment, and  $N$  is the total sample size (both groups) used in the study.

To calculate the standard error for the mean difference effect size, we employ the formula  $SE_{sm} = \sqrt{\frac{n_{G1} + n_{G2}}{n_{G1}n_{G2}} + \frac{ES'_{sm}{}^2}{2(n_{G1} + n_{G2})}}$  (Lipsey and Wilson, 2001, p. 49). Here,  $n_{G1}$  is the number of respondents in Group 1,  $n_{G2}$  is the number of subjects in group 2, and  $ES'_{sm}$  is the adjusted effect size. The inverse variance weight is simply calculated as  $w_{sm} = \frac{1}{SE_{sm}^2}$  (Lipsey and Wilson, 2001, p. 49).

*Calculating the product-moment correlation and inverse variance weight.* The correlation coefficient effect size is equal to the correlation reported in the study:  $ES_r = r$  (Lipsey and Wilson, 2001, p. 64). However, there are more ways to calculate the correlation coefficient using different types of data (Lipsey and Wilson, 2001, p. 201; Wilson, 2010); this study will employ various formulas to calculate correlation coefficient effect sizes as needed.

To adjust correlation coefficient effect sizes, the Fisher's  $Z_r$  transformation is applied using the formula:  $ES_{Z_r} = .5 \log_e \left[ \frac{1+r}{1-r} \right]$  (Lipsey and Wilson, 2001, p. 63). In the above formula,  $ES_{Z_r}$  is the adjusted correlation effect size,  $r$  is the correlation coefficient and  $\log_e$  is the natural logarithm.

Once you have the Fisher's  $Z_r$  transformation, you calculate the standard error as

$SE_{Z_r} = \frac{1}{\sqrt{n-3}}$ . The inverse variance weight is calculated in the same way as before:

$w_{Z_r} = \frac{1}{SE_{Z_r}^2} = n - 3$  (Lipsey and Wilson, 2001, p. 64).

#### **e. Statistical Analysis**

Once the effect sizes are transformed (e.g., into an unbiased  $ES_d$  or Fisher  $Z_r$ ), it is important to examine the distribution of effect sizes. To do this, I created independent sets of ESs, making sure not to violate the assumption of independence by including more than one ES from the same study on the same construct.<sup>30</sup> I then took the group of ESs representing the construct of interest and calculated the mean, using the adjusted ESs described above. Once one calculates the average ES, then the confidence interval is calculated to assess its precision. In addition, I calculated the  $Q$  statistic which assesses whether differences in the individual effects (at the study level) are due only to sampling error or if there are methodological/other differences in studies that affect the observed effect.

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<sup>30</sup>Lipsey and Wilson (2001) recommend either averaging the effect sizes within a study (or multiple studies if they use the same data) or randomly choosing one effect size to be included. You could also model the lack of independence, but this is often very difficult and requires data not generally reported in studies. As such, I chose to average the effect sizes within datasets.

If the effect sizes are not representative of a homogeneous underlying population then it is important to adjust your average weighted mean ES. As discussed in the results, I found my  $Q$  statistic to be highly significant. I calculated the random effects variance component and adjusted my ESs according to Lipsey and Wilson's (2001, pp. 134 – 135) instructions<sup>31</sup>.

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<sup>31</sup> Given that the ESs vary more than would be expected with mere sampling error, future analysis will analyze how effect sizes vary by study characteristics. The meta-analysis presented here is incomplete and is essentially a check on robustness. Therefore, the average weighted mean ESs (calculated using the random effects approach) is presented for illustrative purposes in the dissertation.

## **Chapter 4: Results**

In order to test the five hypotheses outlined in Chapter 2, I use a web-based randomized vignette survey of environmental decision-makers from a variety of organizational types. As described in Chapter 3, I employ a variety of regression models in my exploration of the data. In this chapter, I will discuss the results of those statistical tests. The first section describes our sample and then examines descriptive statistics and correlations among the key variables of interest. Included in this discussion is a demonstration of the success of the multiple imputation process. The second section discusses the regression results for each of the five hypotheses. The third section examines the sensitivity analysis of Hypothesis 1, in which I use meta-analytic data to determine the impact of the external licenses on corporate environmental offending. The fourth section will summarize what we have learned about environmental offending and overcompliance.

### **I. Descriptives, Correlations, and Multiple Imputation**

As mentioned in Chapter 3, the target audience for the web survey included environmental decision-makers in organizations. Table 1 shows the demographic characteristics of our survey respondents. Our respondents are predominantly male, in their mid-fifties on average, and a strong majority are married. A little over half of the respondents have experienced one of the behaviors depicted in the scenarios they saw—of those who said they had experienced such a behavior, a little over 70 percent said they had experienced a violation situation while about a quarter of them said they had experienced overcompliance situations. Over half of our respondents said they had no

more than a high school education, and over three-fourths of our respondents said they had less than a college education. Many of our respondents (38 percent) said they worked as private consultants, a little over a quarter of them worked for a corporation, and about 17 percent worked in a non-profit organization. Interestingly, despite the fairly low education level of our respondents, over ¾ of them report being executives (as opposed to employee or middle-management level) in their organizations. This likely reflects the strong representation of small organizations (the average company size is 10.19 employees, with the median being 3 employees) in our sample. About 85 percent of the sample are “very involved” in environmental decision-making in their organization. About 84 percent of the sample said the environmental commitment of their organization is “about right,” 12 percent said it was “excessive” and only about 5 percent said that it could “use work.” Although predominantly representing small organizations, our respondents match the characteristics of our targeted population well—they are experienced, have positions of authority in their organizations and are highly involved in environmental decision-making.

**Table 1: Demographic Characteristics of Survey Respondents (N = 717)**

<u>Demographic Measure</u>	<u>Range</u>	<u>Mean (S.D.)</u>
Gender	0 = male, 1 = female	0.23 (0.42)
Age	23 – 82	54.59 (9.78)
Are you married?	0 = no, 1 = yes	0.79 (0.41)
Have you ever personally experienced one of the behaviors depicted in the scenario? Yes	0 = no, 1 = yes	0.54 (0.50)
Have you ever personally experienced one of the behaviors depicted in the scenario? No	0 = no, 1 = yes	0.36 (0.48)
Have you ever personally experienced one of the behaviors depicted in the scenario? Not Applicable	0 = no, 1 = yes	0.10 (0.31)

<b><u>Demographic Measure</u></b>	<b><u>Range</u></b>	<b><u>Mean (S.D.)</u></b>
[If marked yes to having personal experience]—Have you ever experienced the situation depicted in the hazardous waste scenario?	0 = no, 1 = yes	0.00 (0.00)
[If marked yes to having personal experience]—Have you ever experienced the situation depicted in the EPA compliance order scenario?	0 = no, 1 = yes	0.35 (0.48)
[If marked yes to having personal experience]—Have you ever experienced the situation depicted in the Discharge Toxins scenario?	0 = no, 1 = yes	0.38 (0.49)
[If marked yes to having personal experience]—Have you ever experienced the situation depicted in the pollution overcompliance scenario?	0 = no, 1 = yes	0.18 (0.38)
[If marked yes to having personal experience]—Have you ever experienced the situation depicted in the Security Overcompliance scenario?	0 = no, 1 = yes	0.06 (0.23)
Highest educational decree achieved: HS or equivalent	0 = no, 1 = yes	0.60 (0.49)
Highest educational decree achieved: Some college	0 = no, 1 = yes	0.20 (0.40)
Highest educational decree achieved: 4-year college degree	0 = no, 1 = yes	0.08 (0.27)
Highest educational decree achieved: Some graduate study	0 = no, 1 = yes	0.02 (0.15)
Highest educational decree achieved: Graduate Degree	0 = no, 1 = yes	0.10 (0.30)
Type of organization: Corporation	0 = no, 1 = yes	0.26 (0.44)
Type of organization: Government	0 = no, 1 = yes	0.09 (0.29)
Type of organization: NGO	0 = no, 1 = yes	0.17 (0.37)
Type of organization: Law	0 = no, 1 = yes	0.03 (0.16)
Type of organization: Private consulting	0 = no, 1 = yes	0.38 (0.49)
Type of organization: Other	0 = no, 1 = yes	0.01 (0.09)
Type of organization: Retired	0 = no, 1 = yes	0.02 (0.13)
Type of organization: Academic	0 = no, 1 = yes	0.02 (0.14)
Type of organization: Self-Employed	0 = no, 1 = yes	0.02 (0.14)
Size of organization	0 – 1267	10.91

<b><u>Demographic Measure</u></b>	<b><u>Range</u></b>	<b><u>Mean (S.D.)</u></b>
		(62.93)
Years of Business Experience	2 – 60	29.85 (10.36)
What is your management level? Employee	0 = no, 1 = yes	0.05 (0.22)
What is your management level? Manager	0 = no, 1 = yes	0.19 (0.39)
What is your management level? Executive	0 = no, 1 = yes	0.76 (0.43)
How involved are you in environmental decision-making in your company? Not at all	0 = no, 1 = yes	0.03 (0.18)
How involved are you in environmental decision-making in your company? Somewhat	0 = no, 1 = yes	0.11 (0.32)
How involved are you in environmental decision-making in your company? Very	0 = no, 1 = yes	0.85 (0.36)
The environmental commitment of my company is: Excessive	0 = no, 1 = yes	0.12 (0.32)
The environmental commitment of my company is: About Right	0 = no, 1 = yes	0.84 (0.37)
The environmental commitment of my company is: Could use work	0 = no, 1 = yes	0.05 (0.21)

Tables 2 and 3 show the descriptive statistics for the variables included in the offending scenarios and the overcompliance scenarios, respectively. Note that these descriptives are for pre-imputation variables only. Appendices B and C compare the means and standard deviations of the variables before and after the multiple imputation process. Although independent samples t-tests founds significant differences ( $p < 0.10$ ) between some of the means of the original data and the imputed data, the significant findings are likely due to the large sample size. Other criteria to look for problematic imputation (e.g., the absolute difference in means pre/post imputation is more than 2 SDs, or the ratio in variances in pre/post imputed data is  $< .05$  or  $> 2$ ) and the small substantive

differences in mean, variance, and distribution suggest that imputation was successful (Stuart et al. 2009).

**Table 2: Summary Statistics, Offending Scenarios**

	<u>Variable Name</u>	<u>N</u>	<u>Range</u>	<u>Mean</u>	<u>SD</u>
Dep. Variable	Offend	879	0 - 1	0.379	0.485
Rational Choice Measures	Ind. Legal Certainty	842	-1.732 – 2.006	0	1
	Ind. Legal Severity	864	-6.999 – 0.429	0	1
	Ind. Social Certainty	851	-3.187 – 1.434	0	1
	Ind. Social Severity	837	-4.898 – 0.686	0	1
	Career	874	0 - 10	2.670	2.758
	Broad Morality	852	-6.929 – 0.593	0	1
	Social Contract	854	-3.078 – 0.771	0	1
	Relativist	865	-2.415 – 1.258	0	1
	Ethical	870	1 - 7	5.916	1.981
	Desirable	879	0 - 10	0.775	1.643
	Thrilling	874	0 - 10	0.609	1.615
	Shame	841	0 - 1	0.043	0.202
	Shame Severity	861	0 - 10	8.846	1.947
Legal License	Firm Legal Certainty	845	-2.107 – 1.662	0	1
	Firm Legal Severity	855	-4.291 – 0.847	0	1
Social License	Firm Rep. Certainty	864	0 - 10	6.753	2.533
	Firm Rep. Severity	852	0 - 10	7.910	2.289
	Mandated	879	0 - 1	0.476	0.499
	Public	879	0 – 1	0.513	0.500
Economic	Foreign Comp.	879	0 – 1	0.350	0.477
	Econ. Healthy	879	0 – 1	0.313	0.464
	Strengthen Comp.	879	0 – 1	0.473	0.499
	Green Market.	879	0 – 1	0.524	0.499

	<u>Variable Name</u>	<u>N</u>	<u>Range</u>	<u>Mean</u>	<u>SD</u>
	Declining Rev.	879	0 – 1	0.532	0.499
Corporate Culture	Common Firm	879	0 – 1	0.330	0.470
	Common Ind.	879	0 – 1	0.345	0.475
	Exceed Standards	879	0 – 1	0.338	0.473
	Met Standards	879	0 – 1	0.334	0.472
	Voluntary Participant	879	0 – 1	0.491	0.500
	Fired	879	0 – 1	0.365	0.482
	Reprimanded	879	0 – 1	0.344	0.475
	Hotline	879	0 – 1	0.182	0.386
	Ethics Code	879	0 – 1	0.205	0.404
	Audits	879	0 – 1	0.208	0.406
	Self-Reporting	879	0 – 1	0.188	0.391
	Ethics Guide	879	0 – 1	0.337	0.473
	Ethics Distinct	879	0 – 1	0.319	0.466
	Super. Asked	879	0 – 1	0.501	0.500
Control Variables	Discharge Toxins	879	0 – 1	0.345	0.475
	Hazard. Labeling	879	0 – 1	0.313	0.464
	Years Experience	815	2 - 60	29.971	10.502
	Marital Binary	798	0 - 1	0.781	0.414
	Religion	816	0 - 3	1.692	1.208
	Coinvolved	802	0 - 2	1.812	0.477
	Personexp_No	879	0 - 1	0.340	0.474
	Personexp_Yes	879	0 - 1	0.487	0.500
	Envcommit	806	0 – 2	0.922	0.396
	Sit. Realistic	876	0 – 1	0.858	0.349
	Upper Level	879	0 - 1	0.485	0.500
	Code of Ethics	826	0 - 1	0.570	0.495
	Mand. Training	826	0 - 1	0.186	0.390
	Random Audits	826	0 - 1	0.024	0.154
	Anon. Hotline	826	0 - 1	0.121	0.326
	Top Man. Ethics	826	0 - 1	0.551	0.498
	Company Policy	826	0 - 1	0.321	0.467
	Size	877	0 - 1267	12.099	76.874

**Table 3: Summary Statistics, Overcompliance Scenarios**

	<u>Variable Name</u>	<u>N</u>	<u>Range</u>	<u>Mean</u>	<u>SD</u>
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	<u>Variable Name</u>	<u>N</u>	<u>Range</u>	<u>Mean</u>	<u>SD</u>
Dep. Variable	Overcompliance	586	0 - 10	7.659	2.951
Rational Choice Measures	Ind. Social Certainty (OVER)	566	-2.468 – 1.953	0	1
	Ind. Social Rewards	566	-2.510 – 1.336	0	1
	Career	583	0 - 10	5.098	2.764
	Broad Morality	560	-0.831 – 2.748	0	1
	Social Contract	568	-0.848 – 2.705	0	1
	Relativist	570	-1.064 – 2.745	0	1
	Ethical	578	1 - 7	2.481	1.995
	Desirable	586	0 - 10	7.056	3.120
	Thrilling	583	0 - 10	4.161	3.238
	Feel Good	567	0 - 1	0.810	0.393
Pride	563	0 - 1	0.742	0.438	
Social License	Firm Social Certainty (OVER)	570	0 - 10	6.353	2.659
	Firm Social Rewards	570	0 - 10	6.839	2.613
	Mandated	586	0 - 1	0.452	0.498
	Public	586	0 - 1	0.514	0.500
Economic License	Foreign Comp.	586	0 - 1	0.340	0.474
	Econ. Healthy	586	0 - 1	0.294	0.455
	Strengthens Comp.	586	0 - 1	0.522	0.500
	Green Market.	586	0 - 1	0.515	0.500
	Declining Rev.	586	0 - 1	0.464	0.499
Corporate Culture	Common Firm	586	0 - 1	0.363	0.481
	Common Ind.	586	0 - 1	0.321	0.467
	Exceed Standards	586	0 - 1	0.358	0.480
	Met Standards	586	0 - 1	0.297	0.457
	Voluntary Participant	586	0 - 1	0.486	0.500
	Fired	586	0 - 1	0.326	0.469
	Reprimanded	586	0 - 1	0.358	0.480
	Hotline	586	0 - 1	0.176	0.381
	Ethics Code	586	0 - 1	0.210	0.407
	Audits	586	0 - 1	0.206	0.405
Self-Reporting	586	0 - 1	0.203	0.402	

	<u>Variable Name</u>	<u>N</u>	<u>Range</u>	<u>Mean</u>	<u>SD</u>
	Ethics Guide	586	0 - 1	0.304	0.460
	Ethics Distinct	586	0 - 1	0.336	0.472
	Super. Asked	586	0 - 1	0.497	0.500
Control Variables	Pollution 40%	586	0 - 1	0.486	0.500
	Years Experience	536	2 - 60	29.674	10.139
	Marital Binary	533	0 - 1	0.801	0.400
	Religion	538	0 - 3	1.678	1.194
	Coinvolved	531	0 - 2	1.827	0.452
	Personexp_No	586	0 - 1	0.323	0.468
	Personexp_Yes	586	0 - 1	0.509	0.500
	Envcommit	533	0 - 2	0.944	0.393
	Sit. Realistic	585	0 - 1	0.771	0.421
	Upper Level	586	0 - 1	0.548	0.498
	Code of Ethics	543	0 - 1	0.582	0.494
	Mand. Training	543	0 - 1	0.204	0.404
	Random Audits	543	0 - 1	0.035	0.184
	Anon. Hotline	543	0 - 1	0.122	0.327
	Top Man. Ethics	543	0 - 1	0.543	0.498
	Company Policy	543	0 - 1	0.346	0.499
	Size	585	0 - 370	9.141	32.22

Tables 4 and 5 give the correlations between the independent variables and the dependent variable for the offending and overcompliance scenarios, respectively. The full correlation matrix can be found in Appendix D. The correlations reported here were run on the variables prior to imputation in order to examine significance, but the size of the correlation coefficients remained substantively the same pre- and post-imputation.

Examining the offending scenario correlations, it is obvious that many of the survey items are correlated with offending intentions. All of the relationships are in the expected directions, such that sanctions variables (certainty/severity of individual legal sanctions, certainty/severity of social sanctions, perceptions of the behavior as immoral

or unethical, certainty/severity of firm legal sanctions, certainty/severity of firm social sanctions, being likely to feel shame) are all associated with lowered offending intentions. On the other hand, incentives (career benefits, desirability of behavior, thrill of behavior) are all associated with increased offending intentions.

Most of the randomized vignette dimensions are not significantly correlated with offending intentions in the bivariate analysis. That said, when the scenario depicts the corporation as having mandatory ethics training, when ethics are distinct from management decisions, and when the specific behavior depicted is the discharging of toxins into a local waterway, the likelihood of offending appears to be lessened (but these are only marginally significant). Vignette dimensions depicting management decisions as being guided by ethics and the hypothetical manager as being asked to engage in offending by a supervisor are associated with heightened offending intentions (however, the “ethics guiding top management” correlation coefficient is only marginally significant). If the respondent is married, is located in a company with a stronger environmental commitment, or is in a larger company, this is associated with increased offending intentions (although size is only marginally significant) while being in a company whose management takes ethical violations seriously is marginally associated with decreased offending.

A few of the independent variables are correlated with each other at 0.8 or above (see Appendix D), indicating a need to assess multicollinearity in the regression equations. Specifically, the correlations between firm-level legal sanction certainty/individual-level legal sanction certainty and firm-level legal sanction severity/firm-level social sanctions severity need to be examined more closely.

Turning to Table 5, we see again that many survey items are significantly correlated with the outcome variable. All of the correlations are in the expected directions such that perceived rewards of the behavior (certainty/benefit of individual-level social approbation, career benefits, desirability and thrill of behavior, likelihood of feeling good and pride if engaging in behavior, certainty/benefit of firm-level reputational enhancement) increase the likelihood of overcompliance while costs of the behavior (seeing the behavior as immoral or unethical) decreases overcompliance intentions.

Few of the randomized vignette dimensions are correlated with overcompliance intentions at the bivariate level. When the behavior is depicted as being common in the firm, when ethics guide managerial decisions, and when the hypothetical manager is asked to overcomply by a supervisor, overcompliance is more likely (although the “common in firm” effect is only marginally significant). When the firm is depicted as having previously met standards and when the behavior is depicted as reducing pollution 40% below required levels, then overcompliance is less likely.

Regarding respondent characteristics, perceiving the situation as realistic is positively correlated with overcompliance intentions, while reporting that your own company has an anonymous hotline to report unethical/illegal conduct is associated with lowered overcompliance intentions.

There is one correlation among the independent variables that suggests multicollinearity may be a problem (see Appendix D). Specifically, perceived benefits to the firm’s reputation is correlated with perceived benefit of individual-level social rewards to a high degree. I will examine potential multicollinearity in the multivariate analyses.

**Table 4: Correlations, Offending Scenario (N = 879)**

<b>Independent Variable</b>	<b>Bivariate Correlation with “Offend”</b>
Ind. Legal Cert.	-0.123***
Ind. Legal Sev.	-0.138***
Ind. Social Cert.	-0.256***
Ind. Social Sev.	-0.192***
Career	0.227***
Broad Moral	-0.399***
Social Contract	-0.239***
Relativist	-0.237***
Ethical	-0.140***
Desirable	0.260***
Thrilling	0.204***
Shame	0.150***
Shame Sev.	-0.162***
Firm Legal Cert.	-0.073**
Firm Legal Sev.	-0.147***
Firm Social Cert.	-0.151***
Firm Social Sev.	-0.155***
Mandated	-0.002
Public	-0.023
Foreign Comp.	0.026
Econ. Healthy	-0.041
Strengthens Comp.	0.021
Green Market.	-0.017
Declining Rev.	-0.011
Common Firm	0.031
Common Industry	-0.009
Exceed Stand.	0.032
Met Stand.	-0.037
Voluntary Part.	-0.013
Fired	0.017
Reprimanded	-0.002
Hotline	0.027
Ethics Code	-0.059*
Audits	0.05
Self Reporting	0.015
Ethics Guide	0.059*
Ethics Distinct	-0.061*
Super. Asked	0.128***
Discharge Toxins	-0.177***

<b>Independent Variable</b>	<b>Bivariate Correlation with “Offend”</b>
Hazard. Labeling	-0.046
Years Exp.	0.034
Marital binary	0.073**
Religion	0.005
Coinvolve	-0.051
personexp_no	0.009
personexp_yes	-0.038
Envcommit	0.094***
Sit. Realistic	0.060*
Upper Level	0.003
Code of Ethics	-0.029
Mandatory Training	-0.005
Random Audits	-0.057
Anon. Hotline	-0.019
Top Man. Ethics	-0.064*
Company Policy	0.019
Size	0.060*

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

**Table 5: Correlations, Overcompliance Scenario (N = 586)**

<b>Independent Variable</b>	<b>Bivariate Correlation with “Overcomply”</b>
Ind. Social Cert (OVER)	0.469***
Ind. Social Rewards	0.467***
Career	0.447***
Broad Moral	-0.733***
Social Contract	-0.565***
Relativist	-0.532***
Ethical	-0.500***
Desirable	0.580***
Thrilling	0.388***
Feel Good	0.588***
Pride	0.425***
Firm Social Cert. (OVER)	0.487***
Firm Social Rewards	0.458***
Mandated	-0.055
Public	-0.066
Foreign Comp.	-0.021
Econ. Healthy	0.043
Strengthens Comp.	0.05
Green Market.	-0.036

<b>Independent Variable</b>	<b>Bivariate Correlation with “Overcomply”</b>
Declining Rev.	-0.014
Common firm	0.069*
Common industry	0.066
Exceed Stand.	0.027
Met Stand.	-0.090**
Voluntary Participant	0.03
Fired	0.048
Reprimand	0.03
Hotline	-0.05
Ethics Code	0.067
Audits	-0.011
Self Reporting	-0.019
Ethics Guide	0.080**
Ethics Distinct	-0.038
Super. Asked	0.296***
Pollution 40	-0.127***
Years Exp.	-0.029
Marital Binary	0.021
Religion	0.076*
Coinvolve	0.03
personexp_no	-0.033
personexp_yes	0.009
Envcommit	-0.011
Sit. Realistic	0.183***
Upper Level	0.023
Code of Ethics	-0.026
Mand. Training	-0.004
Random Audits	0.028
Anon. Hotline	-0.115***
Top Man. Ethics	-0.031
Company Policy	-0.013
Size	-0.02

## II. Hypothesis Testing

Turning now to the results of my hypothesis tests, I will present the results for each hypothesis, discussing the results for the offending scenarios first, then the

overcompliance scenarios (with the exception of Hypothesis 5 which compares the two types of behaviors). For hypotheses 1 – 4, all results for the offending scenarios are presented as Odds Ratios to make interpretation of the logistic regressions easier; the results for the overcompliance behaviors are reported as unstandardized betas. To examine hypothesis 5 I present standardized coefficients for both models in order to compare models that differ in sample size, number of included variables, and operationalization of the dependent variable.

#### **a. Hypothesis 1 Results**

Hypothesis 1 stated that measures of the Legal, Social, and Economic licenses would predict offending and overcompliance.

##### *Offending Scenarios*

Table 6 shows the results for Hypothesis 1 for the offending scenarios. There was some indication of multicollinearity between the firm-level legal sanctions severity scale and the firm-level reputational damage severity item. I run two separate models for the offending scenarios, dropping one of the variables from each model in turn. This is the case for all hypothesis tests using the offending data.

Model 1 is the model that contains the legal severity scale and omits the reputational severity item. In this model, the perceived severity of legal sanctions against the firm and the perceived certainty of tarnishing the firm's reputation both reduce reported offending intentions. Specifically, a one standard deviation increase in perceived severity of legal sanctions predicts about a 22% reduction in the intentions to

offend, while a unit increase in the perceived certainty of tarnishing the firm’s reputation predicts about an 8% reduction in offending intentions. Model 2 contains the reputational damage severity item but omits the legal sanctions severity scale. In this model, both the perceived certainty and severity of tarnishing the firm’s reputation reduce reported offending intentions by about 7% and 11% respectively. It seems that publicizing offending would decrease the likelihood of offending, as well as increasing the severity of legal sanctions or the potential informal damages incurred by publicizing offending. I would argue, therefore, that hypothesis 1 receives support in the offending scenarios—the legal and social license impact offending intentions, although the economic license does not.

The same control variables are significant in both models. We see that the specific type of offense is a strong predictor of offending intentions—respondents report that they are much less likely to discharge toxins or mislabel hazardous waste than they are to ignore an EPA compliance order. Respondents are more likely to offend if they are married, if they see the environmental commitment of their own company as moving towards excessive, when their employer has an environmental compliance management policy in place, and when located in larger companies.

**Table 6: Regression of Offending Intentions on External License Measures and Control Variables (N = 879)**

	<u>Variable Name</u>	<u>Model 1</u>	<u>Model 2</u>
Legal License	Firm Legal Certainty	1.043	1.051
	Firm Legal Severity	0.776***	--
Social License	Firm Social Certainty	0.921**	0.929*
	Firm Social Severity	--	0.890***
	Mandated	1.012	1.007
	Public	0.893	0.871

	<u>Variable Name</u>	<u>Model 1</u>	<u>Model 2</u>
Economic License	Foreign Comp.	0.933	0.939
	Econ. Healthy	0.775	0.797
	Strengthens Comp.	1.150	1.149
	Green Market.	0.966	0.969
	Declining Rev.	0.940	0.936
Controls	Discharge Toxins	0.304***	0.298***
	Hazard. Labeling	0.450***	0.454***
	Years Experience	1.004	1.003
	Marital Binary	1.566**	1.549**
	Religion	1.000	0.990
	Coinvolve	0.877	0.868
	Personexp_no	1.048	1.092
	Personexp_yes	0.917	0.946
	Env. Commitment	1.650**	1.656**
	Sit. Realistic	1.341	1.383
	Upper Level	0.970	0.966
	Code of Ethics	0.967	0.992
	Mand. Training	0.968	0.963
	Random Audits	0.590	0.560
	Anon. Hotline	0.850	0.856
	Top Man. Ethics	0.752	0.742
	Company Policy	1.515**	1.522**
Size	1.002**	1.003***	

*N* = 879 (after imputation)

\**p*<0.10, \*\**p*<0.05, \*\*\**p*<0.001

### *Overcompliance Scenarios*

Turning now to overcompliance behaviors, Table 7 shows the results of the OLS regressions for the model including only measures of external licenses and controls.

What we see in this table is that the firm's reputation is highly salient in decisions to overcomply. As one's perceptions of both the certainty and benefit of firm-level reputation enhancement increases, so does the likelihood of engaging in overcompliance.

Specifically, a 10% increase in the certainty of enhancing the firm’s reputation predicts a 3.64% increase in the likelihood of overcompliance. A 10% increase in perceived benefits of enhancing the firm’s reputation leads to a 3.02% increase in the likelihood of overcompliance. Counterintuitively, we see that when a firm is mandated to publicly announce pollution information the likelihood of overcompliance *decreases* by 5.05%. It may be that the respondents associated mandated publicity with punishment for noncompliance and therefore predict that the manager is less likely to overcomply.<sup>32</sup>

Regarding the control variables, the type of behavior depicted has a strong influence on behavioral intentions—specifically, individuals are much less likely to reduce pollution 40% below required levels than they are to enhance security around toxic waste sites. They are also less likely to overcomply if they report their own companies as having an anonymous hotline to report unethical or illegal conduct. They are more likely to overcomply if their religion is more important to them, if they see the scenario as realistic, and when their company has random ethics audits.

Overall, hypothesis 1 is partially supported for the overcompliance behaviors—firm reputation enhancements strongly encourage overcompliance, mandated publicity discourages it, and firm-level economic variables seem to have little impact.

**Table 7: Regression of Overcompliance Intentions on External License Measures (N = 586)**

	<u>Variable Name</u>	<u>Beta</u>
Social License	Firm Social Certainty (OVER)	0.364***
	Firm Social Rewards	0.302***
	Mandated	-0.505**
	Public	-0.120

<sup>32</sup> Reasoning that this relationship may be driven by one type of overcompliance found that publicity reduced overcompliance intentions in both of the overcompliance vignettes.

Economic License	Foreign Comp.	0.198
	Econ. Healthy	0.259
	Strengthens Comp.	0.089
	Green Market.	-0.216
	Declining Rev.	0.060
Controls	Pollution 40	-0.862***
	Years Experience	-0.010
	Marital Binary	0.370
	Religion	0.208**
	Coinvolve	0.131
	Personexp_No	-0.427
	Personexp_Yes	-0.509
	Envcommit	-0.003
	Sit. Realistic	0.699**
	Upper Level	0.106
	Code of Ethics	0.050
	Mand. Training	0.383
	Random Audits	1.366**
	Anon. Hotline	-1.356***
	Top Man. Ethics	-0.343
Company Policy	-0.045	
Size	-0.001	

*N* = 586 (after imputation)

\**p*<0.10, \*\**p*<0.05, \*\*\**p*<0.001

### **b. Hypothesis 2 Results**

Hypothesis 2 specified that measures of Corporate Culture would predict offending and overcompliance. I also expected that the effect of the external license measures would lessen when the corporate culture measures are included in the regression equation.

*Offending Scenarios*

The first column in Table 8 shows the regression of the corporate culture (and control) variables on offending intentions. Only one corporate culture variable is significant, but has a very strong impact. When the hypothetical manager is depicted as being asked by a higher-level manager (vs. asks an employee) the odds of offending increase by about 69%. The second and third columns in Table 8 add the external license measures into the regression. I expected the impact of the external licenses to become less salient with the inclusion of the corporate culture measures, but this does not appear to be the case. The external licenses continue to exert similar effects as in the prior analysis; the perceived severity of legal sanctions and the perceived certainty and severity of tarnishing the firm’s reputation all continue to reduce offending intentions and the magnitudes of the coefficients is similar to the previous model. If anything, the impact of the certainty of reputational sanctions strengthens when I account for the internal corporate culture measures. Hypothesis 2 received little support when examining environmental offending intentions.

**Table 8: Regression of Offending Intentions on Corporate Culture and External License Measures (N = 879)**

	<u>Variable Name</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Legal License	Firm Legal Certainty		1.035	1.044
	Firm Legal Severity		0.798**	--
Social License	Firm Social Certainty		0.909**	0.916**
	Firm Social Severity		--	0.899***
	Mandated		1.034	1.030
	Public		0.893	0.874
Economic License	Foreign Comp.		0.878	0.885
	Econ. Healthy		0.769	0.787
	Strengthen Comp.		1.177	1.173
	Green Market.		0.927	0.928

	<u>Variable Name</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Corporate Culture	Declining Rev.		0.936	0.929
	Common Firm	1.268	1.258	1.277
	Common Ind.	1.195	1.212	1.218
	Exceed Standards	1.227	1.270	1.271
	Met Standards	0.960	0.950	0.956
	Voluntary Participant	0.847	0.824	0.828
	Fired	1.123	1.132	1.136
	Reprimanded	1.105	1.165	1.164
	Hotline	1.171	1.188	1.220
	Ethics Code	0.864	0.942	0.953
	Audits	1.302	1.342	1.357
	Self-Reporting	1.086	1.098	1.123
	Ethics Guide	1.105	1.164	1.180
	Ethics Distinct	0.808	0.832	0.822
	Super. Asked	1.691***	1.708***	1.685***
Controls	Discharge Toxins	0.309***	0.311***	0.306***
	Hazard. Labeling	0.439***	0.430***	0.433***
	Years Experience	1.008	1.005	1.004
	Marital Binary	1.552*	1.660**	1.638**
	Religion	1.022	0.998	0.988
	Coinvolved	0.893	0.866	0.856
	Personexp_No	1.152	1.185	1.225
	Personexp_Yes	1.053	1.045	1.075
	Envcommit	1.816**	1.745**	1.755**
	Sit. Realistic	1.493	1.366	1.400
	Upper Level	1.017	0.977	0.974
	Code of Ethics	0.936	0.960	0.983
	Mand. Training	0.998	0.958	0.952
	Random Audits	0.635	0.665	0.637
	Anon. Hotline	0.879	0.857	0.858
	Top Man. Ethics	0.690*	0.708*	0.703*
	Company Policy	1.427*	1.509**	1.515**
Size	1.002**	1.002**	1.002**	

$N = 879$  (after imputation)

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.001$

### *Overcompliance scenarios*

Table 9 provides the regression of overcompliance intentions on the corporate culture variables in Model 1, and then compares the results of that regression to a model

that includes the external license measures in Model 2. In the first model, four corporate culture variables significantly increase the likelihood of overcompliance. Specifically, overcompliance is more likely when it is depicted as common in the firm (7.99% more likely) or industry (7.49% more likely; the reference category compares no mention of behavior being common in the firm/industry), 5.12% more likely when the hypothetical corporation’s management is guided by ethical considerations (the reference category says that ethics is irrelevant to top management decisions), and is 16.53% more likely when the scenario says that the hypothetical manager is asked to do so by a supervisor (as opposed to asking an employee).

When adding in the measures of the external licenses, the magnitudes of the corporate culture coefficients are somewhat reduced, although the impact of the company having previously met EPA standards (vs. having violated standards) becomes significant. This variable, though, *reduces* the likelihood of overcompliance. It may be that overcompliance instrumentally serves to get back into the “good graces” of regulators after previous episodes of noncompliance. The effects of the external licenses remain the same as in the prior model. Overall, hypothesis 2 receives mixed support in the overcompliance scenario.

**Table 9: Overcompliance Scenario, Hypothesis 2 Results (N = 586)**

	<u>Variable Name</u>	<u>Model 1</u>	<u>Model 2</u>
Social License	Firm Social Certainty (OVER)		0.326***
	Firm Social Rewards		0.308***
	Mandated		-0.415**
	Public		-0.193
Economic License	Foreign Comp.		0.211
	Econ. Healthy		0.214
	Strengthens Comp.		0.083

	<b><u>Variable Name</u></b>	<b><u>Model 1</u></b>	<b><u>Model 2</u></b>
	Green Market.		-0.204
	Declining Rev.		0.147
Corporate Culture	Common Firm	0.799***	0.599**
	Common Ind.	0.749**	0.484*
	Exceed Standards	0.131	-0.089
	Met Standards	-0.465	-0.486**
	Voluntary Participant	0.109	0.036
	Fired	0.279	0.150
	Reprimanded	0.282	0.143
	Hotline	-0.327	-0.403
	Ethics Code	0.157	-0.241
	Audits	0.027	-0.120
	Self-Reporting	0.059	-0.202
	Ethics Guide	0.512*	0.220
	Ethics Distinct	0.092	-0.221
	Super. Asked	1.653***	1.458***
	Controls	Pollution 40%	-0.637***
Years Experience		-0.011	-0.008
Marital Binary		0.340	0.278
Religion		0.274***	0.245**
Coinvolved		0.273	0.173
Personexp_No		-0.767*	-0.318
Personexp_Yes		-0.590	-0.404
Envcommit		-0.157	-0.061
Sit. Realistic		0.744**	0.466*
Upper Level		0.249	0.102
Code of Ethics		-0.274	-0.143
Mand. Training		0.595*	0.599*
Random Audits		1.499***	1.563***
Anon. Hotline		-1.594***	-1.565***
Top Man. Ethics		-0.005	-0.144
Company Policy		0.171	0.080
Size		-0.001	-0.001

*N* = 586 (after imputation)

\**p*<0.10, \*\**p*<0.05, \*\*\**p*<0.001

### **c. Hypothesis 3 results**

Hypothesis 3 predicted that the firm-level external licenses/corporate culture measures would predict or be correlated with the individual-level RCT measures. Table 10 shows the regressions of the 13 individual-level variables on all of the firm-level variables, using the offending data. Essentially, every single RCT variable is significantly associated with at least two of the firm-level measures. To take one example, a higher level of perceived severity of legal sanctions at the firm level is strongly associated with higher perceived severity of legal sanctions at the individual level ( $p < 0.01$ ). However, when the firm is depicted as being publicly owned then the respondent perceives the severity of legal sanctions as being marginally less ( $p < 0.10$ ). In Table 11, the same regressions are run omitting the legal sanctions severity variable. Here, the perceived severity of damaging the firm's reputation is positively associated with the perceived severity of legal sanctions at the individual level ( $p < 0.01$ ), but none of the other main independent variables of interest are even marginally significant.

Table 12 shows the Hypotheses 3 test for the overcompliance scenarios. Again, every single individual-level variable is predicted by/correlated with at least of the two firm-level variables. What's interesting is that the perceived benefits (both certainty and strength) for the firm's reputation is significant for all models.

Overall, Hypothesis 3 is supported for both offending and overcompliance intentions, as the firm-level variables are associated with individual-level perceptions of the costs and benefits of the behaviors.

**Table 10: Regression of Individual-level Rational Choice Measures on Firm-Level Measures (Offending Scenarios, no Firm Reputational Severity Item) (N = 879)**

	Ind. Legal Certain y	Ind. Legal Severit y	Ind. Social Certain y	Ind. Social Severity	Career	Broad Morality	Social Contact	Relativis m	Ethical	Desirable	Thrilling	Shame <sup>d</sup>	Shame Severity
<b>Firm Legal Certainty</b>	6.704 <sup>c</sup>	-0.009	1.045 <sup>c</sup>	0.007	0.161	0.264 <sup>a</sup>	0.134	0.169	0.084	-0.003	-0.054	0.924	0.023
<b>Firm Legal Severity</b>	0.460 <sup>b</sup>	1.416 <sup>c</sup>	0.954 <sup>b</sup>	3.665 <sup>c</sup>	- 0.497 <sup>c</sup>	0.557 <sup>c</sup>	0.451 <sup>c</sup>	0.512 <sup>c</sup>	0.086	-0.166 <sup>a</sup>	-0.075	0.603 <sup>c</sup>	1.000 <sup>c</sup>
<b>Firm Social Certainty</b>	0.077	-0.025	1.908 <sup>c</sup>	0.327 <sup>c</sup>	- 0.181 <sup>c</sup>	0.124 <sup>a</sup>	0.103	0.283 <sup>c</sup>	0.055	-0.099 <sup>c</sup>	0.018	0.782 <sup>b</sup>	0.056
<b>Firm Social Severity</b>	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>Mandated</b>	0.022	0.174	0.089	-0.289	-0.098	-0.057	-0.313	-0.044	-0.132	0.085	0.006	1.644	-0.042
<b>Public</b>	-0.543 <sup>b</sup>	-0.363 <sup>a</sup>	0.138	-0.338	-0.017	-0.052	-0.197	-0.134	0.011	-0.031	-0.088	0.629	-0.113
<b>Foreign Comp.</b>	-0.636 <sup>b</sup>	0.085	-0.125	0.386	0.098	0.098	-0.076	-0.336	0.196	0.053	-0.235 <sup>a</sup>	0.878	0.078
<b>Econ. Healthy</b>	-0.457	0.277	0.769	1.015 <sup>b</sup>	- 0.529 <sup>b</sup>	0.143	0.140	0.057	-0.060	-0.120	-0.206	1.254	0.261
<b>Strengthen Comp.</b>	-0.220	0.185	0.264	0.480	0.262	0.392 <sup>a</sup>	0.174	0.074	0.204	-0.226	-0.081	0.620	0.113
<b>Green Market.</b>	0.129	0.127	0.456	-0.052	0.241	-0.086	0.281	0.237	0.141	-0.039	-0.051	0.799	0.279 <sup>b</sup>
<b>Declining Rev.</b>	0.204	-0.117	-0.326	-0.249	-0.148	0.039	-0.148	0.339 <sup>a</sup>	0.018	0.051	-0.173	0.755	-0.016
<b>Common Firm</b>	-0.398	-0.055	0.240	0.171	0.199	0.324	-0.239	-0.285	- 0.324 <sup>a</sup>	-0.041	0.119	0.934	-0.029
<b>Common Ind.</b>	-0.124	-0.146	-0.176	-0.114	0.312	-0.106	-0.140	-0.457 <sup>a</sup>	-0.110	0.016	0.044	0.869	0.020
<b>Exceed Standards</b>	-0.136	-0.094	-0.316	-0.011	0.122	-0.290	-0.115	-0.012	- 0.364 <sup>b</sup>	0.216 <sup>a</sup>	0.070	1.924	-0.225
<b>Met Standards</b>	-0.066	0.150	0.202	-0.150	0.135	-0.471 <sup>a</sup>	0.146	-0.137	-0.101	0.318 <sup>b</sup>	0.020	1.560	-0.122
<b>Voluntary Participant</b>	0.042	-0.030	-0.312	-0.050	-0.287	-0.059	0.316	0.020	0.244 <sup>a</sup>	-0.081	0.094	1.092	-0.095
<b>Fired</b>	0.015	-0.219	0.556	-0.243	0.092	-0.151	-0.270	0.135	-0.142	0.011	0.003	1.067	-0.060
<b>Reprimanded</b>	-0.165	-0.153	0.723	-0.398	-0.186	0.214	0.290	0.156	-0.149	-0.106	0.088	0.841	-0.101
<b>Hotline</b>	-0.156	0.182	0.135	0.608	0.151	0.085	0.424	-0.004	0.056	0.046	-0.012	1.407	0.208
<b>Ethics Code</b>	0.126	0.332	-0.366	0.091	0.494 <sup>a</sup>	0.556 <sup>a</sup>	0.733 <sup>b</sup>	0.159	0.339 <sup>a</sup>	-0.047	0.161	0.216	0.155
<b>Audits</b>	-0.365	0.134	0.487	0.057	0.156	0.095	0.671 <sup>b</sup>	-0.125	0.187	0.022	0.197	0.291	0.237
<b>Self-Reporting</b>	0.263	0.330	-0.676	0.124	0.012	-0.220	0.373	-0.143	-0.146	-0.024	0.036	0.899	0.203
<b>Ethics Guide</b>	0.035	-0.028	0.273	-0.070	-0.026	0.410	0.494 <sup>b</sup>	0.183	0.028	0.021	0.077	0.553	0.126
<b>Ethics Distinct</b>	-0.049	-0.072	0.238	-0.026	-0.213	0.202	0.254	-0.070	0.221	0.258 <sup>a</sup>	0.016	0.447 <sup>a</sup>	0.162
<b>Super. Asked</b>	-0.390	0.257	-1.169 <sup>b</sup>	0.268	1.021 <sup>c</sup>	-0.711 <sup>c</sup>	-0.521 <sup>b</sup>	-0.656 <sup>c</sup>	-0.145	0.251 <sup>b</sup>	0.136	1.906	-0.013
<b>Discharge Toxins</b>	0.627 <sup>b</sup>	-0.006	1.510 <sup>c</sup>	0.095	-0.271	1.092 <sup>c</sup>	0.805 <sup>c</sup>	1.092 <sup>c</sup>	0.168	-0.544 <sup>c</sup>	-0.069	0.180 <sup>c</sup>	0.215
<b>Hazard. Labeling</b>	0.897 <sup>c</sup>	-0.133	0.793	-0.147	- 0.480 <sup>b</sup>	0.978 <sup>c</sup>	0.498 <sup>b</sup>	0.844 <sup>c</sup>	0.203	-0.426 <sup>c</sup>	-0.267 <sup>b</sup>	0.535	0.087

	Ind. Legal Certainty	Ind. Legal Severity	Ind. Social Certainty	Ind. Social Severity	Career	Broad Morality	Social Contact	Relativism	Ethical	Desirable	Thrilling	Shame <sup>d</sup>	Shame Severity
<b>Years Experience</b>	0.004	-0.010	0.006	-0.033	0.007	-0.010	0.012	0.015	-0.010	0.013 <sup>a</sup>	0.009	1.038 <sup>a</sup>	-0.012
<b>Marital Binary</b>	-0.366	0.036	-0.029	-0.800 <sup>a</sup>	-0.271	-0.381	-0.235	0.365	-0.194	0.229	-0.019	0.848	-0.135
<b>Religion</b>	-0.304 <sup>b</sup>	0.149	-0.300	-0.207	0.139	0.141	-0.042	-0.102	0.075	-0.153 <sup>c</sup>	0.094	0.841	-0.144 <sup>b</sup>
<b>Coinvolved</b>	-0.014	0.012	0.205	0.074	0.028	-0.189	0.135	-0.119	-0.125	0.110	-0.175	1.035	-0.052
<b>Personexp_No</b>	-0.296	-0.349	-0.557	-0.083	-0.315	0.068	0.511	0.695	-0.010	0.065	-0.380	0.685	0.081
<b>Personexp_Yes</b>	-0.908 <sup>a</sup>	-0.505 <sup>a</sup>	-0.454	-0.477	-0.213	-0.028	0.191	0.603	-0.466 <sup>b</sup>	0.098	-0.166	0.530	-0.105
<b>Envcommit</b>	-0.624	-0.015	0.086	0.118	-0.001	-0.478	-0.519	-0.229	0.243	0.158	-0.042	1.378	-0.225
<b>Sit. Realistic</b>	0.288	0.134	0.812	1.088 <sup>a</sup>	1.279 <sup>c</sup>	0.492	-0.004	-1.025 <sup>c</sup>	-0.004	-0.132	0.154	0.393	0.595 <sup>c</sup>
<b>Upper Level</b>	0.244	-0.253	0.108	-0.069	-0.092	0.117	-0.522 <sup>b</sup>	-0.183	0.055	-0.161	0.122	1.784	-0.043
<b>Code of Ethics</b>	1.095 <sup>c</sup>	0.252	1.407 <sup>b</sup>	0.376	0.073	0.461 <sup>a</sup>	0.192	0.276	0.251	-0.131	0.200	0.480	0.122
<b>Mand. Training</b>	0.846 <sup>a</sup>	-0.539 <sup>a</sup>	0.115	-0.948	-0.467	-0.345	0.582 <sup>a</sup>	0.334	-0.014	0.461 <sup>a</sup>	0.142	1.239	-0.299
<b>Random Audits</b>	-1.267	-0.220	-0.555	-1.728	-0.587	-0.234	-0.415	0.089	0.219	0.154	-0.128	2.512	-0.314
<b>Anon. Hotline</b>	0.131	-0.064	-1.229	0.651	0.160	-0.073	-0.145	-0.754 <sup>a</sup>	-0.067	-0.292	-0.277	1.248	0.043
<b>Top Man. Ethics</b>	-0.335	0.060	0.579	0.556	-0.238	0.047	0.597 <sup>b</sup>	-0.072	0.261	-0.271 <sup>b</sup>	-0.40 <sup>c</sup>	0.515	0.098
<b>Company Policy</b>	0.386	0.037	-0.140	-0.017	-0.057	-0.458	-0.641 <sup>b</sup>	-0.245	-0.231	-0.2020	0.115	2.662	0.042
<b>Size</b>	-0.003 <sup>c</sup>	-0.001	-0.001	0.001	0.000	-0.000	-0.000	-0.000	-0.004 <sup>c</sup>	-0.001 <sup>a</sup>	0.000	1.002	0.000

<sup>a</sup> $p < 0.10$ , <sup>b</sup> $p < 0.05$ , <sup>c</sup> $p < 0.001$

<sup>d</sup>Note: these results are reported as Odds Ratios, due to the dichotomous dependent variable and the need to run logistic regression

**Table 11: Regression of Individual-level Rational Choice Measures on Firm-Level Measures (Offending Scenarios, no Criminal Severity Scale) (N = 879)**

	Ind. Legal Certainty	Ind. Legal Severity	Ind. Social Certainty	Ind. Social Severity	Career	Broad Morality	Social Contact	Relativism	Ethical	Desirable	Thrilling	Shame <sup>d</sup>	Shame Severity
<b>Firm Legal Certainty</b>	6.702 <sup>c</sup>	-0.008	1.017 <sup>c</sup>	-0.114	0.161	0.243 <sup>a</sup>	0.119	0.154	0.075	0.004	-0.055	0.930	-0.017
<b>Firm Legal Severity</b>	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>Firm Social</b>	0.084	0.010	1.874 <sup>c</sup>	0.177	-	0.098	0.082	0.265 <sup>c</sup>	0.039	-0.088 <sup>c</sup>	0.016	0.822 <sup>b</sup>	0.001

	Ind. Legal Certainty	Ind. Legal Severity	Ind. Social Certainty	Ind. Social Severity	Career	Broad Morality	Social Contact	Relativism	Ethical	Desirable	Thrilling	Shame <sup>d</sup>	Shame Severity
<b>Certainty</b>					0.192 <sup>c</sup>								
<b>Firm Social Severity</b>	0.152	0.430 <sup>c</sup>	0.450 <sup>c</sup>	1.779 <sup>c</sup>	-	0.280 <sup>c</sup>	0.224 <sup>c</sup>	0.240 <sup>c</sup>	0.075 <sup>b</sup>	-0.093 <sup>b</sup>	-0.022	0.731 <sup>c</sup>	0.525 <sup>c</sup>
<b>Mandated</b>	0.025	0.185	0.098	-0.252	-0.101	-0.052	-0.308	-0.040	-0.131	0.084	0.006	1.475	-0.032
<b>Public</b>	-0.502 <sup>a</sup>	-0.236	0.217	-0.036	-0.062	-0.006	-0.160	-0.091	0.017	-0.045	-0.094	0.567	-0.033
<b>Foreign Comp.</b>	-0.650 <sup>b</sup>	0.041	-0.152	0.279	0.113	0.082	-0.089	-0.351	0.194	0.057	-0.233 <sup>a</sup>	0.914	0.049
<b>Econ. Healthy</b>	-0.511	0.104	0.665	0.620	-	0.084	0.092	0.001	-0.067	-0.104	-0.196	1.382	0.155
<b>Strengthen Comp.</b>	-0.209	0.225	0.272	0.503	0.248	0.394 <sup>a</sup>	0.177	0.078	0.200	-0.226 <sup>b</sup>	-0.083	0.647	0.114
<b>Green Market.</b>	0.136	0.151	0.456	-0.059	0.233	-0.088	0.280	0.236	0.138	-0.037	-0.052	0.868	0.274 <sup>b</sup>
<b>Declining Rev.</b>	0.215	-0.084	-0.308	-0.188	-0.160	0.048	-0.140	0.348 <sup>a</sup>	0.018	0.048	-0.175	0.656	-0.001
<b>Common Firm</b>	-0.425	-0.136	0.191	-0.013	0.227	0.297	-0.262	-0.311	-	-0.033	0.123	0.993	-0.078
<b>Common Ind.</b>	-0.128	-0.157	-0.200	-0.212	0.316	-0.121	-0.153	-0.469 <sup>a</sup>	-0.116	0.022	0.044	0.871	-0.010
<b>Exceed Standards</b>	-0.126	-0.060	-0.307	0.019	0.110	-0.286	-0.112	-0.007	-0.367	0.216 <sup>a</sup>	0.068	1.769	-0.220 <sup>a</sup>
<b>Met Standards</b>	-0.066	0.149	0.208	-0.125	0.136	-0.467 <sup>a</sup>	0.149	-0.134	-0.099	0.317 <sup>b</sup>	0.020	1.458	-0.114
<b>Voluntary Participant</b>	0.021	-0.099	-0.335	-0.131	-0.263	-0.070	0.307	0.007	0.247	-0.079	0.097	1.207	-0.111
<b>Fired</b>	-0.002	-0.275	0.545	-0.274	0.112	-0.155	-0.274	0.129	-0.137	0.010	0.006	0.976	-0.062
<b>Reprimanded</b>	-0.188	-0.235	0.721	-0.385	-0.157	0.219	0.293	0.155	-0.138	-0.111	0.092	0.759	-0.085
<b>Hotline</b>	-0.209	0.010	0.038	0.235	0.210	0.030	0.380	-0.057	0.051	0.061	-0.002	1.569	0.110
<b>Ethics Code</b>	0.100	0.245	-0.412	-0.084	0.525 <sup>a</sup>	0.531 <sup>a</sup>	0.712 <sup>b</sup>	0.134	0.337 <sup>a</sup>	-0.040	0.166	0.223 <sup>a</sup>	0.110
<b>Audits</b>	-0.393	0.037	0.454	-0.060	0.190	0.079	0.658 <sup>b</sup>	-0.142	0.190	0.024	0.203	0.296	0.213
<b>Self-Reporting</b>	0.225	0.208	-0.757	-0.190	0.053	-0.268	0.336	-0.186	-0.154	-0.010	0.043	1.018	0.117
<b>Ethics Guide</b>	0.016	-0.088	0.225	-0.258	-0.005	0.382	0.471 <sup>a</sup>	0.158	0.022	0.030	0.080	0.596	0.073
<b>Ethics Distinct</b>	-0.021	0.011	0.295	0.195	-0.243	0.236	0.282	-0.039	0.227	0.248 <sup>a</sup>	0.012	0.479	0.222
<b>Super. Asked</b>	-0.394	0.230	-1.117 <sup>b</sup>	0.491	1.030 <sup>c</sup>	-0.67 <sup>c</sup>	-0.492 <sup>b</sup>	-0.628 <sup>c</sup>	-0.125	0.235 <sup>b</sup>	0.137	1.907	0.065
<b>Discharge Toxins</b>	0.628 <sup>b</sup>	-0.018	1.561 <sup>c</sup>	0.311	-0.268	1.129 <sup>c</sup>	0.834 <sup>c</sup>	1.119 <sup>c</sup>	0.185	-0.558 <sup>c</sup>	-0.068	0.152 <sup>c</sup>	0.288 <sup>b</sup>
<b>Hazard. Labeling</b>	0.874 <sup>c</sup>	-0.207	0.755	-0.295	-	0.956 <sup>c</sup>	0.481 <sup>b</sup>	0.823 <sup>c</sup>	0.202	-0.420 <sup>c</sup>	-0.263 <sup>b</sup>	0.567	0.050
<b>Years Experience</b>	0.003	-0.014	0.008	-0.027	0.008	-0.009	0.013	0.015	-0.009	0.013 <sup>a</sup>	0.010	1.029	-0.009
<b>Marital Binary</b>	-0.346	0.101	0.012	-0.639	-0.294	-0.357	-0.215	0.387	-0.191	0.222	-0.023	0.824	-0.092
<b>Religion</b>	-0.293 <sup>b</sup>	0.178 <sup>a</sup>	-0.264	-0.062	0.128	0.163	-0.024	-0.083	0.082	-0.161 <sup>c</sup>	0.092	0.774	-0.101 <sup>a</sup>
<b>Coinvolved</b>	-0.002	0.045	0.236	0.201	0.016	-0.170	0.151	-0.102	-0.120	0.103	-0.177	1.030	-0.015
<b>Personexp_No</b>	-0.358	-0.535 <sup>a</sup>	-0.698	-0.627	-0.249	-0.017	0.443	0.619	-0.026	0.092	-0.370	0.676	-0.071
<b>Personexp_Ye</b>	-0.962 <sup>a</sup>	-0.663 <sup>b</sup>	-0.572	-0.929	-0.157	-0.099	0.135	0.539	-	0.120	-0.158	0.516	-0.230

	Ind. Legal Certainty	Ind. Legal Severity	Ind. Social Certainty	Ind. Social Severity	Career	Broad Morality	Social Contact	Relativism	Ethical	Desirable	Thrilling	Shame <sup>d</sup>	Shame Severity
<b>s</b>									0.479 <sup>b</sup>				
<b>Envcommit</b>	-0.635	-0.049	0.078	0.101	0.011	-0.479	-0.520	-0.233	0.246	0.158	-0.040	1.377	-0.225
<b>Sit. Realistic</b>	0.216	-0.084	0.668	0.542	1.357 <sup>c</sup>	0.409	-0.072	-1.102 <sup>c</sup>	-0.016	-0.107	0.165	0.380 <sup>a</sup>	0.447 <sup>b</sup>
<b>Upper Level</b>	0.245	-0.259	0.134	0.037	-0.091	0.134	-0.508 <sup>b</sup>	-0.169	0.063	-0.168	0.122	1.782	-0.007
<b>Code of Ethics</b>	1.060 <sup>c</sup>	0.151	1.310 <sup>b</sup>	-0.010	0.110	0.400	0.144	0.224	0.235	-0.111	0.205	0.509	0.009
<b>Mand. Training</b>	0.843 <sup>a</sup>	-0.560	0.118	-0.941 <sup>a</sup>	-0.461	-0.341	0.583 <sup>a</sup>	0.334	-0.011	0.459 <sup>b</sup>	0.143	1.057	-0.293
<b>Random Audits</b>	-1.216	-0.079	-0.407	-1.137	-0.636	-0.141	-0.341	0.169	0.243	0.124	-0.135	2.059	-0.138
<b>Anon. Hotline</b>	0.130	-0.064	-1.234	0.634	0.161	-0.076	-0.147	-0.757 <sup>a</sup>	-0.068	-0.291	-0.277	1.330	0.037
<b>Top Man. Ethics</b>	-0.306	0.155	0.625	0.726 <sup>a</sup>	-0.272	0.071	0.617 <sup>b</sup>	-0.047	0.262	-0.277 <sup>b</sup>	-0.41 <sup>c</sup>	0.510	0.140
<b>Company Policy</b>	0.391	0.062	-0.149	-0.055	-0.066	-0.466 <sup>a</sup>	-0.647 <sup>b</sup>	-0.249	-0.237	-0.198	0.113	2.848 <sup>a</sup>	0.025
<b>Size</b>	-0.003 <sup>c</sup>	-0.001 <sup>a</sup>	-0.001	-0.000	0.000	-0.000	-0.000	-0.000	-0.004 <sup>c</sup>	-0.000	0.000	1.003	-0.000

<sup>a</sup> $p < 0.10$ , <sup>b</sup> $p < 0.05$ , <sup>c</sup> $p < 0.001$

<sup>d</sup>Note: these results are reported as Odds Ratios, due to the dichotomous dependent variable and the need to run logistic regression

**Table 12: Regression of Individual-level Rational Choice Measures on Firm-Level Measures (Overcompliance Scenarios) (N = 586)**

	Ind. Social Certainty (Over)	Ind. Social Benefits	Career	Broad Morality	Social Contract	Relativism	Ethical	Desirable	Thrilling	Feel Good <sup>d</sup>	Pride <sup>d</sup>
<b>Firm Social Certainty (OVER)</b>	1.977 <sup>c</sup>	0.298 <sup>b</sup>	0.384 <sup>c</sup>	-0.685 <sup>c</sup>	-0.259 <sup>c</sup>	-0.237 <sup>c</sup>	-0.177 <sup>c</sup>	0.425 <sup>c</sup>	0.403 <sup>c</sup>	1.720 <sup>c</sup>	1.595 <sup>c</sup>
<b>Firm Social Rewards</b>	0.673 <sup>c</sup>	3.119 <sup>c</sup>	0.113 <sup>b</sup>	-1.045 <sup>c</sup>	-0.356 <sup>c</sup>	-0.193 <sup>c</sup>	-0.198 <sup>c</sup>	0.321 <sup>c</sup>	0.220 <sup>c</sup>	1.373 <sup>c</sup>	1.334 <sup>c</sup>
<b>Mandated Public</b>	-1.159 <sup>b</sup>	-0.092	-0.321	0.934 <sup>b</sup>	0.000	0.426 <sup>a</sup>	-0.013	-0.347	0.080	-0.506 <sup>b</sup>	0.603 <sup>b</sup>
<b>Foreign Comp.</b>	-0.913 <sup>a</sup>	-0.413	-0.227	0.076	0.416	0.162	-0.085	0.071	0.043	0.928	-0.535 <sup>b</sup>
<b>Econ. Healthy</b>	-0.060	-0.104	-0.065	-0.181	0.077	0.055	-0.221	-0.025	-0.306	1.367	0.955
<b>Strengthens Comp.</b>	0.864	-0.371	-0.078	-0.275	-0.186	0.071	-0.172	0.231	0.073	1.605	1.296
<b>Green Market.</b>	1.326 <sup>b</sup>	0.424	0.527 <sup>b</sup>	-0.447	-0.417	-0.235	-0.019	0.358	0.882 <sup>c</sup>	2.027 <sup>b</sup>	1.986 <sup>b</sup>
<b>Declining Rev.</b>	-0.241	0.089	-0.115	0.163	-0.048	-0.032	0.223	-0.030	-0.205	1.444	0.741
<b>Common Firm</b>	0.400	0.534	-0.316	-0.457	-0.108	0.170	-0.124	0.212	0.148	1.067	1.400
	0.062	-0.231	-0.027	-0.775	-0.240	-0.779 <sup>b</sup>	-0.243	0.349	-0.553 <sup>a</sup>	1.154	0.779

	Ind. Social Certainty (Over)	Ind. Social Benefits	Career	Broad Morality	Social Contract	Relativism	Ethical	Desirable	Thrilling	Feel Good <sup>d</sup>	Pride <sup>d</sup>
<b>Common Ind.</b>	0.763	0.803	0.354	-0.823	-0.315	-0.692 <sup>b</sup>	-0.178	0.190	0.026	1.780	1.027
<b>Exceed Standards</b>	0.891	0.265	-0.124	-0.133	-0.783 <sup>b</sup>	-0.316	-0.153	0.692 <sup>c</sup>	-0.336	1.999 <sup>a</sup>	1.262
<b>Met Standards</b>	0.875	-0.175	0.103	0.645	-0.056	-0.317	0.073	-0.036	-0.148	0.634	1.162
<b>Voluntary Participant</b>	-0.360	-0.015	0.275	-0.041	-0.286	-0.266	-0.052	0.056	-0.053	0.948	1.008
<b>Fired</b>	0.077	0.585	0.098	0.306	-0.795 <sup>b</sup>	-0.266	0.051	0.114	-0.104	0.545	0.630
<b>Reprimanded</b>	0.599	0.506	0.426 <sup>a</sup>	-0.292	-0.397	-0.236	0.060	0.210	0.450	0.908	1.579
<b>Hotline</b>	0.422	0.640	0.063	1.108	-0.277	0.302	-0.065	-0.339	-0.286	0.568	0.844
<b>Ethics Code</b>	-0.536	0.396	-0.054	0.700	-0.666	0.408	-0.326	-0.057	0.052	1.056	0.569
<b>Audits</b>	-0.059	1.215	0.402	1.198 <sup>a</sup>	-0.550	0.253	-0.139	0.184	-0.006	0.563	0.566
<b>Self-Reporting</b>	0.306	-0.139	-0.173	1.240 <sup>a</sup>	-0.265	0.084	0.279	-0.323	-0.101	0.704	0.665
<b>Ethics Guide</b>	0.402	0.249	0.190	-0.426	-0.199	-0.484	-0.330 <sup>a</sup>	0.150	0.190	0.854	1.290
<b>Ethics Distinct</b>	0.172	-0.266	-0.095	0.425	0.178	0.189	-0.084	-0.162	-0.015	1.393	0.755
<b>Super. Asked</b>	0.292	-0.707	0.688 <sup>c</sup>	-1.676 <sup>c</sup>	-1.112 <sup>c</sup>	-1.332 <sup>c</sup>	-0.400	0.347	0.141	1.393	0.687
<b>Pollution 40%</b>	0.600	0.694 <sup>a</sup>	0.224	1.756 <sup>c</sup>	0.635 <sup>b</sup>	0.871 <sup>c</sup>	0.237	-0.366 <sup>a</sup>	0.843 <sup>c</sup>	0.375 <sup>c</sup>	0.783
<b>Years Experience</b>	0.043	-0.043 <sup>a</sup>	0.001	0.027	0.008	-0.005	0.011	-0.018 <sup>a</sup>	-0.020	0.985	0.979
<b>Marital Binary</b>	0.113	-0.274	0.080	-0.338	-0.126	-0.281	0.165	0.426	-0.260	1.196	0.877
<b>Religion</b>	0.144	0.379 <sup>a</sup>	0.036	-0.759 <sup>c</sup>	-0.296 <sup>b</sup>	-0.265 <sup>b</sup>	-0.087	0.253 <sup>b</sup>	-0.019	1.375 <sup>b</sup>	1.186
<b>Coinvolved</b>	-0.940	0.504	-0.198	-0.878	-0.586 <sup>a</sup>	-0.195	-0.387 <sup>a</sup>	0.280	0.115	1.589	1.820 <sup>a</sup>
<b>Personexp_No</b>	0.802	0.171	-0.102	-0.144	0.312	0.478	-0.081	-0.067	-0.684	0.829	0.758
<b>Personexp_Yes</b>	0.311	-0.273	-0.388	-0.385	0.059	0.327	-0.363	-0.041	-0.319	0.929	0.838
<b>Envcommit</b>	-2.117 <sup>c</sup>	-0.217	-0.290	0.079	0.218	0.614 <sup>a</sup>	-0.363 <sup>a</sup>	0.201	0.245	0.843	1.324
<b>Sit. Realistic</b>	2.083 <sup>c</sup>	-0.313	1.097 <sup>c</sup>	-0.073	0.306	-0.978 <sup>c</sup>	0.136	0.286	0.127	1.742 <sup>a</sup>	2.058 <sup>b</sup>
<b>Upper Level</b>	0.525	-0.092	0.033	-0.391	-0.246	-0.080	0.013	0.427 <sup>a</sup>	0.162	1.120	1.512
<b>Code of Ethics</b>	-0.343	-1.024 <sup>a</sup>	0.113	0.284	0.376	0.324	-0.001	-0.214	0.110	0.924	1.258
<b>Mand. Training</b>	0.151	-0.223	-0.168	-0.884	-0.157	-0.547	-0.420 <sup>a</sup>	-0.182	-0.272	2.099	0.877
<b>Random Audits</b>	-1.475	-2.442	-0.054	-1.060	-0.153	-0.149	-0.680	-0.095	-0.592	0.924	0.488
<b>Anon. Hotline</b>	-1.121	-0.569	-0.359	2.043 <sup>b</sup>	1.118 <sup>a</sup>	1.037 <sup>a</sup>	0.439	-0.210	-0.021	0.368	0.683
<b>Top Man. Ethics</b>	-0.044	0.208	0.022	0.280	-0.225	0.083	0.129	-0.056	-0.023	0.914	0.900
<b>Company Policy</b>	0.477	0.171	0.377	0.036	-0.081	-0.383	0.289	0.104	-0.192	0.807	0.607
<b>Size</b>	-0.003	0.010 <sup>b</sup>	-0.007 <sup>c</sup>	-0.003	-0.010 <sup>c</sup>	-0.001	-0.002	0.001	-0.000	1.001	0.002

<sup>a</sup> $p < 0.10$ , <sup>b</sup> $p < 0.05$ , <sup>c</sup> $p < 0.001$

<sup>d</sup>Note: these results are reported as Odds Ratios, due to the dichotomous dependent variable and the need to run logistic regression

#### **Hypothesis 4 results**

Hypothesis 4 predicted that individual-level RCT measures predict offending and overcompliance intentions, and also that the impact of the corporate-level variables become weaker when individual-level measures are included.

#### *Offending Scenarios*

Table 13 shows the model for the offending behaviors that include only the individual-level (and control) variables in the first column. In this model, perceptions that engaging in the behavior would benefit one's career, that the behavior is desirable, and that the behavior is thrilling all increase the likelihood of offending (by 12.6%, 19.6%, and 21.5%, respectively). Perceptions that the behavior is generally immoral significantly decrease the likelihood of offending by 55.3%.

Models 2 and 3 are merely duplicates of the Hypothesis 2 analyses—they are presented here to more easily compare them to the full model. As mentioned above, I expected the magnitudes of the firm-level variables to decrease when adding in the individual-level considerations. This is generally supported in that the perceptions of firm-level criminal severity, reputational certainty/severity, and being asked by a supervisor are all reduced to non-significance. What is interesting is that the *certainty* of firm-level legal sanctions becomes significant in the full model and increases the likelihood of offending. This positive association appears to be driven by the certainty of the firm being sued (analyses not shown); perhaps, after accounting for potential individual-level consequences, being sued is seen as a form of payment that makes offending more acceptable. Alternatively, this relationship is one that is subject to

temporal confusion—it may be that respondents who say that they are more likely to offend *then* predict a higher likelihood of legal sanctions against the corporation.

Also noteworthy is that the individual-level legal sanctions certainty variable also becomes significant in the full model, but has a deterrent effect. The two legal certainty variables are highly correlated, but multicollinearity doesn't seem to be problem here according to standard tests (Williams, n.d.): none of the VIFs in the regression model are above 5, both of the variables are statistically significant (meaning that their standard errors are not likely to be inflated), and when I ran the regressions on different subsamples and dropping various measures from the models the coefficients of the legal certainty variables are consistent. In fact, when I drop either of the legal certainty variables from the model the remaining variable becomes non-significant which omplies that dropping one of the variables results in omitted variable bias. The main indication of collinearity is that the correlation between estimated coefficients is above .8.

Although the two measures are highly correlated, they are theoretically distinct (an argument supported by the factor analysis methods employed to create the scales). Since they exhibit consistent effects even under different regression models, I'm confident in these results. However, it will be important to test these relationships again using different methods and samples to determine the consistency of this finding.

**Table 13: Regression of Offending Intentions on Individual-Level and Firm-Level Factors (N = 879)**

	<b>Variable Name</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
<b>RCT Measures</b>	Ind. Legal Certainty	0.985			0.716*	0.716*
	Ind. Legal Severity	0.888			0.905	0.882
	Ind. Social Certainty	0.923			0.879	0.864
	Ind. Social Severity	0.998			1.023	1.095
	Career	1.126***			1.101***	1.102***
	Broad Morality	0.447***			0.422***	0.419***

	<b>Variable Name</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
	Social Contract	0.885			0.887	0.890
	Relativist	0.888			0.881	0.891
	Ethical	0.932			0.947	0.950
	Desirable	1.196**			1.221**	1.224**
	Thrilling	1.215***			1.206***	1.209***
	Shame	0.512			0.464	0.486
	Shame Severity	1.030			1.048	1.063
Legal License	Firm Legal Certainty		1.035	1.044	1.454**	1.468**
	Firm Legal Severity		0.798**	--	0.930	--
Social License	Firm Rep. Certainty		0.909**	0.916**	0.999	1.007
	Firm Rep. Severity		--	0.899***	--	0.933
	Mandated		1.034	1.030	1.015	1.019
Economic License	Public		0.893	0.874	0.863	0.858
	Foreign Comp.		0.878	0.885	0.850	0.853
	Econ. Healthy		0.769	0.787	0.833	0.830
	Strengthen Comp.		1.177	1.173	1.395*	1.396*
	Green Market.		0.927	0.928	0.926	0.924
Corporate Culture	Declining Rev.		0.936	0.929	1.035	1.035
	Common Firm		1.258	1.277	1.336	1.345
	Common Ind.		1.212	1.218	1.136	1.143
	Exceed Standards		1.270	1.271	1.140	1.143
	Met Standards		0.950	0.956	0.834	0.838
	Voluntary Participant		0.824	0.828	0.808	0.810
	Fired		1.132	1.136	1.102	1.098
	Reprimanded		1.165	1.164	1.248	1.248
	Hotline		1.188	1.220	1.369	1.371
	Ethics Code		0.942	0.953	1.151	1.156
	Audits		1.342	1.357	1.436	1.436
	Self-Reporting		1.098	1.123	1.126	1.137
	Ethics Guide		1.164	1.180	1.283	1.295
	Ethics Distinct		0.832	0.822	0.791	0.787
	Super. Asked		1.708***	1.685***	1.262	1.241
Controls	Discharge Toxins	0.404***	0.311***	0.306***	0.402***	0.396***
	Hazard. Labeling	0.584***	0.430***	0.433***	0.576***	0.576***
	Years Experience	0.999	1.005	1.004	1.000	1.000
	Marital Binary	1.553*	1.660**	1.638**	1.696**	1.708**
	Religion	0.989	0.998	0.988	0.991	0.992
	Coinvolved	0.860	0.866	0.856	0.819	0.814
	Personexp_No	1.370	1.185	1.225	1.420	1.447
	Personexp_Yes	0.989	1.045	1.075	1.054	1.078
	Envcommit	1.644*	1.745**	1.755**	1.666*	1.663*
	Sit. Realistic	1.241	1.366	1.400	1.267	1.273

	<b>Variable Name</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
	Upper Level	0.936	0.977	0.974	0.956	0.950
	Code of Ethics	0.984	0.960	0.983	1.038	1.052
	Mand. Training	0.884	0.958	0.952	0.914	0.916
	Random Audits	0.743	0.665	0.637	0.657	0.651
	Anon. Hotline	0.867	0.857	0.858	0.912	0.9909
	Top Man. Ethics	0.944	0.708*	0.703*	0.878	0.870
	Company Policy	1.463*	1.509**	1.515**	1.438	1.437
	Size	1.003***	1.002**	1.002**	1.002**	1.002**

*N* = 879 (after imputation)

\**p*<0.10, \*\**p*<0.05, \*\*\**p*<0.001

### *Overcompliance Scenarios*

Table 14 depicts the results of the regression of overcompliance on the individual-level rational choice variables and controls alone in the first column, the results of the hypothesis 2 tests examining all of the corporate-level variables, and then the results for the full regression model that includes all of the individual- and corporate-level variables of interest.

A few individual-level variables impact overcompliance behaviors. Perceived career benefits, the thrill of the behavior and the likelihood of feeling good all increase the likelihood of overcompliance (by 1.41%, 0.97%, and 9.09%, respectively) while perceiving the behavior as generally immoral, culturally and traditionally unacceptable, and unethical decreases the likelihood of overcompliance (by 12.66%, 2.36%, 1.20% respectively). Counterintuitively, the likelihood of feeling pride decreases the likelihood of overcompliance as well. It may be that overcompliance is thought to be an altruistic behavior, while feelings of “pride” are associated with self-interest.

When comparing the full model to the model from hypothesis 2, we find support for the second part of hypothesis 4. The impact of firm reputational benefits and mandating public information become non-significant and the magnitudes of the other

corporate-level variables are reduced. Overall, it seems that hypothesis 4 receives support in the overcompliance scenarios.

**Table 14: Regression of Overcompliance Intentions on Individual-Level and Firm-Level Factors (N = 586)**

	<u>Variable Name</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
RCT Measures	Ind. Social Certainty (OVER)	-0.018		-0.099
	Ind. Social Rewards	0.073		0.123
	Career	0.141***		0.114***
	Broad Morality	-1.266***		-1.167***
	Social Contract	-0.077		-0.069
	Relativist	-0.236*		-0.139
	Ethical	-0.120*		-0.101
	Desirable	0.049		0.046
	Thrilling	0.097***		0.100***
	Feel Good	0.909**		0.856*
Pride	-0.702**		-0.644**	
Social License	Firm Social Certainty (OVER)		0.326***	0.078
	Firm Social Rewards		0.308***	0.007
	Mandated		-0.415**	-0.194
	Public		-0.193	-0.197
Economic License	Foreign Comp.		0.211	0.189
	Econ. Healthy		0.214	0.143
	Strengthens Comp.		0.083	-0.177
	Green Market.		-0.204	-0.159
	Declining Rev.		0.147	0.089
Corporate Culture	Common Firm		0.599**	0.400**
	Common Ind.		0.484*	0.199
	Exceed Standards		-0.089	-0.148
	Met Standards		-0.486**	-0.309*
	Voluntary Participant		0.036	-0.020
	Fired		0.150	0.165
	Reprimanded		0.143	0.006
	Hotline		-0.403	-0.141
	Ethics Code		-0.241	-0.194
	Audits		-0.120	0.013
	Self-Reporting		-0.202	0.095
	Ethics Guide		0.220	0.060
	Ethics Distinct		-0.221	-0.123
Super. Asked		1.458***	0.905***	
	Pollution 40%	-0.437***	-0.847***	-0.512***

	<u>Variable Name</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
Controls	Years Experience	0.001	-0.008	0.002
	Marital Binary	0.232	0.278	0.200
	Religion	0.023	0.245**	0.060
	Coinvolved	-0.067	0.173	-0.029
	Personexp_No	-0.319	-0.318	-0.230
	Personexp_Yes	-0.496*	-0.404	-0.411
	Envcommit	0.016	-0.061	-0.044
	Sit. Realistic	0.408*	0.466*	0.312
	Upper Level	0.023	0.102	0.013
	Code of Ethics	0.093	-0.143	-0.044
	Mand. Training	0.218	0.599*	0.374
	Random Audits	1.200**	1.563***	1.319***
	Anon. Hotline	-0.805**	-1.565***	-0.992***
	Top Man. Ethics	-0.180	-0.144	-0.086
	Company Policy	-0.002	0.080	0.064
Size	-0.002	-0.001	-0.002	

*N* = 586 (after imputation)

\**p*<0.10, \*\**p*<0.05, \*\*\**p*<0.001

#### d. Hypothesis 5 results

Hypothesis 5 argued that the predictors of offending will be the same as the predictors of overcompliance. Since I am comparing models that differ in terms of sample size, the number of measures in the regression model, and the operationalization of the dependent variable, I standardized the regression coefficients. In the case of scales that had been standardized in previous models, I used the original values when calculating the coefficients for this table.

Looking only at statistical significance, Hypothesis 5 appears to receive some support at the individual level (see Table 15); both offending and overcompliance are predicted by perceptions of career benefits, perceptions that the behavior is generally immoral, and perceptions that the behavior would be thrilling to engage in. Perceptions of the behavior as desirable uniquely predict offending but not overcompliance while perceptions of how the

behavior makes you feel about yourself predict overcompliance but not offending. However, when one examines the magnitudes of the coefficients, the strength of the effects differ by the two behaviors—most of the rational choice variables have a larger influence on offending, but the impact of social consequences and the social contract morality scale are more important for overcompliance.

Contrary to the hypothesis, the significant firm-level predictors differ for the two types of behaviors. For offending, the certainty of legal sanctions increases the likelihood of offending, as does the vignette dimension that the behavior will strengthen the firm's competitive position. No measures of corporate culture impact offending intentions, but are the only relevant variables for overcompliance—when the behavior is depicted as being common in the firm, when the firm has previously violated vs. met standards, and when the hypothetical manager has been asked to engage in the behavior, overcompliance becomes more likely. Looking at the magnitudes of the coefficients, it is interesting that although the corporate culture variables are statistically significant in the overcompliance behaviors their magnitudes are actually smaller than the corresponding coefficients in the offending model. This implies that corporate culture may not have much of an impact on either behavior when individual-level variables are included. In fact, the strength of the firm-level variables seems to be bigger for the offending variables generally.

The control variables also differ between the two behaviors. While the specific offense depicted predicts both types of behavior, offending is uniquely affected by the marriage status of the respondent, the environmental commitment of the respondents' company, and the size of the company. Overcompliance is uniquely predicted by whether the respondents'

company has random ethics audits or an anonymous hotline (counterintuitively, having a hotline decreases the likelihood of overcompliance).

To see whether the differences between the offending and overcompliance models were due to the overcompliance regressions lacking any measures of legal sanctions, I re-ran the offending data and dropped all measures of perceived certainty and severity of legal sanctions (Model 3 in Table 15). The results look almost identical to Model 2, with the same variables being significant. Therefore, the similarities and differences between offending and overcompliance are not necessarily explained by the omission of legal sanctions.

**Table 15: Comparing the Full Regression Models of Offending Intentions and Overcompliance Intentions, using Standardized Coefficients**

<u>Offending Variables</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>	<u>Overcompliance Variables</u>	<u>Model 4</u>
<b>Ind. Legal Certainty</b>	<b>-0.086*</b>	<b>-0.086*</b>	--		
Ind. Legal Severity	-0.076	-0.096	--		
Ind. Social Certainty	-0.031	-0.035	-0.035	Ind. Social Certainty (OVER)	-0.304
Ind. Social Severity	0.008	0.031	-0.001	Ind. Social Rewards	0.423
<b>Career</b>	<b>0.550***</b>	<b>0.551***</b>	<b>0.551***</b>	<b>Career</b>	<b>0.107***</b>
<b>Broad Morality</b>	<b>0.557***</b>	<b>0.563***</b>	<b>0.555***</b>	<b>Broad Morality</b>	<b>0.396***</b>
Social Contract	-0.078	-0.078	-0.079	Social Contract	-0.235
Relativist	-0.080	-0.071	-0.072	Relativist	-0.047
Ethical	-0.225	-0.208	-0.220	Ethical	-0.068
<b>Desirable</b>	<b>0.656**</b>	<b>0.665**</b>	<b>0.665**</b>	Desirable	0.049
<b>Thrilling</b>	<b>0.624***</b>	<b>0.624***</b>	<b>0.641***</b>	<b>Thrilling</b>	<b>0.110***</b>
Shame	-0.336	-0.316	-0.336	<b>Feel Good</b>	<b>0.115*</b>
Shame Severity	0.203	0.262	0.245	<b>Pride</b>	<b>-0.096**</b>
<b>Firm Legal Certainty</b>	<b>0.097**</b>	<b>0.099**</b>	--		
Firm Legal Severity	-0.026	--	--		
Firm Social Certainty	-0.005	0.037	0.115	Firm Social Certainty (OVER)	0.071
Firm Social Severity	--	-0.337	-0.298	Firm Social Rewards	0.006
Mandated	0.015	0.019	0.028	Mandated	-0.033

<u>Offending Variables</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>	<u>Overcompliance Variables</u>	<u>Model 4</u>
Public	-0.152	-0.158	-0.110	Public	-0.033
Foreign Comp.	-0.160	-0.156	-0.120	Foreign Comp.	0.030
Econ. Healthy	-0.174	-0.178	-0.147	Econ. Healthy	0.022
<b>Strengthen Comp.</b>	<b>0.343*</b>	<b>0.344*</b>	<b>0.350*</b>	Strengthens Comp.	-0.030
Green Market.	-0.079	-0.081	-0.111	Green Market.	-0.027
Declining Rev.	0.035	0.035	0.016	Declining Rev.	0.015
Common Firm	0.281	0.281	0.308	<b>Common Firm</b>	<b>0.065**</b>
Common Ind.	0.125	0.131	0.142	Common Ind.	0.032
Exceed Standards	0.128	0.131	0.131	Exceed Standards	-0.024
Met Standards	-0.177	-0.172	-0.177	<b>Met Standards</b>	<b>-0.048*</b>
Voluntary Participant	-0.220	-0.218	-0.218	Voluntary Participant	-0.003
Fired	0.096	0.093	0.103	Fired	0.026
Reprimanded	0.217	0.217	0.243	Reprimanded	0.001
Hotline	0.250	0.251	0.248	Hotline	-0.018
Ethics Code	0.117	0.121	0.100	Ethics Code	-0.027
Audits	0.303	0.303	0.311	Audits	0.002
Self-Reporting	0.095	0.104	0.070	Self-Reporting	0.013
Ethics Guide	0.243	0.252	0.225	Ethics Guide	0.009
Ethics Distinct	-0.225	-0.231	-0.246	Ethics Distinct	-0.020
Super. Asked	0.240	0.223	0.241	<b>Super. Asked</b>	<b>0.153***</b>
<b>Discharge Toxins</b>	<b>0.892***</b>	<b>0.907***</b>	<b>0.899***</b>	<b>Pollution 40</b>	<b>0.087***</b>
<b>Hazard. Labeling</b>	<b>0.528***</b>	<b>0.528***</b>	<b>0.545***</b>		
Years Experience	-0.022	-0.009	0.004	Years Experience	0.007
<b>Marital Binary</b>	<b>0.451**</b>	<b>0.457**</b>	<b>0.440**</b>	Marital Binary	0.027
Religion	-0.022	-0.020	-0.020	Religion	0.024
Coinvolved	-0.205	-0.210	-0.199	Coinvolved	-0.005
Personexp_No	0.349	0.368	0.387	Personexp_No	-0.037
Personexp_Yes	0.054	0.077	0.121	Personexp_Yes	-0.069
<b>Envcommit</b>	<b>0.426*</b>	<b>0.424*</b>	<b>0.436*</b>	Envcommit	-0.006
Sit. Realistic	0.171	0.173	0.176	Sit. Realistic	0.044
Upper Level	-0.046	-0.054	-0.056	Upper Level	0.002
Code of Ethics	0.038	0.051	0.011	Code of Ethics	-0.007
Mand. Training	-0.074	-0.074	-0.091	Mand. Training	0.052
Random Audits	-0.148	-0.148	-0.137	<b>Random Audits</b>	<b>0.091***</b>
Anon. Hotline	-0.064	-0.066	-0.072	<b>Anon. Hotline</b>	<b>0.113***</b>
Top Man. Ethics	0.135	-0.143	-0.126	Top Man. Ethics	-0.015
Company Policy	0.351	0.351	0.344	Company Policy	0.010
<b>Size</b>	<b>0.317**</b>	<b>0.317**</b>	<b>0.475**</b>	Size	-0.022

$N = 879$  (after imputation) for Models 1 – 3,  $N = 586$  (after imputation) for Model 4.

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.001$

**e. Summary of Results of the Vignette Survey**

Overall, the tests of the vignette data showed some support for the propositions put forth in the integrated theory of corporate environmental behavior. Table 16 summarizes which hypotheses (and subcomponents) received support.

The tests of Hypothesis 1 received support in the offending scenarios such that increasing the perceived severity of firm legal sanctions and the certainty/severity of firm reputational sanctions decreased offending intentions. The measures of the economic license did not impact offending intentions. In the overcompliance scenarios, Hypothesis 1 received partial support such that increasing the perceived certainty and benefit of enhancing the firm’s reputation increases the likelihood of overcompliance. However, being mandated to report pollution numbers publicly decreases the likelihood of overcompliance. Again, none of the economic license measures are statistically significant in these regressions.

**Table 16: Summary of Vignette Survey Hypothesis Tests**

<u>Hypothesis</u>	<u>Supported with Offending Data?</u>	<u>Supported with Overcompliance data?</u>
1. External Licenses predict DVs	Yes	Partially
2. Corporate Culture predict DVs	Very little support	Mixed
2b. Corp. Culture makes External License measures less salient	No	No
3. Firm-level measures predict Individual-level measures	Yes	Yes
4. Individual-level measures predict DVs	Yes	Yes
4b. Individual-level measures make Firm-level measures less salient	Partially	Yes
5. Predictors of Offending same as Overcompliance	Partially	Partially

Hypothesis 2, which examined the role of corporate culture, received little support in the offending scenarios. Only being asked by a supervisor predicted increased intentions, and adding these variables did not affect the influence of the external licenses as expected. In the overcompliance scenarios, this hypothesis received mixed support; four of the culture variables were significant, but instead of decreasing the importance of the external license measures the culture variables themselves seemed to become less important in the larger model of this regression.

Hypothesis 3 argued that the firm-level variables would predict individual-level cost/benefit perceptions. This received support in both the offending and overcompliance intentions, as each of the individual-level factors was predicted by two or more of the firm-level measures.

Hypothesis 4 predicted that the individual-level variables would impact offending and overcompliance intentions and would make the firm-level variables less salient when included in the full model. This hypothesis was supported with both the offending and overcompliance data. Offending intentions increased when career benefits, perceived desirability, and perceived thrill of the behavior increased but intentions decreased when the behavior was considered generally immoral. When the individual-level variables are included in the regression with firm-level variables, previously significant firm-level variables become nonsignificant although the impact of perceived certainty of firm-level legal sanctions becomes significant and positive. In the overcompliance scenarios, intentions increased when career benefits, perceived thrill, and the likelihood of the action making the respondent feel good increased; the likelihood of overcompliance decreased when the behavior was considered generally immoral, when it was thought to

violate traditional/cultural norms, when it was considered unethical, and then the respondent expected to feel a sense of pride as a result of engaging in overcompliance.

Hypothesis 5 argued that the variables predicting offending intentions would be similar to those predicting overcompliance intentions. When legal sanctions are included in the offending regressions, this hypothesis is fairly well supported for the individual-level variables when looking at statistically significant findings although the magnitudes of the effects appear to differ. The firm-level factors vary by the type of behavior; instrumental variables such as the certainty of legal sanctions and the likelihood of increasing the firm's competitive position predict offending intentions while corporate culture variables (the behavior being common in the firm, having previously violated standards, and being asked by a supervisor) explain overcompliance intentions. Note, however, that the corporate culture variable effects are smaller in the overcompliance regressions than they are in the offending models (despite reaching significance).

Among the control variables, it is interesting that the specific type of behavior is consistently one of the strongest predictors of both offending and overcompliance. This implies that we may need to examine models of behavior that are even more specific than the noncompliance/overcompliance dichotomy suggests.

When reviewing the results it is important to discuss the implications of using, as independent variables, randomized vignettes as opposed to survey measures. Randomized vignette dimensions provide a cleaner estimate of the relationship of interest because randomization ensures that the background characteristics of the respondent are not confounding the relationship. In the above analyses, we see that most of the significant results come from those tests using non-randomized survey questions as

predictors. Specifically, the legal license, social license, and rational choice variables were generally associated with intentions while the corporate culture and economic license measures were much less influential overall. While there may be a true relationship, the significance of these tests may also be a methodological artifact stemming from a correlational analysis as opposed to a more rigorous analysis. This also has implications for the results of the meta-analysis, as most of the studies used to calculate effect sizes use correlational data as well. It is the results of the meta-analysis that I turn to now.

### **III. Results of Meta-analysis**

As mentioned in Chapter 3, I drew on data collected for a systematic review of the literature on environmental offending in order to conduct a sensitivity test on Hypothesis 1. It is important to note that as I was coding the effect sizes and assigning them to license constructs, I found that within each of the 3 external licenses (legal, economic, and social) there were variables that seemed to represent different nuances of the licenses. As such, I wound up coding the eligible effect sizes as representing one of *six* different constructs: 1) legal license (command-and-control approach), 2) legal license (persuasive/cooperative approach), 3) legal license (resources available to regulators), 4) economic license (costs of compliance), 5) economic license (firm size/profitability), and 6) the social license. Trying to combine all of the legal and economic license variables into one effect size would have, in my opinion, overgeneralized the effect of various pressures on organizations.

The coding of articles up to 2006 gleaned 124 eligible articles containing 2,012 variables of relevance to the hypothesis 1 sensitivity analysis. However, many articles did not contain a sufficient amount of data with which to calculate effect sizes. After calculating effect sizes with the available data, I found that I had 1,152 Effect Sizes from 60 articles. Since I have multiple “dependent variables,” note that one article may provide data for more than one effect size. In fact, many articles had multiple effect sizes available within one domain; in order to avoid bias resulting from some articles having more effect sizes than others, I calculated the average effect size from each article representing each construct. After this aggregation, I had the following number of effect sizes by license:

- 1) Legal license (command-and-control): 7 ES-ds, 33 ES-rs
- 2) Legal license (cooperative): 7 ES-ds, 5 ES-s, and 1 ES-OR
- 3) Legal license (resources): 8 ES-rs
- 4) Economic license (costs of compliance): 1 ES-d, 6 ES-rs, and 1 ES-or
- 5) Economic license (size/profit): 14 ES-rs
- 6) Social license: 8 ES-ds, 11 ES-rs, and 1 ES-or

It is important to note, however, that these effect sizes often represent different units of analysis—some use individual respondents, others look at firm-level behavior, others examine environmental outcome by state, etc. Analyzing the ESs on these different units of analyses would confound the results. Since the hypothesis being tested examines only the impact of the external licenses on firm-level behavior, I decide to analyze only those effect sizes that are at the firm-level or geographic area-level of analysis. Also, since there is only one ES-or for any construct (and therefore cannot get a sense of the overall effect of the license using these ESs), I do not discuss those. This brings the number of

articles included in the meta-analysis down to 46, with the following number of effect sizes by license:

- 1) Legal license (command-and-control):
  - a. Firm level: 4 ES-ds, 20 ES-rs
  - b. Geographic areas: 7 ES-rs
- 2) Legal license (cooperative):
  - a. Firm level: 5 ES-ds
  - b. Geographic areas: 3 ES-rs
- 3) Legal license (resources):
  - a. Firm level: 4 ES-rs
  - b. Geographic areas: 3 ES-rs
- 4) Economic license (costs of compliance):
  - a. Firm level: 2 ES-rs
- 5) Economic license (size/profit):
  - a. Firm level: 14 ES-rs
- 6) Social license:
  - a. Firm level: 6 ES-ds, 8 ES-rs
  - b. Geographic areas: 3 ES-rs (from 2 studies)

Tables 17 – 22 provides the list of included articles, broken down into the 6 constructs. Within each table, I list the included articles grouped by the type of effect size and the unit of analysis (firm or geographic area). For each study, I provide the specific independent variables and outcomes that were included when calculating the effect size, the number of effect sizes averaged, and whether the data were cross-sectional or longitudinal.

**Table 17: Articles included in Effect Size Calculations for the Legal License (Command and Control) Construct**

<b>FIRM-LEVEL: ES-D</b>					
<u>Authors (Date)</u>	<u>Name of Article</u>	<u>Independent Variable</u>	<u>Outcome Variable</u>	<u>Number of ESs Averaged</u>	<u>Cross- sectional?</u>
Earnhart (2004b)	Panel data analysis of regulatory factors shaping environmental performance	1) KDHE/EPA 1-year lagged penalty	1) level of relative emissions for facility I in time period t	8	Cross-sectional
EPA (1992)	Principles of Environmental Enforcement	1) North Holland plan for permitting wrecker yards, coupled with exposition of "rules of conduct" for yards until permitting could be completed. The provincial government informed the wrecker yards in writing about the Waste Substances Act, the anticipated permit requirements, and the rules of conduct. The provincial government also established an intensive inspection	Number of Wrecker Yards in Violation of Below Requirement in North Holland: 1) Battery in wreck 2) Burning residues found 3) Incorrect battery storage 4) Incorrect disposal of used oil/hazardous waste 5) Incorrect LPG tank storage 6) No soil protection under battery storage 7) No suitable containers 8) Piles too high 9) Recent overflow 10) Wrecks littered outside of yard	11	Longitudinal

		<p>program</p> <p>2) EPA's National Municipal Policy adopted in 1984-- focused on enforcement to achieve compliance, and all municipalities expected to comply regardless of whether they had received government assistance</p>	<p>11) Number of facilities not in compliance by 1984 (control) vs. not in compliance by 1988 (TX)</p>		
Gerardu and Wasserman (1994)	Third International Conference on Environmental Enforcement	<p>1) inspections of firms to see if they are in compliance with their license</p> <p>2) inspections of facilities</p>	<p>1) Round 1 vs. Round 2: number of shortcomings which are the quality of the licenses and the compliance conduct of the licenses (p.279)</p> <p>2) Round 2 vs. Round 3: number of shortcomings which are the quality of the licenses and the compliance conduct of the licenses (p.279)</p> <p>3) percentage of facilities in</p>	3	Cross-sectional

			compliance		
Potoski and Prakash (2005)	Green clubs and voluntary governances: ISO 14001 and Firms' regulatory compliance	<ol style="list-style-type: none"> <li>1) Stringency of state hazardous air regulations</li> <li>2) Stringency of state ambient air regulations</li> <li>3) state audit protections</li> </ol>	<ol style="list-style-type: none"> <li>1) Proportion of months for which a facility was out of compliance in 2000 - 2001</li> </ol>	3	Cross-sectional
<b><u>FIRM-LEVEL: ES-R</u></b>					
<b><u>Authors (Date)</u></b>	<b><u>Name of Article</u></b>	<b><u>Independent Variable</u></b>	<b><u>Outcome Variable</u></b>	<b><u>Number of ESs Averaged</u></b>	<b><u>Cross-sectional?</u></b>
Barla (2007)	ISO 14001 Certification and Environmental Performance in Quebec's Pulp and Paper Industry	<ol style="list-style-type: none"> <li>1) Toxicity inspections by the ministry of the environment</li> </ol>	<ol style="list-style-type: none"> <li>1) BOD emissions</li> <li>2) TSS emissions</li> <li>3) Total Quantity of Rejected Water</li> </ol>	16	Cross-sectional
Earnhart (2004b) <sup>a</sup>	Panel data analysis of regulatory factors shaping environmental performance	<ol style="list-style-type: none"> <li>1) KDHE/EPA 1-year lagged penalty</li> <li>2) cumulative EPA inspections</li> <li>3) cumulative KDHE inspection</li> <li>4) annual EPA enforcement</li> <li>5) annual KDHE enforcement</li> <li>6) predicted EPA inspection</li> <li>7) predicted KDHE</li> </ol>	<ol style="list-style-type: none"> <li>2) level of relative emissions for facility I in time period t</li> </ol>	38	Cross-sectional

		inspection			
Earnhart (2004a) <sup>a</sup>	The effects of community characteristics on polluter compliance levels	<ol style="list-style-type: none"> <li>1) Annual EPA inspections of Others (general deterrence)</li> <li>2) Annual KDHE (state-level) Inspections of others (general deterrence)</li> </ol>	<ol style="list-style-type: none"> <li>1) BOD relative emissions</li> </ol>	3	Cross-sectional
Earnhart (2004c) <sup>a</sup>	Factors shaping Corporate environmental performance: regulatory pressure, community pressure, and financial status	<ol style="list-style-type: none"> <li>1) preceding 12-month cumulative EPA inspections (specific deterrence)</li> <li>2) preceding 12-month cumulative state inspections (specific deterrence)</li> <li>3) preceding 12-month cumulative EPA inspections of others (general deterrence)</li> <li>4) preceding 12-month cumulative state inspections of others (general deterrence)</li> <li>5) preceding 12-month cumulative administrative penalties</li> <li>6) preceding 12-month cumulative civil penalties</li> </ol>	<ol style="list-style-type: none"> <li>1) monthly frequency of exceeding pollution limits</li> <li>2) BOD relative emissions</li> <li>3) TSS relative emissions</li> </ol>	72	Cross-sectional

		7) annual administrative penalties against similar companies 8) annual civil penalties against similar companies			
Foulon et al. (2002)	Incentives for Pollution Control: Regulation or Information	1) Number of Prosecutions faced by a plant in a given year	1) Compliance rate for BOD 2) Compliance rate for TSS 3) Absolute level of TSS emissions 4) Absolute level of BOD emissions	16	Cross-sectional
Gibbs (2006)	Corporate Citizenship, sanctions, and environmental crime	1) Total sanctions 2) Informal sanctions 3) Formal sanctions	1) Average number of violations 2) Quality compliance ratio—Conventional pollutants 3) Quality compliance ratio—toxic pollutants 4) Concentration compliance ratio—Conventional pollutants 5) Concentration compliance ratio—Toxic pollutants	15	Cross-sectional
Gray and Shadbegian (2004/2005)	When and Why do Plants Comply? Paper Mills in the 1980s	1) log # air enforcement actions against the company	1) Whether compliant during year	8	Cross-sectional

		<ul style="list-style-type: none"> <li>2) log # air inspections against the company</li> <li>3) log # OTHER air enforcement actions against the company</li> </ul>			
Hartman et al. (1997)	Why paper mills clean up: Determinants of pollution abatement in four Asian countries	1) Strength of formal regulatory pressures affecting the survey plant, including both national and provincial regulations	1) Abatement effort score	1	Cross-sectional
Helland and Whitford (2003)	Pollution incidence and political jurisdiction: Evidence from the TRI	1) Inspection rate of firms in the state regulated under the Resource Conservation and Recovery Act	<ul style="list-style-type: none"> <li>1) Log air releases</li> <li>2) Log land emissions</li> <li>3) Log off-site transfers</li> <li>4) Log water emissions</li> </ul>	8	Cross-sectional
Huang and Miller (2006)	Citizen complaints, regulatory violations, and their implications for swine operations in Illinois	1) Number of onsite visits by EPA staff during current calendar year	1) Whether detected violation	1	Cross-sectional
Kassinis and Vafeas (2002)	Corporate boards and outside stakeholders as determinants of environmental litigation	1) Regulatory stringency as a proxy for the pressures exerted on a firm by a state's regulatory environment	1) whether company was subject to lawsuit for violating environmental law	3	Cross-sectional
LaPlante and Rilstone (1996)	Environmental inspections and emissions of the pulp	1) Inspections by the Quebec Ministry of the Environment	<ul style="list-style-type: none"> <li>1) Absolute BOD emissions</li> <li>2) Absolute TSS</li> </ul>	8	Cross-sectional

	and paper industry: The case of Quebec	(current month) 2) Inspections by the Quebec Ministry of the Environment (previous month)	emissions		
Mobus (2005)	Mandatory environmental disclosures in a legitimacy theory context	1) Mandated disclosure of environmental violations	1) Noncompliance with environmental statutes	2	Cross-sectional
Potoski and Prakash (2005)	Green clubs and voluntary governances: ISO 14001 and Firms' regulatory compliance	1) Stringency of state hazardous air regulations 2) Stringency of state ambient air regulations 3) state audit protections 4) Number of inspections 5) Number of enforcement actions 6) Dollar amount of penalties 7) State litigiousness 8) Enforcement flexibility	2) Proportion of months for which a facility was out of compliance in 2000 - 2001	5	Cross-sectional
Quimio (2001)	Environmental management systems: The motivations for adoption and the implications for toxic releases and economic	1) Civil sanctions	1) Off-site toxic emissions per dollar sales 2) On-site toxic emissions per dollar sales	4	Cross-sectional

	performance				
Rassier (2005)	Empirical essays in environmental and labor economics (First essay: do trade unions affect compliance with environmental regulation?)	<ol style="list-style-type: none"> <li>1) Cumulative federal inspections</li> <li>2) Cumulative state inspections</li> <li>3) Cumulative administrative enforcement actions</li> <li>4) Cumulative judicial enforcement actions</li> <li>5) Aggregate federal inspections</li> <li>6) Aggregate state inspections</li> <li>7) Aggregate administrative enforcement actions</li> <li>8) Aggregate judicial enforcement actions</li> </ol>	<ol style="list-style-type: none"> <li>1) Relative discharges</li> <li>2) Compliance violations</li> </ol>	96	Cross-sectional
Ringquist (1993)	Does regulation matter?: Evaluating the effects of state air pollution control programs	<ol style="list-style-type: none"> <li>1) EPA Abatements (dollar amount)</li> <li>2) EPA abatements (number of abatements)</li> <li>3) State Abatements (dollar amount)</li> <li>4) State abatements (number of abatements)</li> </ol>	<ol style="list-style-type: none"> <li>1) Changes in Atmospheric Emissions: nitrogen oxides</li> <li>2) Changes in Atmospheric Emissions: sulfur dioxide</li> </ol>	8	Cross-sectional
Shimshack and Ward (2005)	Regulator reputation, enforcement, and environmental compliance	<ol style="list-style-type: none"> <li>1) Number of informal enforcement actions against anyone</li> <li>2) Number of informal</li> </ol>	<ol style="list-style-type: none"> <li>1) Whether company was in violation this time period</li> </ol>	16	Cross-sectional

		<p>enforcement actions against company</p> <p>3) Predicted inspection probability</p> <p>4) Number of inspections</p>			
Stafford (2006)	Rational or confused polluters? Evidence from Hazardous Waste Compliance	<p>1) 5-year inspection history</p> <p>2) Company inspection history</p> <p>3) State inspections in 1998</p> <p>4) State inspection intensity in 1998</p>	1) Whether violated hazardous waste law in 1999	4	Longitudinal
Short and Toffel (2005) <sup>b</sup>	Voluntary environmental management initiatives: Smoke signals or smoke screens? (Chapter 3: Turning themselves in: Why companies disclose regulatory violations)	<p>1) RCRA inspections</p> <p>2) CAA inspections</p>	<p>1) RCRA violations</p> <p>2) CAA violations</p>	2	Cross-sectional
Toffel (2007) <sup>b</sup>	Inspection Holidays and Compliance Outcomes: Examining the Outcomes of Self-Policing	<p>1) Annual CAA inspections</p> <p>2) Annual RCRA inspections</p> <p>3) Annual RCRA-related enforcement actions</p> <p>4) Predicted probability of CAA</p>	<p>1) Clean CAA inspection</p> <p>2) Clean RCRA inspection</p>	18	Longitudinal

		inspection 5) Predicted probability of RCRA inspection			
Wisner and Epstein (2005)	"Push" and "pull" impacts of NAFTA on environmental responsiveness and performance in Mexican industry	1) Perceived regulatory influence	1) Firm's environmental performance	1	Cross-sectional
<b>GEOGRAPHIC AREA: ES-R</b>					
<b><u>Authors (Date)</u></b>	<b><u>Name of Article</u></b>	<b><u>Independent Variable</u></b>	<b><u>Outcome Variable</u></b>	<b><u>Number of ESs Averaged</u></b>	<b><u>Cross-sectional?</u></b>
Alberini and Austin (2002) <sup>c</sup>	Accidents waiting to happen: Liability policy and toxin pollution releases	1) Number of lawyers working on state minifund cases-- proxy for prosecutorial aggressiveness	1) total number of persons injured in chemical spills per state per year	3	Longitudinal
Alberini and Austin (1999) <sup>c</sup>	Strict liability as a deterrent in toxic waste management: empirical evidence from accident and spill data	1) Number of lawyers working on state minifund cases-- proxy for prosecutorial aggressiveness	1) number of spills and accidents per state per year--acids 2) number of spills and accidents per state per year—ammonia 3) number of spills and accidents per state per year--chlorine	9	Longitudinal
Ivanova (2006)	Corruption, rule of law and international interactions in	1) Strength of the legal system in the country (proxy for	1) Sulphur dioxide emissions as a share of the GDP	15	Cross-sectional

	environmental pollution and cbrn terrorism (chapter 3: corruptible inspectors and air pollution in Europe)	fine imposed on environmental violations)			
Marine Resources Assessment Group. Ltd. (2005)	Review of impacts of illegal, unreported, and unregulated fishing on developing countries	<ol style="list-style-type: none"> <li>1) Total number of environmental agreements</li> <li>2) Number of EU environmental agreements</li> </ol>	1) % IUU catch	4	Cross-sectional
Maxwell et al. (2000)	Self-regulation and social welfare: The political economy of corporate environmentalism	1) Lawyers per capita, proxy for threat of litigation	1) Change in toxicity value of pollution from 1988 to 1992	1	Longitudinal
May and Winter (1999)	Regulatory enforcement and compliance: exploring Danish agro-environmental policy	<ol style="list-style-type: none"> <li>1) Degree of coercion as a regulatory style</li> <li>2) Degree of formalism as a regulatory style</li> <li>3) Effort--percentage of farms inspected</li> <li>4) Extent of targeting for inspections</li> <li>5) Scope of inspections--range of major items inspected</li> <li>6) Use of sanction--% of inspections for which injunctions</li> </ol>	1) Inspectors' perceptions of the effectiveness of enforcement actions	7	Cross-sectional

		were issues 7) Use of sanctions--% inspections referred to police for action			
O'Toole et al. (1997)	Reducing Toxic Chemical Releases and Transfers: Explaining Outcomes for a Voluntary Program	1) State Stringency regarding toxic pollutants	1) Relative Change in the release of 17 chemicals	2	Cross-sectional
Wenner (1971)	Enforcement of water pollution control law	1) Enforcement 2) Strictness of law	1) Improvement in Water Quality	2	Cross-sectional

<sup>a</sup>The studies by Earnhart listed here are different studies, but use the same dataset. As such, the effect sizes from each study are pulled together to avoid problems with non-independent effect sizes.

<sup>b</sup>The studies by Toffel and Short listed here are different studies, but use the same dataset. As such, the effect sizes from each study are pulled together to avoid problems with non-independent effect sizes.

<sup>c</sup>The studies by Alberini and Austin listed here are different studies, but use the same dataset. As such, the effect sizes from each study are pulled together to avoid problems with non-independent effect sizes.

**Table 18: Articles included in Effect Size Calculations for the Legal License (Persuasion/Cooperation) Construct**

<b>FIRM LEVEL ES-DS</b>					
<u>Authors (Date)</u>	<u>Name of Article</u>	<u>Independent Variable</u>	<u>Outcome Variable</u>	<u>Number of ESs Averaged</u>	<u>Cross-sectional?</u>
Chinander (1997)	The influence of accountability and responsibility on managerial decision-making: An investigation of environmental, health, and safety decisions within the chemical and	1) Participation in EPA 33/50 voluntary program	1) 1993 TRI levels 2) Normalized 1993 TRI levels 3) Normalized TRI trend 4) Penalties 5) Percent reductions in total releases and transfers of	13	Cross-sectional

	steel industries		33/50 chemicals 6) Amount of spills 7) TRI trend 8) Violations		
Mass. Department of Environmental protection (1997)	Evaluation of the Environmental Results Program	1) Participation in Environmental Results Program (ERP)-certification program	1) % of companies that went through ERP and complied	1	Cross-sectional
Gibbs (2006)	Corporate Citizenship, sanctions, and environmental crime	1) Participation in TRI 33/50 program 2) Participation in Wastewise program	1) Average number of violations (BOD) 2) Average number of violations (TSS) 3) Average number of violations (convention pollutants) 4) Average number of violations (toxic pollutants) 5) Average number of violations (all) 6) Quality compliance ratio—BOD 7) Quality compliance ratio—TSS 8) Quality compliance ratio—Conventional pollutants 9) Quality compliance ratio—toxic pollutants 10) Concentration compliance ratio—	52	Cross-sectional

			<p>BOD</p> <p>11) Concentration compliance ratio— TSS</p> <p>12) Concentration compliance ratio— Conventional pollutants</p> <p>13) Concentration compliance ratio— Toxic pollutants</p>		
Potoski and Prakash (2005)	Green clubs and voluntary governances: ISO 14001 and Firms' regulatory compliance	1) State EMS programs	1) Proportion of months for which a facility was out of compliance in 2000 - 2001	1	Cross-sectional
Sam et al. (2006)	How do Voluntary Pollution Reduction Programs (VPRs) Work? An Empirical Study of Links between VPRs, Environmental Management, and Environmental Performance	<p>1) Participation in 33/50 program (when program in place)</p> <p>2) Participation in 33/50 program (when program no longer in place)</p>	1) total firm releases of 33/50 pollutants annually	6	Cross-sectional
<b>GEOGRAPHIC AREAS: ES-R</b>					
<b><u>Authors (Date)</u></b>	<b><u>Name of Article</u></b>	<b><u>Independent Variable</u></b>	<b><u>Outcome Variable</u></b>	<b><u>Number of ESs Averaged</u></b>	<b><u>Cross-sectional?</u></b>

Marine Resources Assessment Group. Ltd. (2005)	Review of impacts of illegal, unreported, and unregulated fishing on developing countries	1) Governance indicators of voice/accountability, political instability/violence, government effectiveness, regulatory quality, rule of law, control of corruption	2) % IUU catch	2	Cross-sectional
May and Winter (1999)	Regulatory enforcement and compliance: exploring Danish agro-environmental policy	1) Extent of cooperation with agricultural consultants 2) Use of information and assistance--provision of technical assistance	1) Inspectors' perceptions of the effectiveness of enforcement actions	4	Cross-sectional
O'Toole et al. (1997)	Reducing Toxic Chemical Releases and Transfers: Explaining Outcomes for a Voluntary Program	1) Number of different communicative routes employed by regional offices to implement the program 2) Presence of a complementary state voluntary program that backs up the 33/5-program 3) State information: extensiveness of public awareness and information on toxic releases	1) Relative Change in the release of 17 chemicals	4	Cross-sectional

**Table 19: Articles included in Effect Size Calculations for the Legal License (Resources Available for Regulators)**

<b>Construct</b>					
<b><u>FIRM LEVEL:</u></b>					
<b><u>ES-R</u></b>					
<b><u>Authors (Date)</u></b>	<b><u>Name of Article</u></b>	<b><u>Independent Variable</u></b>	<b><u>Outcome Variable</u></b>	<b><u>Number of ESs Averaged</u></b>	<b><u>Cross-sectional?</u></b>
Earnhart (2004c)	Factors shaping Corporate environmental performance: regulatory pressure, community pressure, and financial status	1) State/local environmental agency budget 2) EPA regional budget 3) EPA overall budget	1) monthly frequency of exceeding pollution limits 2) BOD relative emissions 3) TSS relative emissions	27	Cross-sectional
Grant et al. (2004)	Do facilities with distant headquarters pollute more? How civic engagement conditions the environmental performance of absentee managed plants	1) % of total state expenditures on the environment	1) log annual pounds of chemicals released on-site	8	Cross-sectional
Ringquist (1993)	Does regulation matter?: Evaluating the effects of state air pollution control programs	1) State Air Expenditures: average dollar amount spent on air pollution control	1) Changes in Atmospheric Emissions: nitrogen oxides	3	Cross-sectional
Stafford (2006)	Rational or confused polluters?	1) Gross state product-- proxy for enforcement	1) Whether violated hazardous waste law	2	Longitudinal

	Evidence from Hazardous Waste Compliance	burden that state environmental agency faces 2) Environmental budget	in 1999		
<b><u>GEOGRAPHIC AREA: ES-R</u></b>					
<b><u>Authors (Date)</u></b>	<b><u>Name of Article</u></b>	<b><u>Independent Variable</u></b>	<b><u>Outcome Variable</u></b>	<b><u>Number of ESs Averaged</u></b>	<b><u>Cross-sectional?</u></b>
Maxwell et al. (2000)	Self-regulation and social welfare: The political economy of corporate environmentalism	1) Per capita spending in fiscal year 1988 for state programs to administer clean air laws	1) Change in toxicity value of pollution from 1988 to 1992	1	Longitudinal
Marine Resources Assessment Group. Ltd. (2005)	Review of impacts of illegal, unreported, and unregulated fishing on developing countries	1) Amount of resources available for monitoring, control and surveillance	1) % IUU catch	2	Cross-sectional
Wenner (1971)	Enforcement of Water Pollution Law	1) Resources devoted by state to water pollution control	1) Improvement in Water Quality	1	Cross-sectional

**Table 20: Articles included in Effect Size Calculations for the Economic License (Costs of Compliance) Construct**

<b><u>FIRM-LEVEL: ES-RS</u></b>					
<b><u>Authors (Date)</u></b>	<b><u>Name of Article</u></b>	<b><u>Independent Variable</u></b>	<b><u>Outcome Variable</u></b>	<b><u>Number of ESs Averaged</u></b>	<b><u>Cross-sectional?</u></b>
Gray and Shadbegian (2004) <sup>a</sup>	When and Why do Plants Comply? Paper Mills in the 1980s	1) Plant's real value of shipment—proxy of compliance costs 2) Plant-level pollution abatement expenditure	1) Whether compliant during year 2) Air pollution actions 3) TRI air and water discharges	26	Cross-sectional

		intensity	4) Water violations 5) Air pollution violations		
Gray and Shadbegian (2005) <sup>a</sup>	When and Why do Plants Comply? Paper Mills in the 1980s	1) Plant's real value of shipment—proxy of compliance costs 2) Plant-level pollution abatement expenditure intensity	1) Whether compliant during year 2) Air pollution actions 3) TRI air and water discharges 4) Water violations 5) Air pollution violations	26	Cross-sectional
Khanna and Damon (1999)	EPA's voluntary 33/50 program: impact on toxic releases and economic performance of firms	1) number of superfund sites as a proxy for increasing potential liabilities under the Superfund Act 2) HAP-33/50 releases ratio as a proxy for compliance costs under NESHAP regulation	1) 33/50 releases	2	Cross-sectional

<sup>a</sup>The studies by Gray and Shadbegian listed here are different studies, but use the same dataset. As such, the effect sizes from each study are pulled together to avoid problems with non-independent effect sizes.

**Table 21: Articles included in Effect Size Calculations for the Economic License (Firm Size/Profit) Construct**

<b>FIRM-LEVEL: ES-RS</b>					
<b><u>Authors (Date)</u></b>	<b><u>Name of Article</u></b>	<b><u>Independent Variable</u></b>	<b><u>Outcome Variable</u></b>	<b><u>Number of ESs Averaged</u></b>	<b><u>Cross-sectional?</u></b>
Bandyopadhyay and Horowitz (2006)	Do plants overcomply with water pollution regulations? The role of discharge	1) Size of company	1) Standardized discharge rate	3	Cross-sectional

	variability				
Earnhart (2004b)	Panel data analysis of regulatory factors shaping environmental performance	1) flow capacity	1) level of relative emissions for facility I in time period t	5	Cross-sectional
Gibbs (2006)	Corporate Citizenship, sanctions, and environmental crime	1) Return on sales 2) Firm Size 3) Total company profit 4) Return on assets 5) Liquidity	1) Average number of violations 2) Whether violated—all pollutants 3) Whether violated—BOD 4) Whether violated—TSS 5) Whether violated—conventional pollutants 6) Whether violated—toxic pollutants 7) Quality compliance ratio—Conventional pollutants 8) Quality compliance ratio—toxic pollutants 9) Concentration compliance ratio—Conventional pollutants 10) Concentration compliance ratio—Toxic pollutants	98	Cross-sectional
Gray and	When and Why do	1) Firm's profit	1) Whether compliant	9	Cross-

Shadbegian (2004) <sup>a</sup>	Plants Comply? Paper Mills in the 1980s		during year 2) Air pollution actions 3) TRI air and water discharges 4) Water violations 5) Air pollution violations		sectional
Gray and Shadbegian (2005) <sup>a</sup>	When and Why do Plants Comply? Paper Mills in the 1980s	1) Firm's profit	1) Whether compliant during year 2) Air pollution actions 3) TRI air and water discharges 4) Water violations 5) Air pollution violations	9	Cross- sectional
Huang and Miller (2006)	Citizen complaints, regulatory violations, and their implications for swine operations in Illinois	1) Current operating capacity	1) Whether detected violation	2	Cross- sectional
Kock and Santalo (2005)	Are shareholders environmental "laggards"? Corporate governances and environmental firm performance	1) Firm performance 2) Firm growth 3) Firm size 4) Capital intensity	1) Relative waste production 2) Whether firm punished for env violation	43	Cross- sectional
Mobus (2005)	Mandatory environmental disclosures in a legitimacy theory context	1) Economic performance of firm (utility rate) 2) Economic performance of firm (changes in utility rate)	1) Noncompliance with environmental statutes	6	Cross- sectional

Potoski and Prakash (2005)	Green clubs and voluntary governances: ISO 14001 and Firms' regulatory compliance	1) number of employees in company	1) Proportion of months for which a facility was out of compliance in 2000 - 2001	1	Cross-sectional
Russo and Harrison (2005)	Organizational Design and Environmental Performance: Clues from the Electronics Industry	1) number of employees in company	1) Toxic emissions index	3	Longitudinal
Sam et al. (2006)	How do Voluntary Pollution Reduction Programs (VPRs) Work? An Empirical Study of Links between VPRs, Environmental Management, and Environmental Performance	1) size of the firm (number of facilities)	1) total firm releases of 33/50 pollutants annually	8	Cross-sectional
Shimshack and Ward (2005)	Regulator reputation, enforcement, and environmental compliance	1) Plant capacity (size of plant)--proxy for costs of compliance	1) Whether company was in violation this time period	4	Cross-sectional
Stafford (2006)	Rational or confused polluters? Evidence from	1) Size of company (using waste generated)— proxy for cost of	1) Whether violated hazardous waste law in 1999	1	Longitudinal

	Hazardous Waste Compliance	compliance			
Wisner and Epstein (2005)	"Push" and "pull" impacts of NAFTA on environmental responsiveness and performance in Mexican industry	1) Size of company (small, medium, large)	2) Firm's environmental performance	1	Cross-sectional
Wolf (2005)	Environmental Crime and Justice: The organizational composition of corporate noncompliance	1) Profitability 2) Efficiency 3) Liquidity 4) Growth	1) Whether violation of environmental law prosecuted in criminal or civil courts 2) Fine given for violation	24	Cross-sectional

<sup>a</sup>The studies by Gray and Shadbegian listed here are different studies, but use the same dataset. As such, the effect sizes from each study are pulled together to avoid problems with non-independent effect sizes.

**Table 22: Articles included in Effect Size Calculations for the Social License Construct**

<b><u>FIRM-LEVEL ES-D</u></b>					
<b><u>Authors (Date)</u></b>	<b><u>Name of Article</u></b>	<b><u>Independent Variable</u></b>	<b><u>Outcome Variable</u></b>	<b><u>Number of ESs Averaged</u></b>	<b><u>Cross-sectional?</u></b>
Afsah et al. (1997)	Regulation in the Information Age: Indonesian Public Information Program for Environmental Management	1) Implementation of PROPER PROKASIH (a public disclosure program)	1) How many companies were in compliant categories (Dec 1995 vs. Sep 1996) 2) How many companies were	6	Longitudinal

			in compliant categories (June 1995 vs. Dec 1995)		
Earnhart (2004c)	Factors shaping Corporate environmental performance: regulatory pressure, community pressure, and financial status	1) Publicly-held ownership	1) monthly frequency of exceeding pollution limits 2) BOD relative emissions 3) TSS relative emissions	9	Cross-sectional
Lopez et al. (2004)	Public Disclosure of Industrial Pollution: The PROPER Approach for Indonesia?	1) PROPER, Indonesia's regulatory program featuring negative publicity	1) Change from black/red rating (indicating noncompliance) to blue/green/gold rating (indicating compliance)	3	Longitudinal
Potoski and Prakash (2005)	Green clubs and voluntary governances: ISO 14001 and Firms' regulatory compliance	1) Participation in ISO14001	1) Proportion of months for which a facility was out of compliance in 2000 - 2001	1	Cross-sectional
Russo and Harrison (2005)	Organizational Design and Environmental Performance: Clues from the Electronics Industry	1) ISO14001 member	1) Toxic emissions index	3	Longitudinal
Toffel (2005)	Voluntary environmental management	1) Adopted ISO14001 standards	1) RCRA violations 2) Pounds of emissions	40	Longitudinal

	initiatives: Smoke signals or smoke screens? (Chapter 2: Resolving information asymmetries in markets: The role of certified management programs)				
<b>FIRM-LEVEL: ES-RS</b>					
<u>Authors (Date)</u>	<u>Name of Article</u>	<u>Independent Variable</u>	<u>Outcome Variable</u>	<u>Number of ESs Averaged</u>	<u>Cross-sectional?</u>
Earnhart (2004c)	Factors shaping Corporate environmental performance: regulatory pressure, community pressure, and financial status	<ol style="list-style-type: none"> <li>1) voter turnout (proxy for community pressures)</li> <li>2) democratic voting (proxy for community environmentalism)</li> <li>3) per capital income (proxy for community pressure)</li> <li>4) chemical-related private earnings (proxy for lack of community pressure)</li> </ol>	<ol style="list-style-type: none"> <li>1) monthly frequency of exceeding pollution limits</li> <li>2) BOD relative emissions</li> <li>3) TSS relative emissions</li> </ol>	36	Cross-sectional
Foulon et al. (2002)	Incentives for Pollution Control: Regulation or Information	<ol style="list-style-type: none"> <li>1) Number of appearances in a given on the polluters list under the heading "of concern"</li> <li>2) Number of</li> </ol>	<ol style="list-style-type: none"> <li>1) Compliance rate for BOD</li> <li>2) Compliance rate for TSS</li> <li>3) Absolute level of TSS emissions</li> <li>4) Absolute level of</li> </ol>	32	Cross-sectional

		appearances in a given on the polluters list under the heading "out of compliance"	BOD emissions		
Grant et al. (2004)	Do facilities with distant headquarters pollute more? How civic engagement conditions the environmental performance of absentee managed plants	<ol style="list-style-type: none"> <li>1) log # of associations in a county</li> <li>2) log # of churches in a county</li> <li>3) log # of third places in a county</li> </ol>	<ol style="list-style-type: none"> <li>2) log annual pounds of chemicals released on-site</li> </ol>	24	Cross-sectional
Huang and Miller (2006)	Citizen complaints, regulatory violations, and their implications for swine operations in Illinois	<ol style="list-style-type: none"> <li>1) swine inventory intensity (proxy for market competition or for community reliance on the industry)</li> <li>2) median household income of the country (proxy for community pressure)</li> <li>3) Educational attainment of population in county (proxy for community pressure)</li> </ol>	<ol style="list-style-type: none"> <li>1) Whether detected violation</li> </ol>	6	Cross-sectional
Kassinis and Vafeas (2002)	Corporate boards and outside stakeholders as determinants of environmental	<ol style="list-style-type: none"> <li>1) Environmental preferences of the community as a proxy for informal</li> </ol>	<ol style="list-style-type: none"> <li>1) whether company was subject to lawsuit for violating</li> </ol>	7	Cross-sectional

	litigation	stakeholder pressures 2) Voting record of each state's Congressional delegation as a proxy for pressure from legislative/political actors	environmental law		
Potoski and Prakash (2005)	Green clubs and voluntary governances: ISO 14001 and Firms' regulatory compliance	1) # of members in the Sierra Club and the National Wildlife Federal per 1000 residents	2) Proportion of months for which a facility was out of compliance in 2000 - 2001	1	Cross-sectional
Shimshack and Ward (2005)	Regulator reputation, enforcement, and environmental compliance	1) County per capita income (proxy for community pressure) 2) County unemployment rate (proxy for community pressures)	1) Whether company was in violation this time period	8	Cross-sectional
Stafford (2006)	Rational or confused polluters? Evidence from Hazardous Waste Compliance	1) Environmental group dues	1) Whether violated hazardous waste law in 1999	1	Longitudinal
<b><u>GEOGRAPHIC AREA ES-R</u></b>					
<b><u>Authors (Date)</u></b>	<b><u>Name of Article</u></b>	<b><u>Independent Variable</u></b>	<b><u>Outcome Variable</u></b>	<b><u>Number of ESs Averaged</u></b>	<b><u>Cross-sectional?</u></b>
Brooks and Sethi (1997)	The distribution of pollution: Community characteristics and	1) % people in the population voting in the presidential	1) Air pollution index (1988) 2) Air pollution	ES-r (5) ES-r (Point biserial) (2)	ES-r: Cross sectional ES-r(PB):

	exposure to air toxics	<p>election: proxy for capacity of community to engage in collective action</p> <p>2) initial exposure level in the zip code, as a proxy for TRI publicity</p>	<p>index (1989)</p> <p>3) Air pollution index (1990)</p> <p>4) Air pollution index (1991)</p> <p>5) Air pollution index (1992)</p> <p>6) Change in exposure to air pollution from 1990 - 1992</p>		Longitudinal
Maxwell et al. (2000)	Self-regulation and social welfare: The political economy of corporate environmentalism	<p>1) Citizen environmental group membership as proxy for environmental pressure</p> <p>2) Policy initiatives as a proxy for political climate with relation to environmental issues</p>	1) Change in toxicity value of pollution from 1988 to 1992	2	Longitudinal

Table 23 provides descriptive information on the 46 studies included in the meta-analysis. Most of the included studies used data collected in the United States. About half of the studies were published in journals, while about half were unpublished documents. Only 12.3% of the studies were quasi-experimental, and none used experimental methods. Most of the data used to calculate effect sizes were regression coefficients or correlations. Most of the studies used firm-level data as opposed to comparing geographic areas, used non-random samples, and were cross-sectional in nature. A little bit more than half of the studies used controls in their analyses, and about 58% of the studies included a discussion about the validity of their data.

**Table 23: Study Characteristics and Study Quality Indicators**

<b>Variable</b>	<b>Category</b>	<b>Percent of Studies</b>
Country of Study	United States	68.5%
	Other	31.5%
Study Source	Journal Article	50.7%
	Dissertation/Thesis	20.5%
	Conference paper or Working paper	19.2%
	Government or Regulatory Agency Report	8.2%
	Corporate Paper	1.4%
Discipline of Publication or Author	Multiple disciplines or Other (e.g., operations management, international development)	47.9%
	Public Policy	12.3%
	Economics	9.6%
	Criminology	6.8%
	Environmental Science/Biology	5.5%
	Sociology	6.8%
	Business/Marketing	5.5%
	Political Science	5.5%
Study Type	Non-experimental	87.7%
	Quasi-experimental or Pre-Post	12.3%
Data Used to Calculate ES	Regression Coefficients	57.5%
	Correlations	26.0%
	Pre/Post Comparisons	8.2%
	F, t, or z-test	2.7%
	Other (e.g., percent change, structural	2.7%

<u>Variable</u>	<u>Category</u>	<u>Percent of Studies</u>
	equations)	
	Means and Standard Deviations	1.4%
	Proportions	1.4%
Unit of Analysis	Firm	82.2%
	Geographic Area	17.8%
Cross-sectional?	Yes	79.5%
	No	20.5%
Random sample?	Yes	5.6%
	No	83.1%
	Unclear	11.3%
Controls included in analyses?	Yes	56.2%
	No	43.8%
Discussion of data validity?	Yes	57.5%
	No	42.5%

Tables 24 – 29 demonstrate the effect size calculations for the respective licenses, by unit of analysis and effect size type. Each table reports the average unbiased effect size, the weighted mean effect size, the 95% confidence interval for the weighted mean effect size, and the number of studies included in the calculation of the effect size. Figures 2 – 13 give the stem and leaf plots depicting each study’s mean effect size and the 95% confidence interval. I noted the presence of outliers (defined as effect sizes greater than two standard deviations above or below the average effect size). Following Lipsey and Wilson (2001), I recoded these outliers to have a value at the  $\pm 2$  standard deviation point as appropriate. This allows me to retain studies in the analysis without allowing for extreme bias. When calculating the weighted effect sizes, the  $Q$  statistics were highly significant, indicating that the variability between studies is not just due to sampling error. Therefore, I use the random-effects model for calculating the weighted mean effect size—it is the results of these random effects calculations that are reported.

The random effects model relaxes the assumption that all of the studies are measuring the same treatment effect; instead, it assumes that the treatment effects vary along a distribution with a central value. Calculating the random effects estimate implies that we are interested in exploring the variability of the effects by study characteristics, although in the current project I am unable to do this. Also, with a small number of studies, the random effects model is not able to account for the large amount of uncertainty that comes in calculating between-study variances (Campbell Collaboration, 2012; Johnson, 2011).

Along with the caution that the studies included here appear to be measuring different treatment effects, it is also important to remember that the calculated effect sizes must be interpreted in the context of the methodological quality of the studies from whence they come (Lipsey and Wilson, 2001). Most of the effect sizes calculated here come from regression or correlation coefficients, meaning that they are essentially correlational relationships and one cannot infer causality. Furthermore, we know that many of the study samples are not drawn randomly, which introduces the potential for sampling bias. The effect sizes given should be interpreted as a synthesis of the research findings of studies that are methodologically limited and thus the results should be viewed cautiously. Given the high  $Q$  statistic, the ESs provided are to be interpreted as the mean of the distribution of effects given in the literature to date—and it is noteworthy that the Campbell Collaboration (2012) argues that this should not be the focus of random effects models. Again, I reiterate that a) I am still in the process of collecting data with which I will examine how effects differ by study, and b) that this meta-analysis is only one method by which we are examining the research question; all research methods have

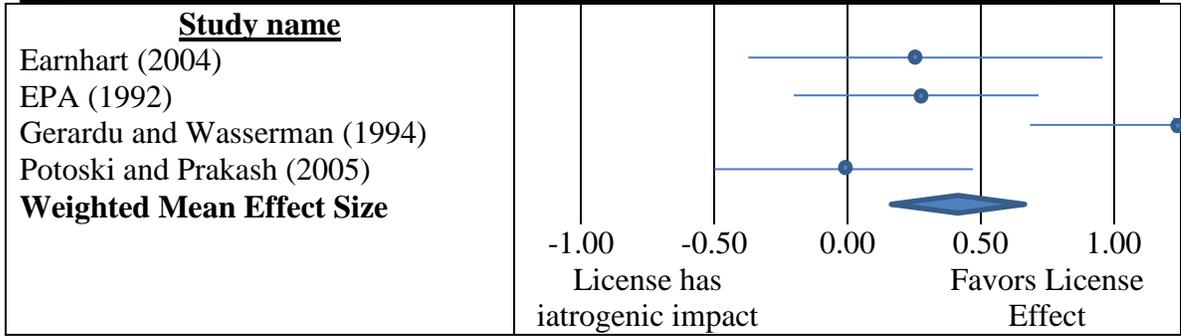
positives and negatives associated with them, but we can gain confidence when results from one approach confirms those found using another.

Given those caveats, the effect sizes for the legal license (command-and-control) construct are given in Table 24 and Figures 2 – 4. Two out of the three weighted mean effect sizes are positive, indicating that command and control interventions do have a beneficial effect on environmental offending. For the firm mean standard difference, the confidence interval does not cross zero, indicating that the impact is significant (which was verified by *z*-tests, not shown). The firm-level standard mean difference effect size indicates that this aspect of the legal license has a small-medium effect on environmental offending. The geographic area correlation effect demonstrates a medium positive effect as well, but is not statistically significant. On the other hand, the firm-level weighted correlation effect size shows that the command and control version of this license may actually encourage offending in a small way. It may be that the presence of a punitive authority or law deters crime, but when you have a continuous measure you may find some sort of threshold such that having too much punitive power (e.g., a certain number of inspections, laws, etc.) has a defiant effect on firms.

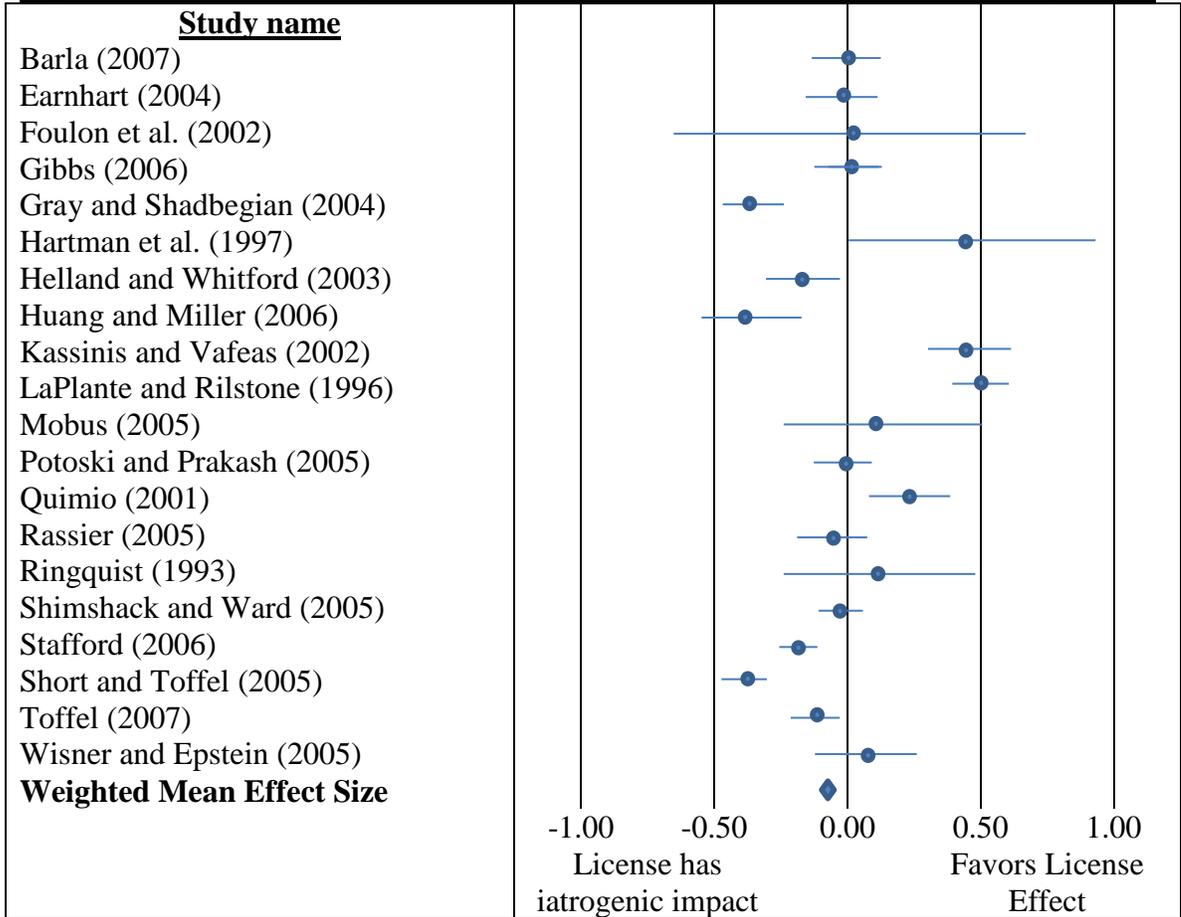
**Table 24: Effect Size Calculations, Legal License (Command and Control)**

<u>Unit of Analysis</u>	<u>Type of Effect Size</u>	<u>Average Unbiased ES</u>	<u>Weighted Mean ES</u>	<u>Lower CI</u>	<u>Upper CI</u>	<u>Number of Effect Sizes</u>
<b>Firm</b>	<b>ES-d</b>	0.438	0.418	0.162	0.675	4
	<b>ES-r</b>	0.019	-0.050	-0.073	-0.028	20
<b>Geographic Area</b>	<b>ES-r</b>	0.264	0.209	-0.009	0.427	7

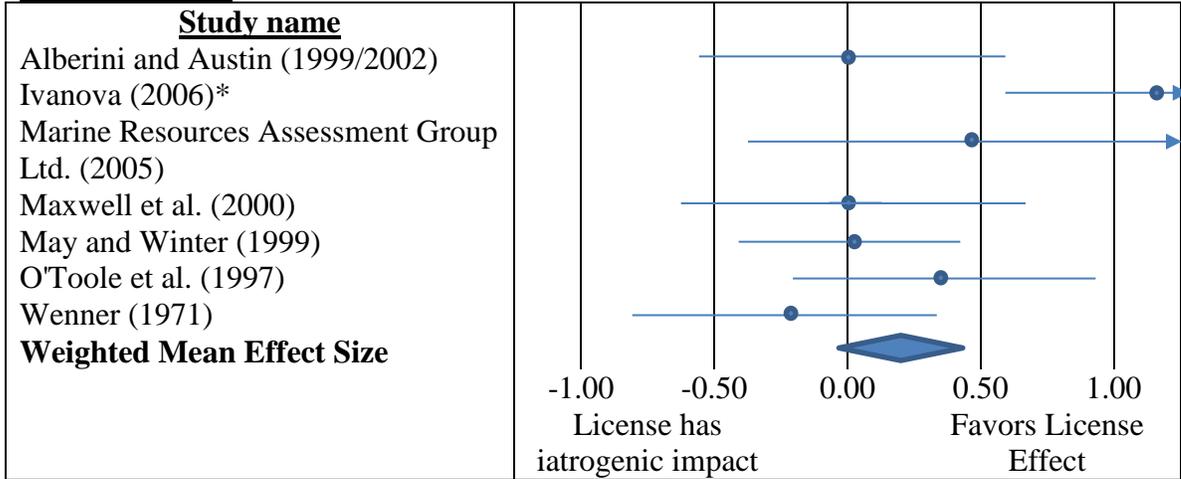
**Figure 2: Box Plot of ESs, Firm-level Legal License (Command and Control)—ES-d**



**Figure 3: Box Plot of ESs, Firm-level Legal License (Command and Control)—ES-r**



**Figure 4: Box Plot of ESs, Geographic Area Legal License (Command and Control)—ES-r**



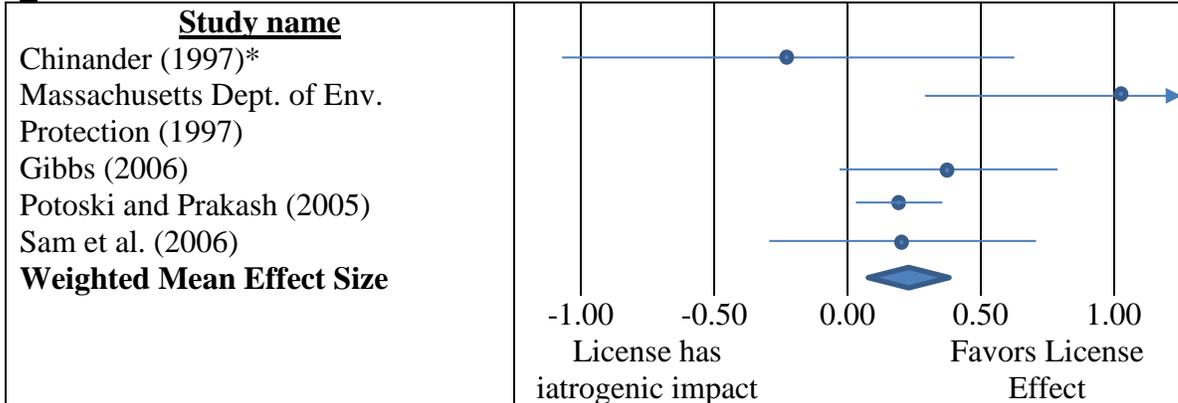
\*Original ES was an outlier. The depicted ES is recoded to be a maximum of 2 standard deviations above the average (non-weighted) mean ES.

Table 25 and Figures 5 - 6 provide the effect size calculations for the measures of the legal license that are more cooperative or persuasive in nature. At the firm level, we find a small, positive, and statistically significant effect. For the geographic area units of analysis, we find a medium and positive weighted mean effect size. However, the correlation effect size for the geographic area is not statistically significant.

**Table 25: Effect Size Calculations, Legal License (Cooperative/Persuasive)**

<u>Unit of Analysis</u>	<u>Type of Effect Size</u>	<u>Average Unbiased ES</u>	<u>Weighted Mean ES</u>	<u>Lower CI</u>	<u>Upper CI</u>	<u>Number of Effect Sizes</u>
Firm	ES-d	0.317	0.231	0.106	0.356	5
Geographic Area	ES-r	0.563	0.369	-0.142	0.879	3

**Figure 5: Box Plot of ESs, Firm-level Legal License (Persuasion/Cooperation)—ES-d**



\*Original ES was an outlier. The depicted ES is recoded to be a maximum of 2 standard deviations below the average (non-weighted) mean ES.

**Figure 6: Box Plot of ESs, Geographic Area Legal License (Persuasion/Cooperation)—ES-r**

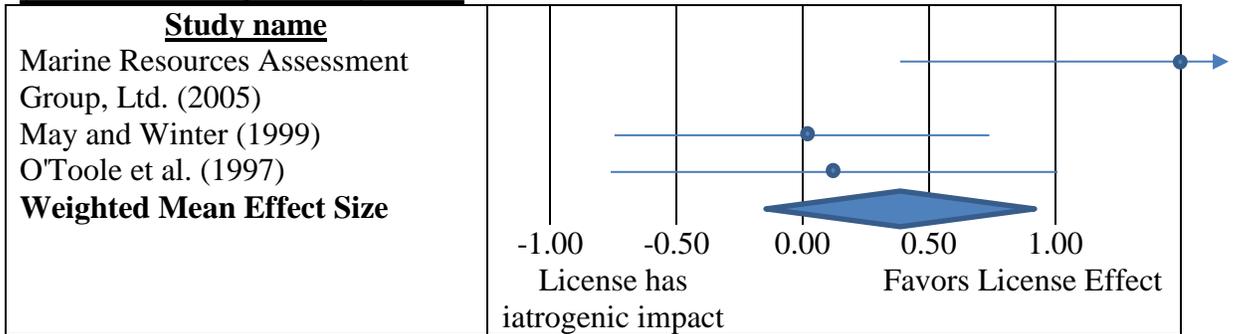
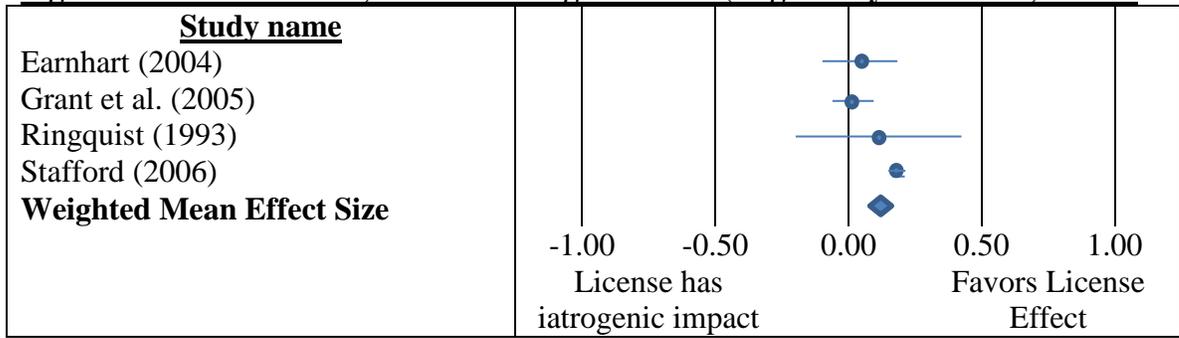


Table 26 and Figures 7 - 8 provide correlation effect sizes for the amount of resources available to regulators, which I classified under the legal license. The firm-level effect is small but has a statistically significant benefit for environmental behavior (more resources leads to better environmental performance by firms), while the geographic area effect size is medium in size but is not statistically significant.

**Table 26: Effect Size Calculations, Legal License (Resources available to regulators)**

<u>Unit of Analysis</u>	<u>Type of Effect Size</u>	<u>Average Unbiased ES</u>	<u>Weighted Mean ES</u>	<u>Lower CI</u>	<u>Upper CI</u>	<u>Number of Effect Sizes</u>
Firm	ES-r	0.094	0.134	0.102	0.166	4
Geographic Area	ES-r	0.372	0.248	-0.193	0.689	3

**Figure 7: Box Plot of ESs, Firm-level Legal License (Regulatory Resources)—ES-r**



**Figure 8: Box Plot of ESs, Geographic Area Legal License (Regulatory Resources)—ES-r**

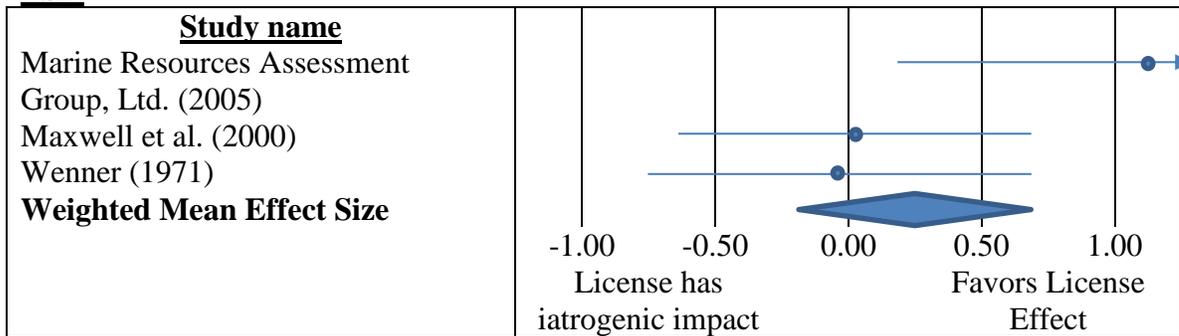


Table 27 and Figure 9 provide the correlation effect size for the economic license (costs of compliance) construct. This effect size is coded such that the impact of costs of compliance on offending is positive if as the costs of compliance go up, the likelihood of offending increases as well. The weighted mean ES demonstrates a small, statistically significant relationship in this direction.

**Table 27: Economic License, Costs of Compliance**

<u>Unit of Analysis</u>	<u>Type of Effect Size</u>	<u>Average Unbiased ES</u>	<u>Weighted Mean ES</u>	<u>Lower CI</u>	<u>Upper CI</u>	<u>Number of Effect Sizes</u>
Firm	ES-r	0.067	0.077	0.033	0.121	2

**Figure 9: Box Plot of ESs, Firm-level Economic License (Cost of Compliance)—ES-r**

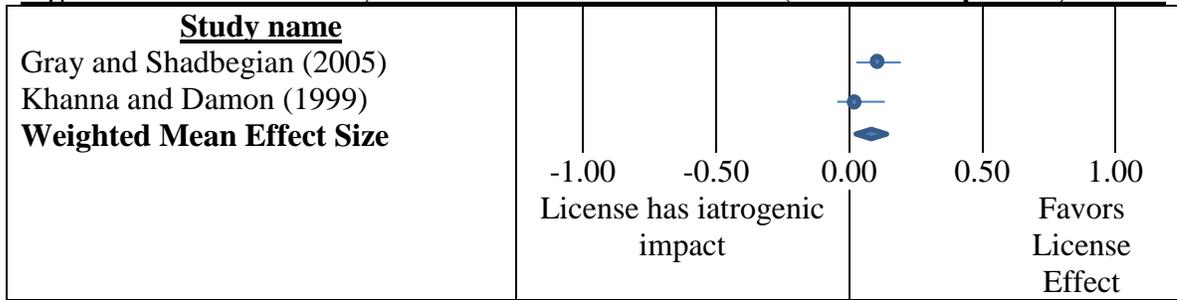
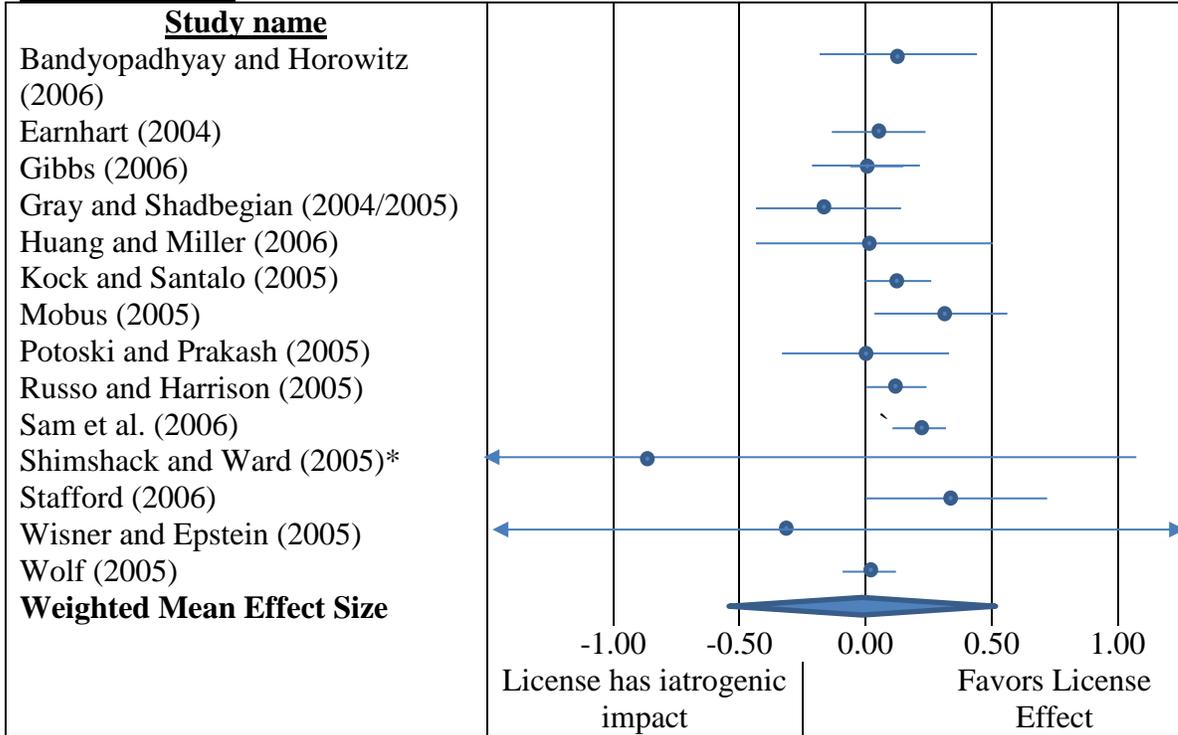


Table 28 and Figure 10 provide the results for another aspect of the economic license, the size of the firm or the profits of the firm. These variables were generally included as control variables in regressions and therefore I wanted to keep them separate from measures more directly assessing the costs of compliance. The effect size is coded such that a positive effect size means that smaller firms are more likely to be in compliance. The overall effect size indicates the exact opposite—that smaller firms are more likely to offend. This may be driven by Shimshack and Ward (2005), despite the ES from that study being recoded to two standard deviations below the average. If you remove the outlier from the data, the effect size becomes positive and is statistically significant with a small effect (not shown).

**Table 28: Economic License, Size/Profits of Firm**

<u>Unit of Analysis</u>	<u>Type of Effect Size</u>	<u>Average Unbiased ES</u>	<u>Weighted Mean ES</u>	<u>Lower CI</u>	<u>Upper CI</u>	<u>Number of Effect Sizes</u>
Firm	ES-r	-0.016	-0.025	-0.556	0.505	14

**Figure 10: Box Plot of ESs, Firm-level Economic License (Firm Size/Profit)—ES-r, without outliers**



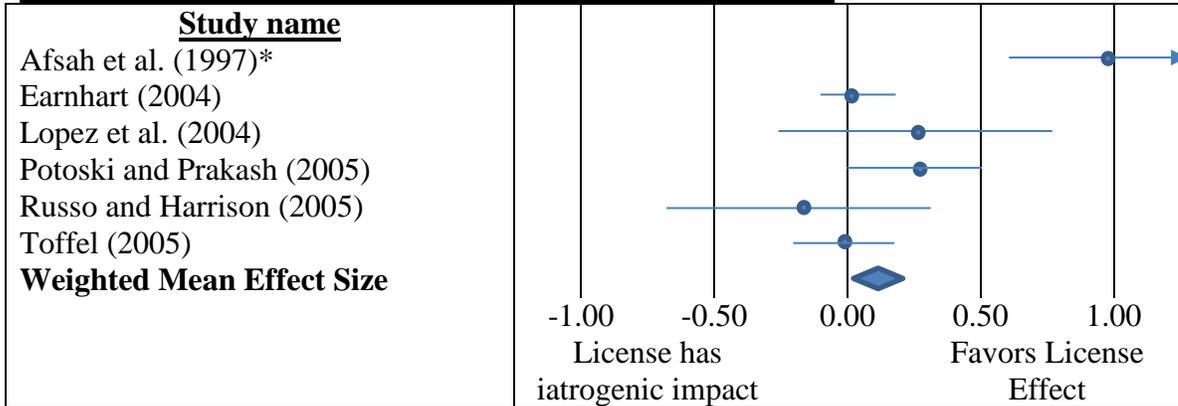
\*Original ES was an outlier. The depicted ES is recoded to be a maximum of 2 standard deviations below the average (non-weighted) mean ES.

Table 29 and Figures 11 – 13 show the results for the overall impact of the social license on offending. The firm standard mean ES and the geographic area correlation ES show that the social license has a small but statistically significant effect on environmental offending. However, the firm-level weighted correlation effect size shows a negative impact of the social license that is not statistically significant. Similar to the command-and-control legal license, it may be that when you measure the social license with continuous variables at the firm level, a threshold effect is found.

**Table 29: Effect Size Calculations, Social License**

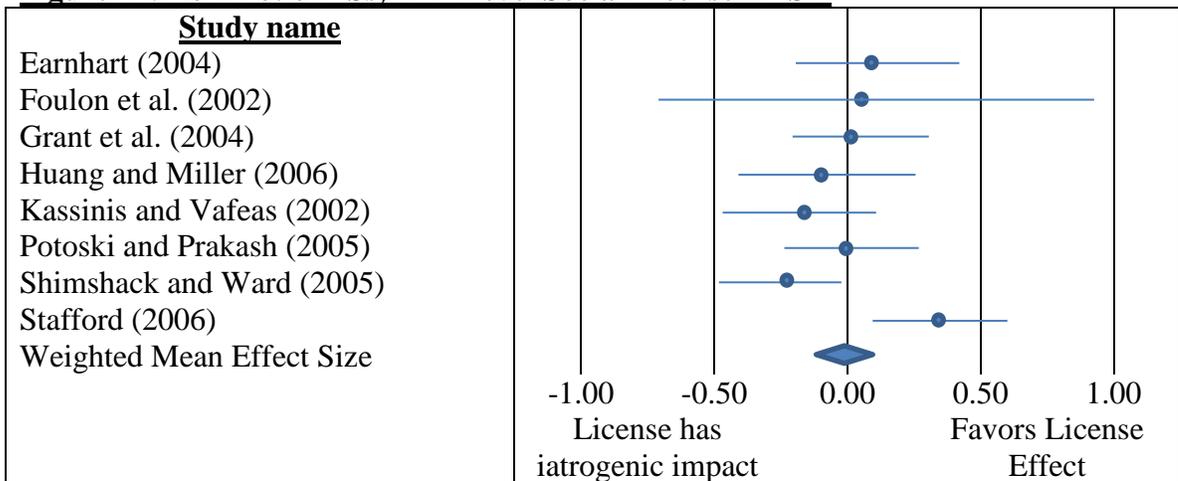
<u>Unit of Analysis</u>	<u>Type of Effect Size</u>	<u>Average Unbiased ES</u>	<u>Weighted Mean ES</u>	<u>Lower CI</u>	<u>Upper CI</u>	<u>Number of Effect Sizes</u>
Firm	ES-d	0.223	0.114	0.031	0.196	6
	ES-r	-0.005	-0.00006	-0.096	0.096	8
Geographic Area	ES-r	0.057	0.066	0.055	0.076	2 (3 ES)

**Figure 11: Box Plot of ESs, Firm-level Social License—ES-d**

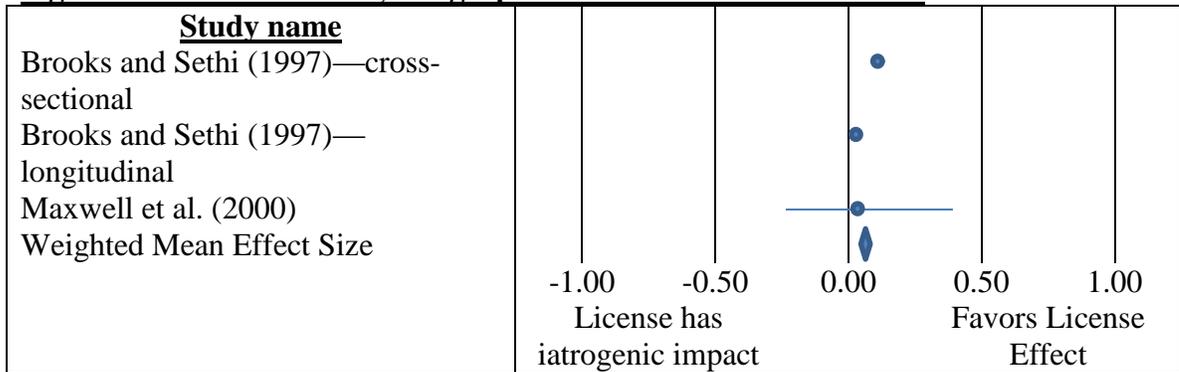


\*Original ES was an outlier. The depicted ES is recorded to be a maximum of 2 standard deviations above the average (non-weighted) mean ES.

**Figure 12: Box Plot of ESs, Firm-level Social License—ES-r**



**Figure 13: Box Plot of ESs, Geographic Area Social License—ES-r**



Taken as a whole, the results demonstrate some additional support for hypothesis 1, although the impact of the licenses differs somewhat according to how they are measured. Out of 12 different calculations, nine effect sizes demonstrate a beneficial effect on offending. Of those nine, six of the effect sizes are statistically significant. The bulk of the evidence implies that external licenses do have some impact on corporate environmental offending behavior.

When explicitly comparing the results of the meta-analysis to the regression results of the Hypothesis 1 test on the offending scenarios, we find some confirmation that the command-and-control approach can impact offending. The persuasive approach was not tested in the vignette, but warrants further study given its qualified support in the meta-analysis. There was also some confirmation as to the impact that the social license can have. Although the costs of compliance (representing the economic license) were only marginally significant in the full regression model, we see that reducing such costs can impact offending when actual behavioral outcomes are used. Finally, although the size of the respondent’s company mattered in the regression models such that people in larger companies were more likely to offend, the results of the meta-analysis imply that larger companies may be less likely to offend (although this may be due to the presence

of an outlier). When comparing the magnitude of the effect sizes to one another, the legal license seems to have the strongest impact on offending.

Taking both methods into account, we find qualified support for the role of the external licenses on corporate crime. The vignette surveys indicate that individual-level factors are important to consider in future theoretical and policy developments. Chapter 5 discusses the implications of the results and ideas for future research.

## Chapter 5: Discussion and Conclusions

A looming question in regulation is whether formal and punitive sanctions effectively reduce noncompliance. Although much research indicates that legal and administrative sanctions can play a role in promoting environmentally sound practices among corporations, it seems that as many studies find that the deterrent impact of punishment is not realized. Research suggests that, due to the small likelihood of being caught or the lack of “teeth” behind sanctions, corporations may be influenced more by societal/community pressures or market pressures. Over the past 25 years or so, many regulatory programs have attempted to incorporate extra-legal pressures into programs that motivate compliance or overcompliance. The research on such programs has similarly been inconsistent in terms of their effectiveness.

Prior research efforts provide inconsistent results because they fail to examine how legal, social, and economic pressures *all* constrain corporate behavior, often interactively. For example, certain (likely larger, more well-known, and powerful) companies are heavily involved in deciding what regulations should be put in place or can afford good lawyers to get them out of legal trouble. To these firms, the potential damage to one’s reputation and/or profit may be a more important determinant of corporate policy. On the other hand, the threat of legal action may deter small, less publicly-known corporations who cannot afford to pay a large fine or will be shut down if the company is prosecuted. It is imperative that empirical research examines whether and how formal and informal controls work together.

The first effort to holistically explain the environmental performance of firms using these various domains is the license framework put forth by Gunningham et al.

(2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009). They argue that legal, social, and economic factors influence corporate decisions; the salience of one domain often depends on the size of the company, the industry it is located in, and its geographic location. They argue, however, that the culture within the corporation is the most important predictor of behavior—even if two firms face the same external pressures, they may react in very different ways due to internal processes and priorities.

Although the license framework was a giant leap in synthesizing the previous literature into a cohesive explanation of corporate behavior, it has three main limitations. First, the “framework” provided a very general conceptualization of how external factors and internal policies affected behavior; the authors never drew detailed, testable propositions from their case studies. This is likely a large reason that the framework has not been subjected to rigorous or multivariate statistical tests. Second, the authors didn’t compare how relevant predictors may differ between offending and overcompliance. Finally, the framework obfuscates the influence of corporate context on individual decisions as well as how individual decisions drive corporate behavior. In fact, many theories of corporate crime fail to differentiate between corporate- and individual-level behaviors and how they are inter-related.

To rectify these limitations I have put forth an integrated theory of corporate environmental behavior, derived testable hypotheses from it, and tested it using quantitative data. In doing so, I have provided a theory of corporate behavior that is broader in scope than most that have come before it, yet fairly parsimonious and clear. This chapter will summarize the theory, the testing and results, will discuss the potential

theory and policy implications, and will conclude with limitations of the current study as well as ideas for future research.

## **I. Summary of the theory**

To explain corporate regulatory compliance, both firm- and individual-level factors should be considered. To that end, I engaged in an end-to-end integration of two theories: the “license framework” put forth by Gunningham et al. (2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009) and the rational choice theory of corporate crime put forth by Paternoster and Simpson (1993, 1996). The “license framework” argues that legal, economic, and social factors *external* to the corporation impact whether the firm offends or overcomplies with regulations, as do *internal* indicators of corporate culture. The rational choice theory argues that corporate managers make decisions based on the costs and benefits of the potential behavior. These two theories are integrated such that measures of the external licenses and firm-level culture can explain outcomes measured at the firm level. At the individual level, the firm-level licenses and culture influence a manager’s perceptions of potential sanctions, benefits, and norms regarding the behavior. These individual-level perceptions, in turn, influence whether the individual manager will decide to offend or overcomply. Although this theory is applied specifically to environmental regulations in the present study, I believe that it has the potential to be applied to other forms of corporate behavior as well.

## **II. Summary of the methods and results**

To test this integrated theory, I primarily use data from a web-based vignette study of environmental decision-makers from a variety of organizations and industries in the United States. The results of the vignette survey generally support the propositions gleaned from the integrated theory, but not all expectations are statistically supported.

My first hypothesis predicted that measures of the legal, economic, and social licenses would be significantly associated with offending and overcompliance behaviors. This hypothesis received partial support—the legal and social licenses proved salient in regressions including only firm-level measures, although the economic license variables were generally unimportant (although one does become marginally significant in the offending regression that includes individual-level measures).

The second hypothesis argued that measures of corporate culture would be important in explaining offending and overcompliance decisions, and would render the measures of the external licenses nonsignificant. The influence of corporate culture was generally not supported using the offending data and was moderately supported using the overcompliance data. Furthermore, including the corporate culture measures did not reduce the impact of the external licenses as expected.

The hypotheses that focused on the individual-level measures received more support. Hypothesis 3 predicted that the firm-level variables would predict or be associated with the individual-level variables, while hypothesis 4 predicted that the individual-level variables would be associated with offending and overcompliance. I also expected the impact of the firm-level variables to wash out in the full model including the

rational choice measures. For both types of scenarios, firm-level measures were associated with individual-level cost/benefit perceptions. Furthermore, these individual-level perceptions were important in predicting offending and overcompliance decisions, and the impact of firm-level factors was reduced in the full model.

Hypothesis 5, which predicted that the factors significantly associated with offending would be the same as those significantly associated with overcompliance, was partially supported such that similar individual-level considerations predicted both offending and overcompliance. However, the firm-level factors differed. Specifically, instrumental variables such as the certainty of legal sanctions and the likelihood of increasing the firm's competitive position predicted offending intentions, while measures of corporate culture explained overcompliance intentions.

I also conducted a sensitivity analysis of the impact of the external licenses on corporate offending, using data from a meta-analysis of articles through 2006. This analysis showed that, at the firm or geographic area levels of analysis, there is some support for the impact of external pressures on corporate environmental offending. Nine out of 12 effect size calculations demonstrated that the licenses impacted corporate offending, of which six ESs were significant. Although the effects were modest, it seems that using punitive sanctions, adopting a persuasive legal approach, increasing resources available to regulators, reducing compliance costs, and increasing social pressures may all impact corporate environmental behavior.

### **III. Theoretical Implications**

I believe that this dissertation makes its biggest contribution to the corporate crime literature theoretically. Criminologists who study corporate crime all too often fail to go beyond assessing whether theories of traditional street crime are supported when using a sample of white-collar or corporate criminals (Farrell and Swigert, 1985). What is needed is a theory that accounts for both the organizational environment of the corporation as well as the factors weighed by individuals nested in that environment. Prior corporate crime research has also been limited by a lack of quantitative data that would allow for us to test theories statistically. I have addressed both conceptual and methodological limitations of prior research by developing testable propositions from Gunningham et al.'s (2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009) license framework, clarifying its scope, and integrating it with a rational choice perspective on corporate crime. This integrated theory clearly delineates the processes occurring at the corporate and individual levels and, as such, can be empirically tested with corporate- or individual-level data.

The results of the vignette survey indicate that the social license generally affects corporate behavior when individual-level factors are not accounted for. This jibes with Gunningham et al.'s (2002, 2003, 2004; Gunningham et al., 2005; Kagan et al., 2003; Thornton et al. 2007, 2008, 2009) finding that social pressures on the corporation often play a role in shaping corporate behavior; the potential damage or benefits to one's corporate reputation due to certain behaviors influences the decisions of managers. However, the legal license is also salient—when not accounting for individual-level factors the perceived *severity* of legal sanctions decreases offending intentions. Contrary

to expectations, the perceived *certainty* of legal sanctions against the corporation becomes salient in the full model and increases intentions to offend. The only external license not receiving much support among our sample is the economic license; only when individual-level factors are included does the potential for improving the firm's competitiveness become important. Overall, then, the first multivariate statistical test of the license framework yields mixed support.

There has been much discussion in the literature about the need for a strong corporate culture to prevent offending (Schell-Busey, 2009). However, in the present study, only one of the measures of corporate culture predicted offending—being asked by a supervisor (vs. asking an employee) increases the likelihood of offending. On the other hand, corporate culture seems to be more important in explaining overcompliance decisions. It appears that offending and overcompliance behaviors are therefore driven by different firm-level factors.

I did find support that firm-level factors are correlated with or predict individual-level calculations about the costs and benefits of engaging in the behavior, as predicted. I thought it was particularly interesting that firm reputation impacted all of the rational choice measures in the overcompliance scenarios. If the firm is not seen as deriving reputational benefits from overcompliance, individuals may not see themselves as benefiting from such behaviors.

In turn, multiple individual-level factors influence the likelihood of offending and overcomplying (and render some of the firm-level factors insignificant). Of particular import for both types of scenarios are potential benefits to one's career, the perceived morality of the behavior, and whether engaging in the behavior would be thrilling.

Generally, I think that the rational choice theory of corporate crime (Paternoster and Simpson, 1993, 1996) is supported in this study. What is interesting is that the individual-level measures of legal sanctions and social sanctions/benefits are not strongly related to offending or overcompliance decisions. It may be that when one accounts for the potential monetary rewards and normative approbation of the behavior, individuals are fairly unconcerned about such factors or may think that they are able to easily pass blame to others in the organization.

I also examined the impact of external pressures using a meta-analysis that included only studies on actual environmental offending behavior by firms. This meta-analysis offers some support for the impact of punitive legal measures, the use of persuasive legal measures, reducing the costs of the compliance, and increasing social pressures. The support for external pressures was not overwhelming and seemed to depend on whether the independent variables were dichotomous or continuous in some cases, but the bulk of the evidence indicated that the licenses can promote compliance (especially the legal license). Theories of corporate crime should account for external pressures and seek to empirically test their importance.

#### **IV. Policy Implications**

In determining what factors are associated with offending and overcompliance, this dissertation also informs practical efforts to control corporate environmental behavior. It is important to understand what influences corporations as well as individuals in order to make more efficient and effect regulations, or to exert informal social control on them.

The vignette survey implies that to reduce corporate offending using external pressures, we can take advantage of legal and social pressures by making legal sanctions more severe *or* making sure that such sanctions are publicized widely. The positive side of the social license also seemed to enhance the likelihood of overcompliance; again, publicizing good citizenship may be important to driving corporate decisions. In this study, it seems that market forces are not as important to predicting behavior. That said, other literature suggests that taking steps to make sure that noncompliance does not create a competitive advantage is important in ensuring continued compliance among non-offenders (see Thornton et al., 2008).

Internal corporate mechanisms tend to impact overcompliance more than offending, but when the scenario depicts an employee being asked by a supervisor to offend this does predict intentions in most models. As such, educating employees about whistleblower programs and laws may be an important method by which offending can be prevented. What is interesting is that overcompliance is predicted by previous corporate behaviors—when the behavior has been common in the firm, when the company has previously been in violation of regulations, or when a supervisor asks an employee to do so, overcompliance becomes more likely. This suggests that current programs seeking to incentivize overcompliance may not be necessary.<sup>33</sup> If the particular type of behavior is already occurring on a regular basis in the organization, or if overcompliance is used to get back in the “good graces” of regulators after a violation (Short and Toffel, 2008), then attempting to encourage such behaviors through

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<sup>33</sup> For example, the EPA’s 33/50 program was completely voluntary; companies were not legally bound to reduce emissions. Therefore, participation is considered to be a form of overcompliance. Incentives to participate included: public recognition and awards given by the EPA for exceptional programs, technical assistance and participation in a technological information exchange program, and preferential treatment by vendors (Arora and Cason, 1995).

information provision or awards programs may be redundant. It may be that the government's limited resources would be better spent on finding out how to bring offenders back into compliance. In the present study, the finding that instrumental considerations are more important than cultural considerations for offending is interesting; again, using funds to increase the certainty of formal or reputational sanctions may be more important than funding voluntary compliance programs. However, it is important to remember that in the full models, the certainty of legal sanctions actually promoted noncompliance, a finding driven by the measure of civil suits. It may be that lawsuits are not perceived as sufficiently severe and managers may see them as a cost of doing business that, once paid, allows them to offend with impunity (Manweller, 2003; Scott and Bryant, 1992).

Although it may seem easier to develop policies geared towards corporations rather than individuals, the fact that rational choice measures are as important to decision-making in this study warrants a discussion about what may possibly be accomplished through formal/informal regulatory and business structures. First and foremost, both types of behaviors are driven by perceived career benefits. This indicates that corporations who incentivize environmentally-friendly behaviors by their employees will be more likely to be in compliance or to overcomply. It may be that, instead of offering leniency to programs who self-report violations, regulatory agencies could provide incentives for corporations who incorporate regulatory compliance into their promotion or salary enhancement criteria. In addition, the results indicate that individuals who perceive both noncompliance and overcompliance as morally wrong are less likely to engage in such behaviors. Some form of education about why compliance and

overcompliance is normatively desirable may be beneficial; perhaps regulatory agencies could develop some form of “character education” program or training that emphasizes the normative value of being a good environmental citizen.

The results of the meta-analysis indicate that the legal license does impact offending behavior, and that both persuasion and punitive approaches may be needed. This accords with Ayres and Braithwaite’s (1992) strategy of “responsive regulation” in which regulators take a cooperative approach to initial instances of noncompliance but become more punitive as offending continues. The meta-analysis also implies that finding ways to reduce the expense of coming into compliance may be helpful—perhaps through tax subsidies or educating business owners about how environmentally-friendly technology may actually help profits. The presence of social pressures also seemed to encourage compliance; educating citizens or exposing offenders in a more public forum may be important for promoting compliance with environmental regulations.

## V. **Limitations and Future Research**

Although this study makes many contributions to the corporate crime literature, it should be viewed as merely the starting point of an ambitious research agenda that will build on the limitations of the current study and will expand research questions as the evidence suggests. In terms of limitations, there is much documentation about concerns around randomized vignette survey methodology. Although it has many advantages, respondents are not reporting actual behavior, they are reporting *intended* behavior. Although some studies have found a correlation between behavioral intentions and

behavior committed in real life (Pogarsky, 2004), others have not (Exum et al., 2012). Also, some scholars are concerned about whether the scenarios are seen as realistic and whether that may impact one's responses to the vignette. I control for scenario realism in my study, but some evidence suggests that the type of behavior depicted impacts perceptions of realism and that these perceptions do have a significant impact on intentions (Rorie, 2012). To address this, I conducted a sensitivity analysis using a very different method, which provided additional support for the impact of external pressures. In addition to issues of realism and intentions, it is important to realize that many aspects of the analyses using the vignette were cross-sectional in nature and it seems that many of the significant results came from the less rigorous analyses. More research should be conducted to tease out these concerns and methodological considerations, and the results of this dissertation should be seen as one part of a larger approach to answering this research question. Clearly, this research should be conducted using different methods and measures to build knowledge around the topic.

Another cause for concern in the current study is the low response rate of the web survey. Attempting to access businesspeople is difficult in and of itself, and the lack of response to web-based surveys has been demonstrated in other studies (Porter and Whitcomb, 2003; Ranchhod and Zhou, 2001). Furthermore, it appears that my sample is made up of individuals from small organizations. Although I argue that they are head of their organizations and therefore able to put themselves in the place of the hypothetical manager, it may be that the responses of this sample are very different than those of

people located in a large corporation.<sup>34</sup> I believe that this is an important sample to target—and an oft-neglected one. As Vandenberg (2004) notes, many large corporations have improved their environmental outcomes due to the pressures placed on them, yet small businesses and individuals have not been subject to similar demands and remain a large source of day-to-day pollution releases. Even so, the theory presented is one predicting “corporate” crime. Future research should use different methods and strategies to improve the response rate and better assess the representativeness of the sample to the target population. In future research, we should also objectively assess whether the respondents or their firms have experienced environmental offending (e.g., by gathering more information on their organizations and conducting a reverse records check).

I already discussed how the methods used here should be seen as just one way to examine this question; future research should explore this question using more statistical sophistication and more rigorous methods. Supplementing the research with meta-analytic review data as was done here is helpful, although the current results should be interpreted with caution, in light of the methodological limitations of the studies used. It’s relevant that the correlational measures in the vignette surveys and the meta-analysis studies result in more significant findings than those analyses using the “cleaner” randomized vignette dimensions. It is obvious that these questions should be tested using other methods, such as: designing experimental studies with actual corporations (e.g., see Ariel, 2012), conducting surveys of multiple people nested within multiple corporations that are actually offending or overcomplying with regulations and conducting a multi-

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<sup>34</sup> However, see Simpson et al. (2013), in which we combined responses from the current sample and responses from people located in large corporations. The location of the respondent was not significant in the regression models, and the models looked substantively similar between the two samples.

level analysis, using propensity-score matching techniques, designing programs based on the theoretical propositions here and conducting program evaluations, or time-series data to examine the impact of specific programs or newsworthy events linked to informal social controls. The potential for empirical research on the integrated theory is endless.

It is also important to note that the meta-analysis results provided here are subject to change as I continue to include studies into the sample. My plan is to complete coding of articles published through 2011 and then update the results. With more studies included, it's likely that some of the findings may change. Given that the  $Q$  statistic was fairly high, I will be conducting moderator analyses to determine how the characteristics of the studies (see Table 23) impact the results.

There were also a couple of important components to the license framework that could not be examined in this study due to a lack of measures. For example, our measures of the legal license did not translate to the overcompliance scenarios. Although overcompliance is (by definition) going above and beyond what is required by law, there is some indication in the literature that legal mechanisms may promote a desire to do more than what is asked. For example, Shimshack and Ward (2008) found that corporations who are already exceeding requirements will reduce emissions *even further* when other organizations are fined, while offenders may respond to sanctions by reducing emissions beyond what is required by law. Another important factor not measured in the vignette is the pressure exerted by non-profit, non-governmental environmental organizations such as Greenpeace. Chapter 2 described how such pressures impacted pulp and paper corporations in Canada (Raizada, 1998), and the question of such organizations' effectiveness has received much research attention.

Given that such organizations are so important in the conceptualization of the license framework, it is important to include such relationships in future tests of this theory.

In addition, the interactions between various components of the theory were not tested. The license framework is very complex and clearly articulates how the various external pressures may be more/less salient in the presence or absence of the other licenses, so this is a very important question to be addressed. With the addition of individual-level considerations, there are many potential interactions that can be investigated.

Another consideration is that the literature often (but not always) discusses overcompliance and offending behaviors as existing on a continuum (e.g., a corporation moves from violating emissions standards to exceeding them), but when examined these behaviors are generally tested as if they are completely different. I think that scholars need to think about the appropriate way to measure and compare offending and overcompliance. For example, it may be that there is a temporal component to these behaviors, whereby a corporation can move from being an overcomplier at one point and then merely a complier at a later point because it successfully lobbied for more stringent standards. A longitudinal within-firm analyses on the life course of a corporation (preferably incorporating a qualitative component) would be an important contribution.

Relatedly, the impact of the licenses and internal factors can be thought of as a process that entails path dependencies. In other words, a corporation makes decisions based on events that have come before (e.g., see Finney and Lesieur, 1982). For example, corporation A may not respond to public pressures until a lawsuit (the legal license) brings bad publicity. In responding to the lawsuit, a latent consequence may be

that the firm is “responsive” to public pressures although that was not their original intent. The associated economic benefits that result from these changes may lead corporation A to explore more environmentally-friendly methods of production that also increase efficiency. A detailed case study that examines corporations over time (along the lines of Raizada, 1998) could help tease out the process by which licenses and managerial considerations impact corporate offending.

Examining whether overcompliance is driven by instrumental or normative considerations is important to tease out as well. Although the current study suggests that instrumental values are less salient in explaining overcompliance at the firm level, scholars should examine this more closely. For example, it may be possible to see if overcompliers in one period negotiate for more stringent regulations to put competitors at a disadvantage, and then what their outcomes look like after new regulations are implemented. Do they continue to overcomply? It would also be interesting to conduct case studies on violators who become overcompliers, either after being sanctioned for violations or being informally pressured to do so. This would allow us to look into the “black box” of corporate motivations.

Finally, given that this is the first multivariate study of the license framework and the first empirical study of the integrated theory, it is important to replicate these findings with different samples to assess the generalizability of the study. For example, the pressures faced by different industries may lead to different findings. Targeting individuals in different management positions would provide more insight into unique cost/benefit calculations at the individual level. It may be that different regulatory structures in different countries would impact the relationships predicted. Although this

theory is specific to environmental behavior, I think it is general enough to apply to a variety of other corporate crimes; testing these propositions on different crime outcomes is important. Research should continue to test the theory to determine its scope, its success, and its failures.

At the end of the day, I hope to contribute to knowledge about corporate decision-making to mitigate the amount of future noncompliance and its consequent impact on wildlife and human life. Although the empirical results here should be considered in light of the methodological limitations, creating a comprehensive (but clear) theoretical framework that looks beyond the legal domain can guide tests of multiple factors and multiple levels of analysis and provide a framework to examine relevant interactions. Only by studying the pressures on corporations, the pressures on individuals, and how they are related can we hope to make changes in organizational behavior.

## Appendix A: Descriptions of Variables Used in the Vignette Analyses

### Offending Scenarios

Variable Name	Level	Description	Range	Number Observations	Mean	Standard Deviation	Scale Alphas
<b><u>Dependent Variable</u></b>							
Offend	Individual	What is the chance that you would act as the manager (Lee) did under these circumstances?	0 = No chance 1 = 10% or more chance	879	0.38	0.49	-
<b><u>Legal License</u></b>							
Firm Legal Certainty	Firm	Scale combining responses on the certainty of firm legal sanctions (being prosecuted, being investigated by regulatory agency, being sued)	0 – 30	845	16.88	7.96	0.91
Firm Legal Severity	Firm	Scale combining responses on the severity of firm legal sanctions (being prosecuted, being investigated by regulatory agency, being sued)	0 - 30	855	25.14	5.64	0.94
<b><u>Social License</u></b>							
Firm Social Certainty	Firm	What is the chance that your actions would tarnish the reputation of the firm?	0 = No chance 10 = 100% chance	864	6.75	2.53	-

Variable Name	Level	Description	Range	Number Observations	Mean	Standard Deviation	Scale Alphas
Firm Social Severity	Firm	How much of a problem would it be if you tarnished the reputation of the firm for doing what the manager did?	0 = No problem at all 10 = A very big problem	852	7.91	2.29	-
Mandate (VD)	Firm	The firm has been mandated to release public information regarding the type and amount of toxic substances released by its facilities	0 = not part of vignette 1 = part of vignette	879	0.48	0.500	-
No Info (VD)	Firm	No indication that the firm has been mandated to release public information regarding the type and amount of toxic substances released by its facilities ( <i>Reference Category</i> )	0 = not part of vignette 1 = part of vignette	879	0.52	0.500	-
<b><u>Economic License</u></b>							
<b>Economic Constraints</b>							
Foreign Comp. (VD)	Firm	Losing ground to foreign competitors	0=No 1=Yes	879	0.35	0.48	-
Econ. Healthy (VD)	Firm	Economically healthy	0=No 1=Yes	879	0.31	0.46	-
Econ. Deteriorating (VD)	Firm	Economically deteriorating ( <i>reference category</i> )	0=No 1=Yes	879	0.34	0.47	-

Variable Name	Level	Description	Range	Number Observations	Mean	Standard Deviation	Scale Alphas
<b>Firm Competitive Position</b>							
Strengthen Comp. (VD)	Firm	Strengthen the firm's competitive position	0=No 1=Yes	879	0.47	0.50	-
Weak Comp. (VD)	Firm	Weaken the firm's competitive position ( <i>reference category</i> )	0=No 1=Yes	879	0.53	0.50	-
<b>Environmental Marketing</b>							
Green Market. (VD)	Firm	Firm that promotes itself as a green company	0=No 1=Yes	879	0.52	0.50	-
No Market. (VD)	Firm	No information on marketing ( <i>reference category</i> )	0=No 1=Yes	879	0.48	0.50	-
<b>Firm Economic Status</b>							
Increasing Rev. (VD)	Firm	Increasing sales and revenues	0=No 1=Yes	879	0.47	0.50	-
Declining Rev. (VD)	Firm	Declining sales and revenues	0=No 1=Yes	879	0.53	0.50	-
<b>Corporate Culture</b>							
Common Firm (VD)	Firm	This practice is common in the firm	0=No 1=Yes	879	0.33	0.47	-
Common Industry (VD)	Firm	This practice is common in the industry	0=No 1=Yes	879	0.35	0.48	-
No Culture (VD)	Firm	No information about culture ( <i>Reference category</i> )	0=No 1=Yes	879	0.33	0.47	-

Variable Name	Level	Description	Range	Number Observations	Mean	Standard Deviation	Scale Alphas
<b>Firm Environmental Record</b>							
Exceed Standards (VD)	Firm	Firm has exceeded regulatory compliance standards	0=No 1=Yes	879	0.34	0.47	-
Met Standards (VD)	Firm	Firm generally has met EPA compliance standards	0=No 1=Yes	879	0.33	0.47	-
Violated Standards (VD)	Firm	Firm routinely has violated EPA compliance standards ( <i>Reference category</i> )	0=No 1=Yes	879	0.33	0.47	-
<b>Firm EPA Volunteer Status</b>							
Voluntary Participant (VD)	Firm	Volunteered to participate in an EPA sponsored pollution reduction program	0=No 1=Yes	879	0.49	0.50	-
Reject Program (VD)	Firm	Was contacted by the EPA to participate in a voluntary pollution reduction program but declined to do so ( <i>Reference category</i> )	0=No 1=Yes	879	0.51	0.50	-
<b>Internal Compliance Operation</b>							
Reprimand (VD)	Firm	The firm severely reprimanded an employee who was discovered violating environmental regulations	0=No 1=Yes	879	0.34	0.48	-

Variable Name	Level	Description	Range	Number Observations	Mean	Standard Deviation	Scale Alphas
Fired (VD)	Firm	The firm fired an employee who was discovered violating environmental regulations	0=No 1=Yes	879	0.37	0.48	-
No action (VD)	Firm	The firm took no action against an employee who was discovered violating environmental regulations ( <i>Reference category</i> )	0=No 1=Yes	879	0.29	0.46	-
<b>Internal Compliance Structure</b>							
Hotline (VD)	Firm	A hotline in which violation of compliance can be anonymously reported	0=No 1=Yes	879	0.18	0.39	-
Audits (VD)	Firm	Internal random environmental audits in which violations of compliance can be uncovered	0=No 1=Yes	879	0.21	0.41	-
Self Reporting (VD)	Firm	Mandatory self-reporting to the EPA of monthly release data	0=No 1=Yes	879	0.19	0.39	-
Mandatory Training (VD)	Firm	Mandatory ethics training	0=No 1=Yes	879	0.21	0.40	-
Ethics Code	Firm	An ethics code ( <i>Reference category</i> )	0=No 1=Yes	879	0.21	0.40	-
<b>Management demands</b>							
Super. Asked (VD)	Individual	Is asked by a higher level manager	0=No 1=Yes	879	0.50	0.50	-
Asks (VD)	Individual	Asks an employee ( <i>Reference category</i> )	0=No 1=Yes	879	0.50	0.50	-

Variable Name	Level	Description	Range	Number Observations	Mean	Standard Deviation	Scale Alphas
<b>Managerial Ethics</b>							
Ethics Guide (VD)	Firm	Ethical considerations guide top management hiring decisions, performance evaluations, and promotions	0=No 1=Yes	879	0.34	0.47	-
Ethics Distinct (VD)	Firm	Ethical considerations are considered important, but distinct, from business decisions	0=No 1=Yes	879	0.32	0.47	-
Ethics Irrelev. (VD)	Firm	Ethical considerations are considered mostly irrelevant to business decisions ( <i>Reference category</i> )	0=No 1=Yes	879	0.35	0.48	-
<b><u>Rational Choice Variables</u></b>							
Ind. Legal Certainty	Individual	Scale combining responses on the certainty of individual legal sanctions (being arrested, being investigated by regulatory agency, being sued)	0 – 30	842	13.94	8.06	0.90
Ind. Legal Severity	Individual	Scale combining responses on the severity of individual legal sanctions (being arrested, being sued)	0 – 20	864	18.93	2.40	0.90
Ind. Social Certainty	Individual	Scale combining responses on the certainty of individual social sanctions (losing respect of business associates, being dismissed from company, losing respect of good friends, jeopardizing future job prospects)	0 – 40	851	27.73	8.55	0.85

Variable Name	Level	Description	Range	Number Observations	Mean	Standard Deviation	Scale Alphas
Ind. Social Severity	Individual	Scale combining responses on the severity of individual social sanctions (losing respect of business associates, being dismissed from company, losing respect of good friends, jeopardizing future job prospects)	6 – 40	837	36.11	5.31	0.88
Career	Individual	How much would it advance your career if you did what the manager did under these circumstances?	0 = Not at all – 10 = A great deal	874	2.67	2.76	-
Broad Moral	Individual	Scale combining four items pertaining to justice (the behavior was fair, the behavior was just), deontology (behavior was morally right), and relativism (behavior is acceptable to my family)	4 - 28	852	26.12	3.16	0.86
Social Contract	Individual	Scale combining two items testing whether the behavior violates an unspoken promise or an unwritten contract	2 - 14	854	11.60	3.11	0.78
Relativist	Individual	Scale combining two items about whether the behavior is traditionally acceptable or culturally acceptable	2 - 14	865	9.88	3.27	0.72
Ethical	Individual	What this manager is doing is: Very unethical—No at all unethical	1= Not at all unethical 7= Very unethical	870	5.92	1.98	-

Variable Name	Level	Description	Range	Number Observations	Mean	Standard Deviation	Scale Alphas
Thrilling	Individual	How exciting or thrilling would it be for you if you did what the manager did under the circumstances?	0 = Not exciting 10 = Very exciting	874	0.61	1.62	-
Desirable	Individual	Please rate this behavior according to its desirability	0= Not at all desirable 10= Very desirable	873	0.73	1.57	-
<b><u>Control Variables</u></b>							
Discharge Toxin	Scenario	The scenario depicted the behavior as “discharging toxins into a local waterway”	0 = No 1 = Yes	879	0.35	0.48	-
Hazard. Labeling	Scenario	The scenario depicted the behavior as “mislabeling hazardous waste”	0 = No 1 = Yes	879	0.31	0.46	-
Ignore Comp.	Scenario	Reference Category: The scenario depicted the behavior as “ignoring an EPA compliance order”	0 = No 1 = Yes	879	0.34	0.48	-
Years Experience	Individual	Years of work experience	2 - 60	815	29.97	10.50	-
Marital_Binary	Individual	Marital status: whether married	0=not married 1=married	798	0.78	0.41	-

Variable Name	Level	Description	Range	Number Observations	Mean	Standard Deviation	Scale Alphas
Religion	Individual	How important is religion in your everyday life?	0=Very Important 1=Important 2=Somewhat Important 3=Not Important	816	1.69	1.21	-
Coinvolve	Individual	Within your organization, how involved are you in environmental decision-making?	0=Not involved 1 = Somewhat involved 2=Routinely involved	802	1.81	0.48	-
Personexp_no	Individual	If you have ever worked in publicly or privately-owned business, have you personally experienced situations similar to those described in the scenarios? = NO	0 = No 1 = Yes	816	0.37	0.48	-

Variable Name	Level	Description	Range	Number Observations	Mean	Standard Deviation	Scale Alphas
Personexp_years	Individual	If you have ever worked in publicly or privately-owned business, have you personally experienced situations similar to those described in the scenarios? = YES	0 = No 1 = Yes	816	0.53	0.50	-
Personexp_na	Individual	If you have ever worked in publicly or privately-owned business, have you personally experienced situations similar to those described in the scenarios? = NOT APPLICABLE (Reference category)	0 = No 1 = Yes	816	0.11	0.31	-
Envcommit	Firm	Describe the environmental commitment of your company	0=Excessive 1=About Right 2=Use Work 3=Poor	806	0.92	0.40	-
Sit. Realistic	Individual	Regardless of what you would do, is the situation described in this scenario believable or realistic?	0=No 1=Yes	876	0.86	0.35	-
Upper level (VD)	Individual	An upper-level manager	0=No 1=Yes	879	0.49	0.50	-
Mid-level (VD)	Individual	A mid-level manager (Reference category)	0=No 1=Yes	879	0.52	0.50	-
Code of Ethics	Firm	Does your current employer have a code of ethics?	0=No 1=Yes	826	0.57	0.50	-
Mand. Training	Firm	Does your current employer have mandatory ethics training?	0=No 1=Yes	826	0.19	0.39	-

Variable Name	Level	Description	Range	Number Observations	Mean	Standard Deviation	Scale Alphas
Random Audits	Firm	Does your current employer have random ethics audits?	0=No 1=Yes	826	0.02	0.15	-
Anon. hotline	Firm	Does your current employer have an anonymous hotline to report unethical/illegal conduct?	0=No 1=Yes	826	0.12	0.33	-
Top man. Ethics	Firm	Does your current employer have top management that treats ethics and ethics violations seriously?	0=No 1=Yes	826	0.55	0.50	-
Company Policy	Firm	Does your current employer have company policy regarding environmental compliance management systems in relevant business sites	0=No 1=Yes	826	0.32	0.47	-
Size	Firm	Number of employees in respondent's firm	0 - 1267	877	12.10	76.88	-

*NOTE:* The number of observations and descriptives provided here reflect the original data, not the imputed data. The post-imputation means and standard deviations can be found in Appendices B and C. Note, however, that the scale alphas here reflect the scales created with imputed data.

### Overcompliance Scenarios

Variable Name	Level	Description	Range	Number of Observations	Mean	Standard Deviation	Scale Alphas
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### Dependent Variable

Variable Name	Level	Description	Range	Number of Observations	Mean	Standard Deviation	Scale Alphas
Overcomply	Individual	What is the chance that you would act as the manager (Lee) did under these circumstances?	0 = 0% chance – 10 = 100% chance	586	7.66	2.95	-
<b><u>Social License</u></b>							
Firm Social Certainty (OVER)	Firm	What is the chance that your actions would enhance the reputation of the firm?	0 = 0% chance – 10 = 100% chance	570	6.35	2.66	-
Firm Social Rewards	Firm	How beneficial would it be if your actions enhanced the reputation of the firm?	0 = not at all beneficial – 10 = extremely beneficial	570	6.84	2.61	-
Mandate (VD)	Firm	The firm has been mandated to release public information regarding the type and amount of toxic substances released by its facilities	0 = not part of vignette 1 = part of vignette	586	0.45	0.49	-
No Info (VD)	Firm	No indication that the firm has been mandated to release public information regarding the type and amount of toxic substances released by its facilities ( <i>Reference Category</i> )	0 = not part of vignette 1 = part of vignette	586	0.55	0.50	-
<b><u>Economic License</u></b>							
Economic Constraints Foreign Comp. (VD)	Firm	Losing ground to foreign competitors	0=No 1=Yes	586	0.34	0.47	-

Variable Name	Level	Description	Range	Number of Observations	Mean	Standard Deviation	Scale Alphas
Econ. Healthy (VD)	Firm	Economically healthy	0=No 1=Yes	586	0.29	0.46	-
Econ. Deteriorating (VD)	Firm	Economically deteriorating ( <i>reference category</i> )	0=No 1=Yes	586	0.37	0.48	-
<b>Firm Competitive Position</b>							
Strengthen Comp. (VD)	Firm	Strengthen the firm's competitive position	0=No 1=Yes	586	0.52	0.50	-
Weak Comp. (VD)	Firm	Weaken the firm's competitive position ( <i>reference category</i> )	0=No 1=Yes	586	0.48	0.50	-
<b>Environmental Marketing</b>							
Green Market. (VD)	Firm	Firm that promotes itself as a green company	0=No 1=Yes	586	0.52	0.50	-
No Market. (VD)	Firm	No information on marketing ( <i>reference category</i> )	0=No 1=Yes	586	0.49	0.50	-
<b>Firm Economic Status</b>							
Increasing Rev. (VD)	Firm	Increasing sales and revenues	0=No 1=Yes	586	0.54	0.50	-
Declining Rev. (VD)	Firm	Declining sales and revenues	0=No 1=Yes	586	0.46	0.50	-
<b>Corporate Culture</b>							
Common Firm (VD)	Firm	This practice is common in the firm	0=No 1=Yes	586	0.36	0.48	-
Common Industry (VD)	Firm	This practice is common in the industry	0=No 1=Yes	586	0.32	0.47	-

Variable Name	Level	Description	Range	Number of Observations	Mean	Standard Deviation	Scale Alphas
No Culture (VD)	Firm	No information about culture ( <i>Reference category</i> )	0=No 1=Yes	586	0.32	0.47	-
<b>Firm Environmental Record</b>							
Exceed Standards (VD)	Firm	Firm has exceeded regulatory compliance standards	0=No 1=Yes	586	0.36	0.48	-
Met Standards (VD)	Firm	Firm generally has met EPA compliance standards	0=No 1=Yes	586	0.30	0.46	-
Violated Standards (VD)	Firm	Firm routinely has violated EPA compliance standards ( <i>Reference category</i> )	0=No 1=Yes	586	0.35	0.48	-
<b>Firm EPA Volunteer Status</b>							
Voluntary Participant (VD)	Firm	Volunteered to participate in an EPA sponsored pollution reduction program	0=No 1=Yes	586	0.49	0.50	-
Reject Program (VD)	Firm	Was contacted by the EPA to participate in a voluntary pollution reduction program but declined to do so ( <i>Reference category</i> )	0=No 1=Yes	586	0.51	0.50	-
<b>Internal Compliance Operation</b>							
Reprimand (VD)	Firm	The firm severely reprimanded an employee who was discovered violating environmental regulations	0=No 1=Yes	586	0.36	0.48	-

Variable Name	Level	Description	Range	Number of Observations	Mean	Standard Deviation	Scale Alphas
Fired (VD)	Firm	The firm fired an employee who was discovered violating environmental regulations	0=No 1=Yes	586	0.33	0.47	-
No action (VD)	Firm	The firm took no action against an employee who was discovered violating environmental regulations <i>(Reference category)</i>	0=No 1=Yes	586	0.32	0.47	-
<b>Internal Compliance Structure</b>							
Hotline (VD)	Firm	A hotline in which violation of compliance can be anonymously reported	0=No 1=Yes	586	0.18	0.38	-
Audits (VD)	Firm	Internal random environmental audits in which violations of compliance can be uncovered	0=No 1=Yes	586	0.21	0.41	-
Self Reporting (VD)	Firm	Mandatory self-reporting to the EPA of monthly release data	0=No 1=Yes	586	0.20	0.40	-
Mandatory Training (VD)	Firm	Mandatory ethics training	0=No 1=Yes	586	0.21	0.41	-
Ethics Code	Firm	An ethics code <i>(Reference category)</i>	0=No 1=Yes	586	0.21	0.40	-
<b>Management demands</b>							
Super. Asked (VD)	Individual	Is asked by a higher level manager	0=No 1=Yes	586	0.50	0.50	-
Asks (VD)	Individual	Asks an employee <i>(Reference category)</i>	0=No 1=Yes	586	0.50	0.50	-
<b>Managerial Ethics</b>							

Variable Name	Level	Description	Range	Number of Observations	Mean	Standard Deviation	Scale Alphas
Ethics Guide (VD)	Firm	Ethical considerations guide top management hiring decisions, performance evaluations, and promotions	0=No 1=Yes	586	0.30	0.46	-
Ethics Distinct (VD)	Firm	Ethical considerations are considered important, but distinct, from business decisions	0=No 1=Yes	586	0.34	0.47	-
Ethics Irrelev. (VD)	Firm	Ethical considerations are considered mostly irrelevant to business decisions ( <i>Reference category</i> )	0=No 1=Yes	586	0.36	0.48	-
<b><u>Rational Choice Variables</u></b>							
Ind. Social Certainty	Individual	Scale combining responses on the certainty of individual social rewards (gaining respect of business associates, being promoted in the company, gaining respect of good friends, advancing future job prospects)	0 – 40	566	22.47	8.99	0.88
Ind. Social Severity	Individual	Scale combining responses on the benefits of individual social rewards (gaining respect of business associates, being promoted in the company, gaining respect of good friends, advancing future job prospects)	0 – 40	566	26.26	10.25	0.95
Career	Individual	How much would it advance your career if you did what the manager did under these circumstances?	0 = Not at all 10 = A great deal	583	5.10	2.76	-

Variable Name	Level	Description	Range	Number of Observations	Mean	Standard Deviation	Scale Alphas
Broad Moral	Individual	Scale combining four items pertaining to justice (the behavior was fair, the behavior was just), deontology (behavior was morally right), and relativism (behavior is acceptable to my family)	4 - 28	560	9.52	6.64	0.95
Social Contract	Individual	Scale combining two items testing whether the behavior violates an unspoken promise or an unwritten contract	2 - 14	568	4.86	3.35	0.91
Relativist	Individual	Scale combining two items about whether the behavior is traditionally acceptable or culturally acceptable	2 - 14	570	5.32	3.13	0.73
Ethical	Individual	What this manager is doing is: Very unethical—No at all unethical	1= Not at all unethical 7= Very unethical	578	2.48	2.00	-
Thrilling	Individual	How exciting or thrilling would it be for you if you did what the manager did under the circumstances?	0 = Not exciting 10 = Very exciting	583	4.16	3.24	-
Desirable	Individual	Please rate this behavior according to its desirability	0= Not at all desirable 10= Very desirable	575	7.06	3.15	-

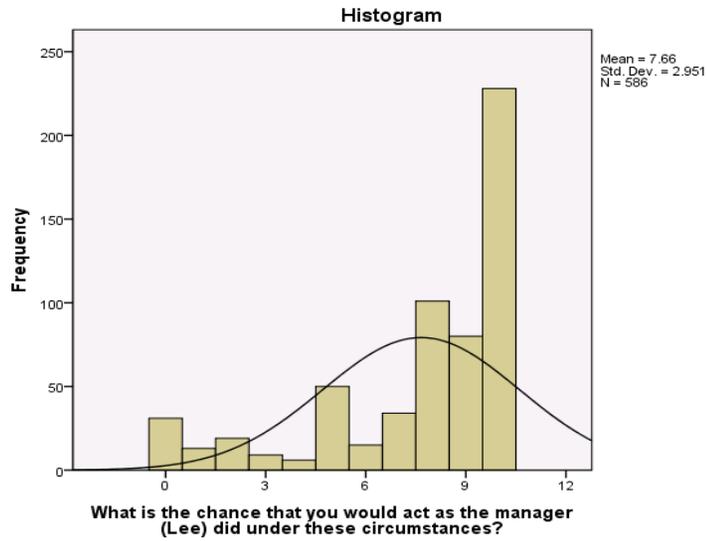
Variable Name	Level	Description	Range	Number of Observations	Mean	Standard Deviation	Scale Alphas
Feel Good	Individual	Assume that you did what the manager did and it did not become known within or outside of the company. Would you feel good for acting as the manager did?	0 = No 1 = Yes	567	0.81	0.39	-
Pride	Individual	Would you feel a sense of pride if others knew that you had done this?	0 = No 1 = Yes	563	0.74	0.44	-
<b><u>Control Variables</u></b>							
Pollution 40	Scenario	Behavior depicted in scenario is “reduces pollution 40% below required levels”	0 = No 1 = Yes	586	0.49	0.50	-
Security	Scenario	Behavior depicted in scenario is “enhances security around toxic storage sites” ( <i>reference categories</i> )	0 = No 1 = Yes	586	0.51	0.50	-
Years Experience	Individual	Years of work experience	2 - 60	536	29.67	10.14	-
Marital_Binary	Individual	Marital status: whether married	0=not married 1=married	533	0.80	0.40	-
Religion	Individual	How important is religion in your everyday life?	0=Very Important 1=Important 2=Somewhat Important 3=Not Important	538	1.68	1.19	-

Variable Name	Level	Description	Range	Number of Observations	Mean	Standard Deviation	Scale Alphas
Coinvolve	Individual	Within your organization, how involved are you in environmental decision-making?	0=Not involved 1=Somewhat involved 2=Routinely involved	531	1.83	0.45	-
Personexp_no	Individual	If you have ever worked in publicly or privately-owned business, have you personally experienced situations similar to those described in the scenarios? = NO	0 = No 1 = Yes	539	0.35	0.48	-
Personexp_yes	Individual	If you have ever worked in publicly or privately-owned business, have you personally experienced situations similar to those described in the scenarios? = YES	0 = No 1 = Yes	539	0.55	0.50	-
Personexp_na	Individual	If you have ever worked in publicly or privately-owned business, have you personally experienced situations similar to those described in the scenarios? = NOT APPLICABLE ( <i>Reference category</i> )	0 = No 1 = Yes	539	0.10	0.30	-
Envcommit	Firm	Describe the environmental commitment of your company	0=Excessive 1=About Right 2=Use Work 3=Poor	533	0.11	0.31	-

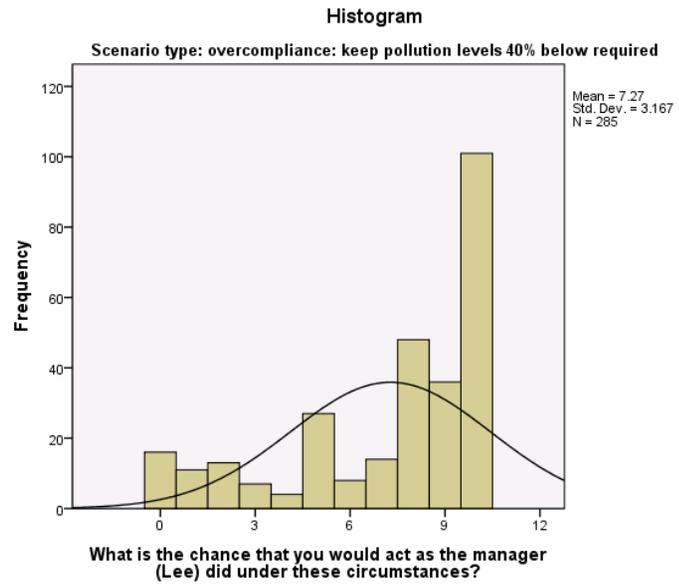
Variable Name	Level	Description	Range	Number of Observations	Mean	Standard Deviation	Scale Alphas
Sit. Realistic	Individual	Regardless of what you would do, is the situation described in this scenario believable or realistic?	0=No 1=Yes	585	0.77	0.42	-
Upper level (VD)	Individual	An upper-level manager	0=No 1=Yes	586	0.50	0.50	-
Mid-level (VD)	Individual	A mid-level manager ( <i>Reference category</i> )	0=No 1=Yes	586	0.45	0.50	-
Code of Ethics	Firm	Does your current employer have a code of ethics?	0=No 1=Yes	543	0.58	0.49	-
Mand. Training	Firm	Does your current employer have mandatory ethics training?	0=No 1=Yes	543	0.20	0.40	-
Random Audits	Firm	Does your current employer have random ethics audits?	0=No 1=Yes	543	0.04	0.18	-
Anon. hotline	Firm	Does your current employer have an anonymous hotline to report unethical/illegal conduct?	0=No 1=Yes	543	0.12	0.33	-
Top man. Ethics	Firm	Does your current employer have top management that treats ethics and ethics violations seriously?	0=No 1=Yes	543	0.54	0.50	-
Company Policy	Firm	Does your current employer have company policy regarding environmental compliance management systems in relevant business sites	0=No 1=Yes	543	0.35	0.48	-
Size	Firm	Number of employees in respondent's firm	0 - 370	585	9.14	32.22	-

*NOTE:* The number of observations and descriptives provided here reflect the original data, not the imputed data. The post-imputation means and standard deviations can be found in Appendices B and C. Note, however, that the scale alphas here reflect the scales created with imputed data.

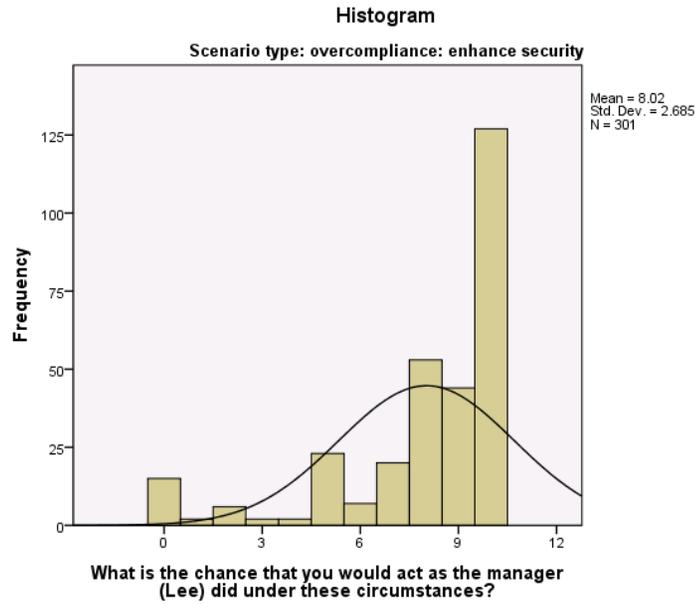
### Frequency Distribution of Overcompliance Intentions, Both Types of Behaviors



## Frequency Distribution of Overcompliance Intentions, Keeping Pollution 40% Below Required



## Frequency Distribution of Overcompliance Intentions, Enhancing Security Around Toxic Waste Sites



**Appendix B: Noncompliance Scenarios Descriptives, Before and After Imputation**

Variable Name	Response Values	Valid N	Number (%) Missing out of 879 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
Offend	0 = No chance 1 = 10% or more chance	879	0 (0%)	0.38 (0.485)	9669	0.38 (0.485)
<b>Legal License</b>						
Firm Legal Certainty	0 – 30	845	34 (3.9%)	16.88 (7.960)	9635	16.77 (7.961)
Firm Legal Severity	0 - 30	855	24 (2.7%)	25.14 (5.637)	9645	25.06 (5.839)
<b>Social License</b>						
Firm Social Certainty	0 = No chance 10 = 100% chance	864	15 (1.7%)	6.75 (2.533)	9654	6.74 (2.544)
Firm Social Severity	0 = No problem at all 10 = A very big problem	852	27 (3.1%)	7.91 (2.288)	9642	7.86 (2.371)
<b>Public Awareness</b>						
Mandated (VD)	0=No 1=Yes	879	--	0.48 (0.500)	9669	0.48 (0.5000)
<b>Economic License</b>						
Economic Constraints						
Foreign Comp. (VD)	0=No 1=Yes	879	--	0.35 (0.477)	9669	0.35 (0.477)
Econ. Healthy (VD)	0=No 1=Yes	879	--	0.31 (0.464)	9669	0.31 (0.464)
Econ. Deteriorating (VD)	0=No 1=Yes	879	--	0.34 (0.473)	9669	0.34 (0.473)
Firm Competitive						

Variable Name	Response Values	Valid N	Number (%) Missing out of 879 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
Position						
Strengthen Comp. (VD)	0=No 1=Yes	879	--	0.47 (0.500)	9669	0.47 (0.499)
Weak Comp. (VD)	0=No 1=Yes	879	--	0.53 (0.500)	9669	0.53 (0.499)
Firm Environmental Marketing						
Green Marketing (VD)	0=No 1=Yes	879	--	0.52 (0.500)	9669	0.52 (0.499)
Firm Economic Status/Subsidiary Economic Status						
Declining Rev. (VD)	0=No 1=Yes	879	--	0.53 (0.499)	9669	0.53 (0.499)
Increasing Rev. (VD)	0=No 1=Yes	879	--	0.47 (0.499)	9669	0.47 (0.499)
Firm Ownership						
Public (VD)	0=No 1=Yes	879	--	0.51 (0.500)	9669	0.51 (0.500)
Private (VD)	0=No 1=Yes	879	--	0.49 (0.500)	9669	0.49 (0.500)
Corporate Culture						
Common Firm (VD)	0=No 1=Yes	879	--	0.33 (0.470)	9669	0.33 (0.470)
Common Ind. (VD)	0=No 1=Yes	879	--	0.34 (0.476)	9669	0.34 (0.475)

<b>Variable Name</b>	<b>Response Values</b>	<b>Valid N</b>	<b>Number (%) Missing out of 879<sup>b</sup></b>	<b>Mean (SD)— Before imputation</b>	<b>Valid N— Imputed</b>	<b>Mean (SD)— After imputation</b>
No Culture (VD)		879	--	0.33 (0.469)	9669	0.33 (0.469)
Firm Environmental Record						
Exceed Stand. (VD)	0=No 1=Yes	879	--	0.34 (0.473)	9669	0.34 (0.473)
Met Stand. (VD)	0=No 1=Yes	879	--	0.33 (0.472)	9669	0.33 (0.472)
Violate Stand. (VD)	0=No 1=Yes	879	--	0.33 (0.470)	9669	0.33 (0.469)
Firm EPA Volunteer Status						
Voluntary Participant (VD)	0=No 1=Yes	879	--	0.49 (0.500)	9669	0.49 (0.500)
Reject Program (VD)	0=No 1=Yes	879	--	0.51 (0.500)	9669	0.51 (0.500)
Internal Compliance Operation						
No Action (VD)	0=No 1=Yes	879	--	0.29 (0.455)	9669	0.29 (0.454)
Reprimanded (VD)	0=No 1=Yes	879	--	0.34 (0.475)	9669	0.34 (0.475)
Fired (VD)	0=No 1=Yes	879	--	0.37 (0.482)	9669	0.37 (0.482)
Internal Compliance Structure						
Hotline (VD)	0=No 1=Yes	879	--	0.18 (0.386)	9669	0.18 (0.386)

Variable Name	Response Values	Valid N	Number (%) Missing out of 879 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
Audits (VD)	0=No 1=Yes	879	--	0.21 (0.406)	9669	0.21 (0.406)
Self Reporting (VD)	0=No 1=Yes	879	--	0.19 (0.391)	9669	0.19 (0.391)
Ethics Code (VD)	0=No 1=Yes	879	--	0.22 (0.413)	9669	0.22 (0.412)
Ethics Training (VD)	0=No 1=Yes	879	--	0.20 (0.404)	9669	0.20 (0.404)
<b>Managerial Ethics</b>						
Ethics Guide (VD)	0=No 1=Yes	879	--	0.34 (0.473)	9669	0.34 (0.473)
Ethics Distinct (VD)	0=No 1=Yes	879	--	0.32 (0.466)	9669	0.32 (0.466)
Ethics Irrelevant (VD)	0=No 1=Yes	879	--	0.34 (0.476)	9669	0.34 (0.475)
Super. Asked (VD)	0=No 1=Yes	879	--	0.50 (0.500)	9669	0.50 (0.500)
Asks (VD)	0=No 1=Yes	879	--	0.50 (0.500)	9669	0.50 (0.500)
<b>Rational Choice variables</b>						
Ind. Legal Certainty	0 - 30	842	37 (4.21%)	13.94 (8.062)	9632	13.90 (8.026)
Ind. Legal Severity	0 - 20	864	15 (1.71%)	18.93 (2.399)	9654	18.85 (2.692)
Ind. Social Certainty	0 – 40	851	28 (3.19%)	27.73 (8.554)	9641	27.59 (8.655)
Ind. Social Severity	6 – 40	837	42 (4.8%)	36.11 (5.311)	9635	26.79 (4.633)
Career	0 = Not at all	874	5 (0.60%)	2.67 (2.756)	9664	2.67 (2.757)

Variable Name	Response Values	Valid N	Number (%) Missing out of 879 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
	10 = A great deal					
Broad Moral	4 - 28	852	27 (3.07%)	26.12 (3.161)	9642	26.11 (3.191)
Social Contract	2 – 14	854	25 (2.84%)	11.59 (3.114)	9644	11.60 (3.118)
Relativist	2 – 14	865	14 (1.59%)	9.88 (3.270)	9655	9.89 (3.267)
Ethical	1 = not at all unethical - 7 = greatly unethical	870	9 (1.02%)	5.92 (1.981)	9660	5.92 (1.980)
Desirable	0=Not at all desirable 10=Very desirable	879	0 (0.0%)	0.77 (1.643)	9669	0.75 (1.596)
Thrilling	0 = Not exciting 10 = Very exciting	874	5 (0.60%)	0.61 (1.615)	9664	0.61 (1.611)
Shame	0 = Yes 1 = No	841	38 (4.32%)	0.04 (0.203)	9631	0.05 (0.212)
Shame Severity	0 = No problem at all 10 = A very big problem	861	18 (2.05%)	8.85 (1.947)	9651	8.78 (2.083)
<b>Control Variables</b>						
Discharge Toxins	0=No 1=Yes	879	0 (0.0%)	0.35 (0.476)	9669	0.34 (0.475)
Hazard Labeling	0=No 1=Yes	879	0 (0.0%)	0.31 (0.464)	9669	0.31 (0.464)

<b>Variable Name</b>	<b>Response Values</b>	<b>Valid N</b>	<b>Number (%) Missing out of 879<sup>b</sup></b>	<b>Mean (SD)— Before imputation</b>	<b>Valid N— Imputed</b>	<b>Mean (SD)— After imputation</b>
Ignore Compliance	0=No 1=Yes	879	0 (0.0%)	0.34 (0.475)	9669	0.34 (0.475)
Years Experience	Specify	815	64 (7.3%)	29.97 (10.502)	9605	29.99 (10.596)
Marital Binary	0=not married 1=married	798	81 (9.2%)	0.78 (0.414)	9588	0.78 (0.414)
Religion	0=Very Important 1=Important 2=Somewhat Important 3=Not Important	816	63 (7.2%)	1.69 (1.208)	9606	1.69 (1.210)
Coinvolve	0=Not involved 1=Somewhat involved 2=Routinely involved	802	77 (8.8%)	1.81 (0.477)	9592	1.80 (0.496)
Personexp_no	0=Has had personal experience or Not Applicable 1=Has not had personal experience	816	63 (7.2%)	0.37 (0.482)	9606	0.37 (0.482)
Personexp_yes	0=Has not has personal experience with scenarios 1=Has had	816	63 (7.2%)	0.52 (0.500)	9606	0.52 (0.500)

Variable Name	Response Values	Valid N	Number (%) Missing out of 879 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
	personal experience					
Personexp_na	0=Has had opportunity to have had personal experiences with scenarios 1=Personal experiences are not applicable	816	63 (7.2%)	0.11 (0.312)	8976	0.11 (0.311)
Envcommit	0 = Excessive 1 = About right 2 = Use work 3 = Poor	806	73 (8.3%)	0.92 (0.396)	9596	0.93 (0.404)
Sit. Realistic	0 =No 1 =Yes	876	3 (0.3%)	0.86 (0.349)	9666	0.86 (0.349)
Mid-level (VD)	0=No 1=Yes	879	--	0.52 (0.500)	9669	0.52 (0.500)
Upper-level (VD)	0=No 1=Yes	879	--	0.48 (0.500)	9669	0.48 (0.500)
Code of Ethics	0=No 1=Yes	826	53 (6.0%)	0.57 (0.495)	9616	0.58 (0.494)
Mand. Training	0=No 1=Yes	826	53 (6.0%)	0.19 (0.390)	9616	0.20 (0.399)
Random Audits	0=No 1=Yes	826	53 (6.0%)	0.02 (0.154)	9616	0.03 (0.171)

Variable Name	Response Values	Valid N	Number (%) Missing out of 879 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
Anon. Hotline	0=No 1=Yes	826	53 (6.0%)	0.12 (0.326)	9616	0.13 (0.338)
Top Management Ethics <sup>b</sup>	0=No 1=Yes	826	53 (6.0%)	0.55 (0.498)	9616	0.55 (0.498)
Company Policy	0=No 1=Yes	826	53 (6.0%)	0.32 (0.467)	9616	0.33 (0.469)
Size	0 – 1267	877	2 (0.2%)	12.10 (76.875)	9667	12.16 (76.797)

<sup>a</sup> These means do not add up to 1 because these dummy variables were created from the original envcommit variable, in which there were 73 missing values (out of 879 possible).

<sup>b</sup> This is the number of offending scenarios after dropping unit nonresponders and those with missing information on the dependent variable (based on recommendations by Ye, 2010).

**Appendix C: Overcompliance Scenarios Descriptives, Before and After Imputation**

Variable Name		Response Values	Valid N	Number (%) Missing out of 586 <sup>b</sup>	Mean (SD)—Before imputation	Valid N—Imputed	Mean (SD)—After imputation
Overcomply	0 = No chance 10 = 100% chance		586	0 (0%)	7.66 (2.951)	6446	7.66 (2.949)
<b>Social License</b>							
Firm Social Certainty (OVER)	0 = No chance 10 = 100% chance		570	16 (2.7%)	6.35 (2.659)	6430	6.33 (2.671)
Firm Social Rewards	0=Not at all beneficial 10=Extremely beneficial		570	16 (2.7%)	6.84 (2.613)	6430	6.79 (2.662)
Public Awareness							
Mandated (VD)	0=No 1=Yes		586	--	0.45 (0.498)	6446	0.45 (0.498)
<b>Economic License</b>							
Economic Constraints							
Foreign Comp. (VD)	0=No 1=Yes		586	--	0.34 (0.474)	6446	0.34 (0.474)
Econ. Healthy (VD)	0=No 1=Yes		586	--	0.29 (0.456)	6446	0.29 (0.455)
Econ. Deteriorating (VD)	0=No 1=Yes		586	--	0.37 (0.482)	6446	0.37 (0.482)
Firm Competitive Position							
Strengthen Comp.	0=No 1=Yes		586	--	0.52 (0.500)	6446	0.52 (0.500)

Variable Name	Response Values	Valid N	Number (%) Missing out of 586 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
(VD)						
Weaken Comp. (VD)	0=No 1=Yes	586	--	0.48 (0.500)	6446	0.48 (0.500)
Firm Environmental Marketing						
Green Market. (VD)	0=No 1=Yes	586	--	0.52 (0.500)	6446	0.52 (0.500)
Firm Economic Status/Subsidiary Economic Status						
Declining Rev. (VD)	0=No 1=Yes	586	--	0.46 (0.499)	6446	0.46 (0.499)
Increasing Rev. (VD)	0=No 1=Yes	586	--	0.54 (0.499)	6446	0.54 (0.499)
Firm Ownership						
Public (VD)	0=No 1=Yes	586	--	0.51 (0.500)	6446	0.51 (0.500)
Private (VD)	0=No 1=Yes	586	--	0.49 (0.500)	6446	0.49 (0.500)
<b>Corporate Culture</b>						
Common Firm (VD)	0=No 1=Yes	586	--	0.36 (0.481)	6446	0.36 (0.481)
Common Ind. (VD)	0=No 1=Yes	586	--	0.32 (0.467)	6446	0.32 (0.467)
No Culture (VD)		586	--	0.32 (0.465)	6446	0.32 (0.465)

Variable Name	Response Values	Valid N	Number (%) Missing out of 586 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
Firm Environmental Record						
Exceed Stand. (VD)	0=No 1=Yes	586	--	0.36 (0.480)	6446	0.36 (0.480)
Met Stand. (VD)	0=No 1=Yes	586	--	0.30 (0.457)	6446	0.30 (0.460)
Violated Stand. (VD)	0=No 1=Yes	586	--	0.34 (0.476)	6446	0.34 (0.475)
Firm EPA Volunteer Status						
Voluntary Part. (VD)	0=No 1=Yes	586	--	0.49 (0.500)	6446	0.49 (0.500)
Reject Program (VD)	0=No 1=Yes	586	--	0.51 (0.500)	6446	0.51 (0.500)
Internal Compliance Operation						
No Action (VD)	0=No 1=Yes	586	--	0.32 (0.465)	6446	0.32 (0.465)
Reprimanded (VD)	0=No 1=Yes	586	--	0.36 (0.480)	6446	0.36 (0.480)
Fired (VD)	0=No 1=Yes	586	--	0.33 (0.469)	6446	0.33 (0.469)
Internal Compliance Structure						
Hotline(VD)	0=No 1=Yes	586	--	0.18 (0.381)	6446	0.18 (0.381)

Variable Name	Response Values	Valid N	Number (%) Missing out of 586 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
Audits (VD)	0=No 1=Yes	586	--	0.21 (0.405)	6446	0.21 (0.405)
Self Reporting (VD)	0=No 1=Yes	586	--	0.20 (0.403)	6446	0.20 (0.402)
Ethics code (VD)	0=No 1=Yes	586	--	0.20 (0.404)	6446	0.20 (0.404)
Ethics training (VD)	0=No 1=Yes	586	--	0.21 (0.408)	6446	0.21 (0.407)
<b>Managerial Ethics</b>						
Ethics Guide (VD)	0=No 1=Yes	586	--	0.30 (0.460)	6446	0.30 (0.460)
Ethics Distinct (VD)	0=No 1=Yes	586	--	0.34 (0.473)	6446	0.34 (0.472)
Ethics Irrelevant (VD)	0=No 1=Yes	586	--	0.36 (0.480)	6446	0.36 (0.480)
Super. Asked (VD)	0=No 1=Yes	586	--	0.50 (0.500)	6446	0.50 (0.500)
Asks (VD)	0=No 1=Yes	586	--	0.50 (0.500)	6446	0.50 (0.500)
<b>Rational Choice variables</b>						
Ind. Legal Certainty (OVER)	0 - 40	566	20 (3.41%)	22.47 (8.985)	6426	22.33 (9.050)
Ind. Legal Rewards	0 - 40	566	20 (3.41%)	26.26 (10.247)	6426	26.11 (10.399)
Career	0 = Not at all 10 = A great	583	3 (0.0%)	5.10 (2.763)	6443	5.09 (2.766)

Variable Name	Response Values	Valid N	Number (%) Missing out of 586 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
	deal					
Broad Moral	4 – 28	560	26 (4.44%)	9.52 (6.636)	6420	9.57 (6.705)
Social Contract	2 - 14	568	18 (3.07%)	4.86 (3.354)	6428	4.86 (3.377)
Relativist	2 - 14	570	16 (2.73%)	5.32 (3.131)	6430	5.35 (3.150)
Ethical	1 = not at all unethical - 7 = greatly unethical	578	8 (1.37%)	2.48 (1.995)	6438	2.49 (2.003)
Desirable	0=Not at all desirable 10=Very desirable	586	0 (0.0%)	7.06 (3.120)	6446	7.05 (3.157)
Thrilling	0 = Not exciting 10 = Very exciting	583	3 (0.5%)	4.16 (3.238)	6443	4.16 (3.236)
Feel Good	0 = No 1 = Yes	567	19 (3.24%)	0.81 (0.393)	6427	0.81 (0.395)
Pride	0 = No 1 = Yes	563	23 (3.92%)	0.74 (0.438)	6423	0.73 (0.442)
<b>Control Variables</b>						
Pollution 40	0=No 1=Yes	586	--	0.49 (0.500)	6446	0.49 (0.500)
Security	0=No 1=Yes	586	--	0.51 (0.500)	6446	0.51 (0.500)
Years Experience <sup>b</sup>	Specify	536	50 (8.5%)	29.67 (10.139)	6396	29.69 (10.161)
Marital_Binary	0=not married 1=married	533	53 (9.0%)	0.80 (0.400)	6393	0.80 (0.404)

Variable Name	Response Values	Valid N	Number (%) Missing out of 586 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
Religion	0=Very Important 1=Important 2=Somewhat Important 3=Not Important	538	48 (8.2%)	1.68 (1.194)	6398	1.68 (1.194)
Coinvolve	0=Not involved 1=Somewhat involved 2=Routinely involved	531	55 (9.4%)	1.83 (0.452)	6391	1.81 (0.465)
Personexp_no	0=Has had personal experience or Not Applicable 1=Has not had personal experience	539	47 (8.0%)	0.35 (0.478)	6399	0.35 (0.478)
Personexp_yes	0=Has not has personal experience with scenarios 1=Has had personal experience	539	47 (8.0%)	0.55 (0.500)	6399	0.55 (0.498)
Personexp_na	0=Has had opportunity to have had	539	47 (8.0%)	0.10 (0.296)	6399	0.10 (0.293)

Variable Name	Response Values	Valid N	Number (%) Missing out of 586 <sup>b</sup>	Mean (SD)— Before imputation	Valid N— Imputed	Mean (SD)— After imputation
	personal experiences with scenarios 1=Personal experiences are not applicable					
Envcommit	0 = Excessive 1 = About right 2 = Use work 3 = Poor	533	53 (9.04%)	0.94 (0.393)	6393	0.95 (0.396)
Sit. Realistic	0=Yes 1=No	585	1 (0.2%)	0.77 (0.421)	6445	0.77 (0.420)
Code of Ethics	0=No 1=Yes	543	43 (7.3%)	0.58 (0.494)	6403	0.59 (0.492)
Mand. Training	0=No 1=Yes	543	43 (7.3%)	0.20 (0.404)	6403	0.22 (0.411)
Random Audits	0=No 1=Yes	543	43 (7.3%)	0.03 (0.184)	6403	0.04 (0.203)
Anon. Hotline	0=No 1=Yes	543	43 (7.3%)	0.12 (0.327)	6403	0.13 (0.337)
Top Man. Ethics <sup>b</sup>	0=No 1=Yes	543	43 (7.3%)	0.54 (0.499)	6403	0.54 (0.498)
Company Policy	0=No 1=Yes	543	43 (7.3%)	0.35 (0.476)	6403	0.35 (0.477)
Mid-level (VD)	0=No 1=Yes	586	--	0.45 (0.498)	6446	0.45 (0.498)
Upper-level (VD)	0=No 1=Yes	586	--	0.55 (0.498)	6446	0.55 (0.498)

<b>Variable Name</b>	<b>Response Values</b>	<b>Valid N</b>	<b>Number (%) Missing out of 586<sup>b</sup></b>	<b>Mean (SD)— Before imputation</b>	<b>Valid N— Imputed</b>	<b>Mean (SD)— After imputation</b>
Size	0 - 370	585	1 (0.2%)	9.14 (32.216)	6445	9.13 (32.168)

<sup>a</sup> These means do not add up to 1 because these dummy variables were created from the original envcommit variable, in which there were 84 missing values (out of 617 possible).

<sup>b</sup>This is the number of overcompliance scenarios after dropping unit nonresponders and those with missing information on the dependent variable (based on a recommendation by Ye, 2010).

## Appendix D: Vignette Measures Correlation Matrices

**Table D. 1. Correlation Matrix, Offending Scenario**

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
1	<b>Offend</b>	1											
2	<b>Ind. Legal Cert.</b>	- 0.123 ***	1										
3	<b>Ind. Legal Sev.</b>	- 0.138 ***	0.101 ***	1									
4	<b>Ind. Social Cert.</b>	- 0.256 ***	0.461 ***	0.197 ***	1								
5	<b>Ind. Social Sev.</b>	- 0.192 ***	0.216 ***	0.603 ***	0.439 ***	1							
6	<b>Career</b>	0.227 ***	- 0.079 **	- 0.087 **	- 0.302 ***	- 0.161 ***	1						
7	<b>Broad Moral</b>	- 0.399 ***	0.184 ***	0.271 ***	0.364 ***	0.383 ***	- 0.160 ***	1					
8	<b>Social Contract</b>	- 0.239 ***	0.147 ***	0.200 ***	0.269 ***	0.251 ***	- 0.128 ***	0.413 ***	1				
9	<b>Relativist</b>	- 0.237 ***	0.241 ***	0.112 ***	0.374 ***	0.211 ***	- 0.378 ***	0.324 ***	0.265 ***	1			
10	<b>Ethical</b>	- 0.140	0.088 **	0.106 ***	0.130 ***	0.091 ***	-0.016	0.227 ***	0.206 ***	0.080 **	1		

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
		***											
1 1	<b>Desirable</b>	0.260 ***	- 0.105 ***	- 0.276 ***	- 0.302 ***	- 0.317 ***	0.150 ***	- 0.498 ***	- 0.230 ***	- 0.155 ***	- 0.123 ***	1	
1 2	<b>Thrilling</b>	0.204 ***	- 0.068 *	- 0.076 **	- 0.125 ***	- 0.130 ***	0.139 ***	- 0.166 ***	- 0.107 ***	- 0.092 ***	-0.043	0.106 ***	1
1 3	<b>Shame</b>	0.150 ***	- 0.083 **	- 0.181 ***	- 0.340 ***	- 0.314 ***	0.094 ***	- 0.456 ***	- 0.234 ***	- 0.125 ***	- 0.127 ***	0.387 ***	0.123 ***
1 4	<b>Shame Sev.</b>	- 0.162 ***	0.169 ***	0.369 ***	0.394 ***	0.656 ***	- 0.092 ***	0.375 ***	0.240 ***	0.151 ***	0.090 ***	- 0.310 ***	- 0.148 ***
1 5	<b>Firm Legal Cert.</b>	- 0.073 **	0.874 ***	0.084 **	0.441 ***	0.204 ***	- 0.067 *	0.167 ***	0.132 ***	0.207 ***	0.062 *	- 0.097 ***	-0.035
1 6	<b>Firm Legal Sev.</b>	- 0.147 ***	0.255 ***	0.443 ***	0.325 ***	0.646 ***	- 0.261 ***	0.216 ***	0.181 ***	0.279 ***	0.066 *	- 0.179 ***	- 0.077 **
1 7	<b>Firm Social Cert.</b>	- 0.151 ***	0.461 ***	0.160 ***	0.674 ***	0.354 ***	- 0.225 ***	0.219 ***	0.187 ***	0.340 ***	0.106 ***	- 0.217 ***	-0.02
1 8	<b>Firm Social Sev.</b>	- 0.155 ***	0.283 ***	0.327 ***	0.379 ***	0.693 ***	- 0.208 ***	0.234 ***	0.196 ***	0.288 ***	0.103 ***	- 0.187 ***	- 0.064 *
1 9	<b>Mandated</b>	-0.002	0.067 *	0.028	0.051	-0.004	-0.025	-0.006	-0.035	0.023	-0.027	0.011	0.001
2 0	<b>Public</b>	-0.023	-0.027	-0.018	0.033	0.033	-0.009	-0.001	-0.031	-0.012	-0.001	-0.013	-0.023
2 1	<b>Foreign Comp.</b>	0.026	0.034	0.006	0.022	0.022	0.052	0.005	-0.003	-0.041	0.053	0.024	-0.034

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
2 2	<b>Econ. Healthy</b>	-0.041	-0.038	-0.002	0.01	0.002	- 0.079 **	0.003	0.018	0.017	-0.045	-0.029	-0.022
2 3	<b>Strengthens Comp.</b>	0.021	-0.003	0.03	0.005	0.047	0.036	0.061 *	0.023	0.006	0.043	- 0.092 ***	-0.036
2 4	<b>Green Market.</b>	-0.017	-0.045	0.021	0.024	-0.021	0.033	-0.031	0.037	0.034	0.024	0.007	-0.017
2 5	<b>Declining Rev.</b>	-0.011	-0.02	-0.021	-0.047	-0.031	-0.014	0.009	-0.037	0.035	0.014	0.031	-0.043
2 6	<b>Common Firm</b>	0.031	-0.036	-0.02	-0.004	-0.027	0.003	0.051	-0.039	-0.019	- 0.066 *	-0.007	0.019
2 7	<b>Common Industry</b>	-0.009	0.045	0.011	0.005	0.014	0.042	-0.022	0.005	-0.033	0.022	-0.004	0.002
2 8	<b>Exceed Stand.</b>	0.032	-0.033	-0.015	-0.018	0.016	-0.015	-0.006	-0.013	0.012	- 0.063 *	0.019	0.01
2 9	<b>Met Stand.</b>	-0.037	0.002	0.029	0.016	-0.005	0.01	-0.047	0.022	-0.022	0.024	0.049	-0.007
3 0	<b>Voluntary Part.</b>	-0.013	-0.038	-0.049	-0.052	- 0.068 *	-0.031	-0.029	0.031	-0.014	0.053	-0.007	0.051
3 1	<b>Fired</b>	0.017	-0.01	-0.03	0	-0.024	0.036	-0.051	- 0.076 **	0.011	-0.023	0.019	-0.01
3 2	<b>Reprimanded</b>	-0.002	0.049	-0.01	0.092 ***	-0.001	-0.06	0.069 **	0.084 **	0.025	-0.009	- 0.061 *	0.005
3 3	<b>Hotline</b>	0.027	0.002	-0.02	0.006	0.005	0.016	-0.021	-0.014	-0.016	-0.015	0.029	-0.025

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
3 4	<b>Ethics Code</b>	- 0.059 *	0.083 **	0.02	0.046	0.013	0.028	0.079 **	0.065 *	0.059	0.073 **	-0.021	0.022
3 5	<b>Audits</b>	0.05	0.005	-0.022	0.049	-0.025	0.01	-0.004	0.041	-0.012	0.012	-0.005	0.039
3 6	<b>Self Reporting</b>	0.015	-0.035	0.051	- 0.061 *	0.02	-0.011	-0.051	-0.015	-0.033	-0.046	0.002	-0.012
3 7	<b>Ethics Guide</b>	0.059 *	-0.028	0.009	0.022	0.003	0.018	0.053	0.055	0.033	-0.019	-0.025	0.021
3 8	<b>Ethics Distinct</b>	- 0.061 *	-0.013	-0.02	-0.001	-0.001	- 0.057 *	0.008	-0.006	-0.007	0.053	0.066	-0.008
3 9	<b>Super. Asked</b>	0.128 ***	-0.002	0.025	-0.047	0.01	0.202 ***	- 0.129 ***	- 0.092 *	- 0.118 ***	-0.026	0.079	0.052
4 0	<b>Discharge Toxins</b>	- 0.177 ***	0.129 ***	0.012	0.148 ***	0.037	-0.044	0.115 ***	0.109 ***	0.151 ***	0.048	- 0.134 ***	0.014
4 1	<b>Hazard. Labeling</b>	-0.046	-0.039	-0.036	-0.024	-0.039	-0.052	0.051	-0.001	0.02	0.005	-0.026	- 0.062 *
4 2	<b>Years Exp.</b>	0.034	0.016	-0.08	-0.032	- 0.116 ***	0.068 *	- 0.059 *	-0.001	0.002	- 0.058 *	0.109 ***	0.068 *
4 3	<b>Marital binary</b>	0.073 **	-0.049	-0.012	0.016	- 0.063 *	- 0.089 **	-0.047	-0.017	0.066 *	-0.032	0.037	-0.019
4 4	<b>Religion</b>	0.005	- 0.190 ***	0.024	- 0.149 ***	- 0.098 ***	0.091 ***	0.024	-0.026	- 0.091 *	0.043	- 0.087 **	0.087 **

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
4 5	<b>Coinvolve</b>	-0.051	0.068 *	0.01	0.019	0	0.023	-0.023	0.021	-0.02	- 0.061 *	-0.003	-0.051
4 6	<b>personexp_n o</b>	0.009	0.005	0.026	-0.003	0.035	-0.042	0.042	0.071 **	0.056	0.097 ***	-0.026	- 0.082 **
4 7	<b>personexp_ye s</b>	-0.038	0	- 0.076 **	0.012	-0.054	0.012	-0.01	-0.022	0	- 0.132 ***	-0.002	0.012
4 8	<b>Envcommit</b>	0.094 ***	- 0.100 ***	-0.034	- 0.066 *	-0.035	0.004	-0.057	- 0.070 **	-0.042	0.044	0.060 *	0.01
4 9	<b>Sit. Realistic</b>	0.060 *	-0.023	-0.043	-0.026	0.007	0.196 ***	0.013	-0.007	- 0.145 ***	-0.006	-0.016	0.025
5 0	<b>Upper Level</b>	0.003	0.002	- 0.073 **	-0.012	-0.034	-0.012	0.016	- 0.078 **	-0.031	0.006	-0.025	0.047
5 1	<b>Code of Ethics</b>	-0.029	0.174 ***	0.025	0.121 ***	0.034	-0.013	0.05	0.055	0.04	0.067 *	-0.036	0.025
5 2	<b>Mandatory Training</b>	-0.005	0.078 **	- 0.073 **	0.023	-0.041	- 0.082 **	-0.045	0.052	0.012	0.004	0.042	-0.008
5 3	<b>Random Audits</b>	-0.057	0.070 **	- 0.062 *	0.054	-0.047	- 0.088 **	0.001	0.028	0.044	0.023	0.009	-0.049
5 4	<b>Anon. Hotline</b>	-0.019	0.039	-0.036	-0.006	0.004	-0.034	-0.029	0.021	-0.047	-0.015	-0.039	-0.054
5 5	<b>Top Man. Ethics</b>	- 0.064 *	0.080 **	0.044	0.101 ***	0.096 ***	- 0.061 *	0.019	0.105 ***	0.001	0.034	- 0.109 ***	- 0.110 ***

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
5 6	<b>Company Policy</b>	0.019	0.171 ***	-0.003	0.081 **	0.025	- 0.064 *	- 0.062 *	-0.034	0.013	-0.037	- 0.069 **	-0.025
5 7	<b>Size</b>	0.060 *	0.009	-0.05	0.026	0.021	-0.017	0.005	0.028	0.004	- 0.132 ***	-0.028	-0.006

**Table D. 1. Correlation Matrix, Offending Scenario (cont.)**

		<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>
1 3	<b>Shame</b>	1										
1 4	<b>Shame Sev.</b>	- 0.497* **	1									
1 5	<b>Firm Legal Cert.</b>	- 0.094* **	0.139* **	1								
1 6	<b>Firm Legal Sev.</b>	- 0.210* **	0.487* **	0.219* **	1							
1 7	<b>Firm Social Cert.</b>	- 0.190* **	0.255* **	0.494* **	0.383* **	1						
1 8	<b>Firm Social Sev.</b>	- 0.214* **	0.569* **	0.259* **	0.799* **	0.430* **	1					
1 9	<b>Mandated</b>	0.02	-0.003	0.082* *	0.021	0.053	0.015	1				
2 0	<b>Public</b>	-0.041	0.026	0.01	0.0642 *	0.01	0.036	-0.03	1			
2	<b>Foreign Comp.</b>	-0.011	0.016	0.063* *	0.041	0.069	0.031	0.036	-	1		

	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	
<b>1</b>								0.072*				
								*				
<b>2</b> <b>2</b>	<b>Econ. Healthy</b>	0.035	0	-0.025	0.075*	-0.049	-0.043	-	0.044	0.496*	1	
					*			0.048		**		
<b>2</b> <b>3</b>	<b>Strengthens Comp.</b>	-0.05	0.048	0.011	0.014	-0.024	0.02	0.005	-0.016	0.001	0.044	1
<b>2</b> <b>4</b>	<b>Green Market.</b>	-0.012	0.088*	-0.067*	0.013	0.005	0.018	0.049	0.03	0.04	0.009	-
			**									0.028
<b>2</b> <b>5</b>	<b>Declining Rev.</b>	-0.015	-0.006	-0.047	-0.008	-0.043	-0.015	0.007	-0.014	0.024	-0.037	0.007
<b>2</b> <b>6</b>	<b>Common Firm</b>	0.015	-0.04	-0.023	-0.037	-0.023	-0.028	-	0.025	-0.003	0.022	0.013
								0.019				
<b>2</b> <b>7</b>	<b>Common Industry</b>	-0.006	0.033	0.045	0.04	0.02	0.033	0.004	-0.017	0.044	-0.035	-
												0.007
<b>2</b> <b>8</b>	<b>Exceed Stand.</b>	0.034	-0.029	-0.029	0.035	0.001	0.02	0.023	-0.031	0	0.026	-
												0.027
<b>2</b> <b>9</b>	<b>Met Stand.</b>	0.013	0.003	0.004	-0.023	-0.02	-0.006	-	0.01	-0.056*	0.052	0.043
								0.038				
<b>3</b> <b>0</b>	<b>Voluntary Part.</b>	0.013	-0.064*	-0.037	-0.064*	-0.021	-0.051	0.003	0.006	0.083*	0.058*	-
										*		0.016
<b>3</b> <b>1</b>	<b>Fired</b>	0.023	-0.01	-0.023	-0.01	-0.022	-0.009	0.006	0.006	-0.022	0.023	0.048
<b>3</b> <b>2</b>	<b>Reprimanded</b>	-0.031	0.002	0.073*	-0.006	0.105*	0.002	0.011	-0.024	0.051	-0.013	-
				*		**						0.014
<b>3</b> <b>3</b>	<b>Hotline</b>	0.099*	-0.001	0.007	-0.035	0.003	-0.016	0.017	-0.036	0.012	-0.013	-
		**										0.046
<b>3</b> <b>4</b>	<b>Ethics Code</b>	-0.051	0.004	0.080*	0.029	0.084*	0.024	-	0.066*	-0.036	0.065*	-
				*		*		0.015				0.029
<b>3</b>	<b>Audits</b>	-	0.013	0.024	-0.024	0.021	-0.019	0.017	-0.044	0.052	-0.032	-

		<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>
5		0.077*										0.003
		*										
3 6	<b>Self Reporting</b>	0.005	0.033	-0.048	0.005	-0.04	0.024	- 0.014	0.037	0.007	-0.035	0.070 **
3 7	<b>Ethics Guide</b>	-0.024	0.02	-0.028	-0.005	0.034	0.036	- 0.047	-0.004	0.032	-0.014	0.024
3 8	<b>Ethics Distinct</b>	-0.031	0.014	-0.008	0.025	-0.008	-0.015	0.043	0.065*	0.02	0.018	- 0.017
3 9	<b>Super. Asked</b>	0.073* *	-0.019	0.028	-0.063*	0.027	0.069* *	- 0.015	0.033	0.028	-0.018	- 0.042
4 0	<b>Discharge Toxins</b>	- 0.092* **	0.049	0.125* **	0.009	0.127* **	-0.001	0	-0.031	-0.021	0.011	0.051
4 1	<b>Hazard. Labeling</b>	0.009	-0.016	- 0.076* *	-0.018	-0.04	-0.002	0.016	0.004	-0.053	0.016	-0.05
4 2	<b>Years Exp.</b>	0.094* *	- 0.109* **	0.055	- 0.110* **	-0.058	- 0.126* **	0.083 **	-0.014	0.069* *	-0.021	0.001
4 3	<b>Marital binary</b>	0.004	-0.014	-0.060*	0.01	0.036	0.001	0.001	0.023	-0.009	-0.003	- 0.028
4 4	<b>Religion</b>	0.006	- 0.143* **	- 0.159* **	- 0.084* *	- 0.108* *	- 0.129* **	- 0.048	-0.032	-0.02	0.005	- 0.046
4 5	<b>Coinvolve</b>	0.004	-0.028	0.085* *	0.003	-0.01	-0.021	- 0.006	-0.001	0.005	-0.043	- 0.011
4 6	<b>personexp_no</b>	-0.003	0.048	-0.021	0.016	0.057	0.038	- 0.059 *	0.022	0.011	-0.013	- 0.002
4	<b>personexp_yes</b>	-0.009	-0.03	0.048	-0.012	-0.019	-0.006	0.016	0.034	-0.062*	0.064*	-

		<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>
7												0.016
4 8	<b>Envcommit</b>	0.027	- 0.090* *	- 0.074* *	-0.045	- 0.064*	-0.047	0.009	-0.032	0.038	-0.06*	- 0.002
4 9	<b>Sit. Realistic</b>	-0.035	0.061*	-0.015	- 0.093* **	- 0.0622 *	-0.032	0	0.004	-0.003	-0.024	0.056
5 0	<b>Upper Level</b>	0.008	-0.03	-0.01	-0.035	-0.019	-0.04	- 0.016	0.057*	0.013	-0.026	0.047
5 1	<b>Code of Ethics</b>	-0.042	0.044	0.111* **	0.038	0.066*	0.077* *	0.005	0.041	0.062*	- 0.070* *	- 0.028
5 2	<b>Mandatory Training</b>	0.043	-0.033	0.042	0.012	0.035	0.022	0.005	-0.025	0.079* *	-0.026	0.024
5 3	<b>Random Audits</b>	0.045	-0.017	0.078* *	0.02	0.074* *	0.01	-0.01	-0.006	0.035	-0.006	0.057 *
5 4	<b>Anon. Hotline</b>	0.053	-0.01	0.02	0.017	0.041	0.014	- 0.031	0.008	0.052	-0.054	0.001
5 5	<b>Top Man. Ethics</b>	-0.035	0.059*	0.101* **	0.088* *	0.084* *	0.072	0.062	-0.021	0.054	-0.028	0.043
5 6	<b>Company Policy</b>	0.055	0.038	0.156* **	0.067*	0.086* *	0.078* *	0.048	-0.014	0.103* **	-0.017	0.025
5 7	<b>Size</b>	0.011	0.013	0.044	0.016	0.05	0.032	0.028	0.027	0.052	-0.01	0.022

**Table D. 1. Correlation Matrix, Offending Scenario (cont.)**

		<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>
2 4	<b>Green Market.</b>	1										
2	<b>Declining Rev.</b>	0.021	1									

	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	
5												
2 6	<b>Common Firm</b>	-0.01	0.037	1								
2 7	<b>Common Industry</b>	0.034	- 0.059 *	- 0.509* **	1							
2 8	<b>Exceed Stand.</b>	0.03	- 0.025	-0.01	0.003	1						
2 9	<b>Met Stand.</b>	-0.025	0.017	-0.031	0.019	- 0.506* **	1					
3 0	<b>Voluntary Part.</b>	0.011	0.018	-0.003	0.005	0	-0.027	1				
3 1	<b>Fired</b>	0.036	0.01	0.031	- 0.018	0.033	-0.027	-0.004	1			
3 2	<b>Reprimanded</b>	0.013	0.006	-0.008	- 0.016	-0.005	0.015	-0.012	- 0.549* **	1		
3 3	<b>Hotline</b>	-0.017	0.028	-0.024	0.005	-0.025	-0.003	-0.016	- 0.076* *	0.031	1	
3 4	<b>Ethics Code</b>	-0.036	- 0.039	- 0.068* *	0.047	0.019	0.005	0.009	-0.004	0.001	- 0.239* **	1
3 5	<b>Audits</b>	0.045	- 0.008	0.016	- 0.054	0.031	-0.013	0.023	0.013	0.001	- 0.242* **	- 0.260* **
3 6	<b>Self Reporting</b>	0.032	- 0.028	-0.021	0.031	0.014	-0.02	-0.036	0.035	0.002	- 0.227* **	- 0.244* **
3	<b>Ethics Guide</b>	0.052	0.012	0.048	-	0.015	-	0.007	0.02	-0.029	0.013	-0.022

	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	
7				0.046		0.066*						
						*						
3 8	<b>Ethics Distinct</b>	-0.038	-0.03	0.014	0.013	0.033	-0.014	0.021	-0.011	-0.001	-0.019	0.059*
3 9	<b>Super. Asked</b>	0.001	0.003	-0.02	0.006	-0.047	-	0.026	-0.022	0.023	0.058*	0.005
							0.059*					
4 0	<b>Discharge Toxins</b>	-0.014	-	-	0.013	-0.037	-0.002	0.01	0.002	0.015	-0.032	0.029
			0.006	0.071*								
				*								
4 1	<b>Hazard. Labeling</b>	0.014	0.008	0.043	0.032	0	0.042	-0.065	0.003	-0.023	-0.007	-0.026
4 2	<b>Years Exp.</b>	0.024	-	0.003	0.046	-0.013	-0.025	0.031	0.071*	-	0.089*	0.008
			0.018						*	*		
4 3	<b>Marital binary</b>	-0.01	0.023	-0.006	-	-	0.071*	0.060*	0.034	0.041	-0.023	-0.029
					0.019	0.071*	*					
4 4	<b>Religion</b>	-	0.076*	0.034	0.013	0.002	0.038	0.009	0.021	0.005	-0.039	-0.027
		0.076*	*									
4 5	<b>Coinvolve</b>	-0.056	-	0.028	-	0.056	-0.016	-	0.073*	-0.031	0.028	0.002
			0.015		0.006			0.073*	*			0.059*
4 6	<b>personexp_no</b>	-0.018	-	0.002	-	-0.02	0	0.029	0.019	-0.019	0.016	0.011
			0.035		0.061							
					*							
4 7	<b>personexp_yes</b>	0.012	-	0.004	0.031	-0.022	0.004	-0.038	-0.006	-0.01	-0.029	0.042
			0.027									
4 8	<b>Envcommit</b>	-0.03	0.022	-0.027	-	0.021	0.002	-0.012	-0.024	-0.016	-	0.069*
					0.042						0.069*	-0.035
											*	

		<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>
<b>49</b>	<b>Sit. Realistic</b>	0.013	0.025	-0.029	0.02	-0.042	0.051	0.038	-0.018	-0.018	0.03	-0.02
<b>50</b>	<b>Upper Level</b>	-0.016	0.015	-0.027	0.058*	-0.019	0.022	-0.024	0.007	0.022	-0.056*	0.044
<b>51</b>	<b>Code of Ethics</b>	-0.06	0.021	0.031	0.043	-0.028	0.02	-0.015	-0.023	-0.009	0.031	0.03
<b>52</b>	<b>Mandatory Training</b>	0.016	-0.004	-0.018	0.016	0.043	0.013	0.038	-0.033	0.009	0.047	0.045
<b>53</b>	<b>Random Audits</b>	0.007	0.038	-0.043	0.051	0.072*	-0.029	0.018	-0.023	0.003	0.027	0.074*
<b>54</b>	<b>Anon. Hotline</b>	0.038	-0.045	0.032	-0.014	0.028	0.002	0.028	-0.016	0.038	0.103**	0.011
<b>55</b>	<b>Top Man. Ethics</b>	-0.028	-0.031	0.022	0.02	0.041	-0.019	-0.045	-0.018	0.111**	-0.007	0.008
<b>56</b>	<b>Company Policy</b>	-0.048	-0.024	0.004	0.011	-0.031	0.025	0.007	0.021	-0.014	0.078*	-0.001
<b>57</b>	<b>Size</b>	-0.02	0.064*	-0.042	0.007	0.012	-0.042	0.006	-0.051	0.089**	-0.019	0.008

**Table D. 1. Correlation Matrix, Offending Scenario (cont.)**

		<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41</u>	<u>42</u>	<u>43</u>	<u>44</u>	<u>45</u>
<b>35</b>	<b>Audits</b>	1										
<b>36</b>	<b>Self Reporting</b>	0.247**	1									
<b>37</b>	<b>Ethics Guide</b>	0.032	0.015	1								
<b>38</b>	<b>Ethics Distinct</b>	-0.02	0.091*	0.487*	1							

		<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41</u>	<u>42</u>	<u>43</u>	<u>44</u>	<u>45</u>
			**	**								
3 9	<b>Super. Asked</b>	0.025	-0.044	0.004	- 0.074* *	1						
4 0	<b>Discharge Toxins</b>	-0.012	0.013	-0.066*	0.003	- 0.037	1					
4 1	<b>Hazard. Labeling</b>	0.053	-0.01	0.054	-0.024	- 0.023	- 0.489* **	1				
4 2	<b>Years Exp.</b>	0.034	0.007	0.005	0.028	- 0.003	-0.02	0.00 8	1			
4 3	<b>Marital binary</b>	0.036	0.029	0	0.005	- 0.042	0.004	0.00 9	0.006	1		
4 4	<b>Religion</b>	0.004	0.04	0.022	-0.023	- 0.017	-0.005	0.01 7	0.047	- 0.059*	1	
4 5	<b>Coinvolve</b>	0.029	-0.055	0.017	-0.03	- 0.026	0.001	- 0.02 7	0.068*	- 0.069*	0.022	1
4 6	<b>personexp_no</b>	-0.019	0.042	0.068* *	-0.006	- 0.032	0.01	- 0.02 4	- 0.111* **	0.108* **	0.025	- 0.139* **
4 7	<b>personexp_yes</b>	0.016	- 0.084* *	-0.054	0.042	- 0.015	-0.036	0.04 5	0.087* *	- 0.088* *	- 0.072* *	0.172* **
4 8	<b>Envcommit</b>	0	0.075* *	-0.007	-0.019	0.002	0.002	0.02 9	-0.025	-0.01	0.031	- 0.198* **
4 9	<b>Sit. Realistic</b>	0.037	0.011	-0.024	-0.003	0.025	- 0.078* *	- 0.00 2	0.001	0.003	-0.008	0.025
5	<b>Upper Level</b>	-0.01	0.024	0.012	0.016	-	0.02	0.01	0.049	0.03	-0.005	-0.022

		<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41</u>	<u>42</u>	<u>43</u>	<u>44</u>	<u>45</u>	
<b>0</b>						0.028		8					
<b>5 1</b>	<b>Code of Ethics</b>	-0.019	-0.058*	-0.054	0.052	0.069**	0.053	- 5	0.05	-0.02	-0.015	- 0.136* **	-0.01
<b>5 2</b>	<b>Mandatory Training</b>	-0.026	0.023	- 0.078* *	0.037	0.051	0.003	0.01 2	-0.062*	0.046	0.078* *	- 0.083* *	
<b>5 3</b>	<b>Random Audits</b>	-0.004	-0.054	-0.029	0.077* *	- 0.063 *	0.036	0.01	0.158* **	0.085* *	- 0.111* **	-0.004	
<b>5 4</b>	<b>Anon. Hotline</b>	-0.046	-0.003	-0.052	0.055	0.023	0.015	0.02 4	0	0.055	-0.019	-0.028	
<b>5 5</b>	<b>Top Man. Ethics</b>	0.013	-0.014	-0.068* *	-0.005	0.049	-0.038	0.02 9	-0.017	-0.004	-0.066* **	0.173* **	
<b>5 6</b>	<b>Company Policy</b>	0.027	-0.043	-0.029	0.006	0.046	-0.008	0.01 3	0.013	0.026	- 0.153* **	0.098* **	
<b>5 7</b>	<b>Size</b>	0.070* *	-0.03	0.039	-0.032	0.01	0.015	- 0.00 9	-0.006	0.048	- 0.082* *	0.005	

**Table D. 1. Correlation Matrix, Offending Scenario (cont.)**

		<u>46</u>	<u>47</u>	<u>48</u>	<u>49</u>	<u>50</u>	<u>51</u>	<u>52</u>	<u>53</u>	<u>54</u>	<u>55</u>	<u>56</u>
<b>4 6</b>	<b>personexp_no</b>	1										
<b>4 7</b>	<b>personexp_yes</b>	- 0.699** *	1									
<b>4 8</b>	<b>Envcommit</b>	-0.02	-0.037	1								
<b>4</b>	<b>Sit. Realistic</b>	-0.046	0.075*	-0.052	1							

9			*									
50	Upper Level	-0.009	-0.002	0.014	0	1						
51	Code of Ethics	-0.069**	0.078*	-0.027	-0.015	0.063*	1					
52	Mandatory Training	-0.05	0.051	0.048	-0.029	0.024	0.290**	1				
53	Random Audits	0.013	-0.006	-0.049	-0.006	0.022	0.121**	0.329**	1			
54	Anon. Hotline	-0.025	0.009	-0.002	-0.015	-0.039	0.255**	0.489**	0.376**	1		
55	Top Man. Ethics	-0.090**	0.089*	-0.079**	0.070*	-0.060*	0.224**	0.207**	0.095**	0.186**	1	
56	Company Policy	-0.135**	0.196**	-0.102**	-0.083*	-0.019	0.261**	0.310**	0.145**	0.278**	0.313**	1
57	Size	-0.02	0.037	0.017	0.01	0.033	-0.039	0.148**	0.027	0.179**	0.067*	-0.036

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

**Table D. 2. Correlation Matrix, Overcompliance Scenario**

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
<b>1 Overcomply</b>	1										
<b>2 Ind. Social Cert (OVER)</b>	0.469**	1									
<b>3 Ind. Social Rewards</b>	0.467**	0.590**	1								
<b>4 Career</b>	0.447**	0.607**	0.369**	1							

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
<b>5</b>	<b>Broad Moral</b>	- 0.733* **	- 0.515* **	- 0.577* **	- 0.369* **	1						
<b>6</b>	<b>Social Contract</b>	- 0.565* **	- 0.427* **	- 0.477* **	- 0.302* **	0.709* **	1					
<b>7</b>	<b>Relativist</b>	- 0.532* **	- 0.395* **	- 0.304* **	- 0.373* **	0.605* **	0.581* **	1				
<b>8</b>	<b>Ethical</b>	- 0.500* **	- 0.354* **	- 0.415* **	- 0.218* **	0.608* **	0.503* **	0.363* **	1			
<b>9</b>	<b>Desirable</b>	0.580* **	0.493* **	0.517* **	0.326* **	- 0.726* **	- 0.587* **	- 0.467* **	- 0.494* **	1		
<b>10</b>	<b>Thrilling</b>	0.388* **	0.495* **	0.488* **	0.504* **	- 0.383* **	- 0.224* **	- 0.102* *	- 0.269* **	0.362 ***	1	
<b>11</b>	<b>Feel Good</b>	0.588* **	0.531* **	0.494* **	0.306* **	- 0.735* **	- 0.509* **	- 0.425* **	- 0.468* **	0.631 ***	0.388 ***	1
<b>12</b>	<b>Pride</b>	0.425* **	0.561* **	0.549* **	0.292* **	- 0.589* **	- 0.386* **	- 0.294* **	- 0.371* **	0.528 ***	0.468 ***	0.679 ***
<b>13</b>	<b>Firm Social Cert. (OVER)</b>	0.487* **	0.716* **	0.549* **	0.469* **	- 0.516* **	- 0.399* **	- 0.333* **	- 0.403* **	0.522 ***	0.464 ***	0.546 ***
<b>14</b>	<b>Firm Social Rewards</b>	0.458* **	0.550* **	0.852* **	0.339* **	- 0.570* **	- 0.438* **	- 0.289* **	- 0.399* **	0.481 ***	0.401 ***	0.481 ***
<b>15</b>	<b>Mandated</b>	-0.055	-0.016	0.049	-0.039	0.055	-0.021	0.063	-0.028	-0.014	0.05	-0.042

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
5												
1 6	<b>Public</b>	-0.066	- 0.0893 **	- 0.077*	-0.06	0.055	0.087* *	0.063	0.013	-0.039	-0.003	-0.052
1 7	<b>Foreign Comp.</b>	-0.021	- 0.0585	-0.058	-0.036	0.0538	0.055	0.029	0.004	-0.049	- 0.083 **	-0.023
1 8	<b>Econ. Healthy</b>	0.043	0.0813 *	0.002	0.026	-0.045	-0.038	-0.016	-0.035	0.047	0.049	0.041
1 9	<b>Strengthens Comp.</b>	0.05	0.0923 **	0.022	0.141* **	- 0.078*	- 0.072*	- 0.077*	-0.014	0.096 **	0.150 ***	0.104 **
2 0	<b>Green Market.</b>	-0.036	- 0.0025	-0.011	-0.012	0.009	0	-0.007	0.039	-0.008	-0.026	0.007
2 1	<b>Declining Rev.</b>	-0.014	0.0015	0.01	- 0.069*	-0.007	0.023	0.057	0.008	0.014	0.006	-0.022
2 2	<b>Common firm</b>	0.069*	0.01	-0.031	-0.02	-0.034	-0.026	- 0.079*	-0.056	0.048	-0.059	0.03
2 3	<b>Common industry</b>	0.066	0.053	0.085* *	0.088* *	-0.064	-0.06	-0.069	-0.038	0.031	0.066	0.053
2 4	<b>Exceed Stand.</b>	0.027	0.031	0.047	-0.037	-0.04	- 0.126* **	-0.014	-0.066	0.119 ***	-0.017	0.071 8*
2 5	<b>Met Stand.</b>	- 0.090* *	0.015	-0.024	0.025	0.055	0.072* *	0.003	0.054	- 0.075 *	-0.009	- 0.092 **
2 6	<b>Voluntary Participant</b>	0.03	0.036	0.059	0.085* *	-0.04	- 0.076* *	- 0.078* *	-0.041	0.037	0.032	0.018
2 7	<b>Fired</b>	0.048	0.043	0.025	0.015	-0.001	- 0.091* *	-0.056	-0.005	0.032	-0.026	0.027
2	<b>Reprimand</b>	0.03	0.023	0.016	0.063	-0.043	-0.03	-0.016	-0.015	0.037	0.077	0.017

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	
<b>8</b>										*		
<b>29</b>	<b>Hotline</b>	-0.05	0.009	-0.015	-0.005	0.046	0.022	0.023	0.012	-0.049	-0.033	-0.049
<b>30</b>	<b>Ethics Code</b>	0.067	0.034	0.043	0.044	-0.075*	0.090*	-0.038	0.119*	0.057	0.045	0.094**
<b>31</b>	<b>Audits</b>	-0.011	-0.039	0.03	0.036	0.048	-0.018	0.04	-0.007	0.017	-0.015	-0.065
<b>32</b>	<b>Self Reporting</b>	-0.019	0.029	0.01	-0.041	0.022	0.032	0.006	0.092*	-0.027	0.008	0.008
<b>33</b>	<b>Ethics Guide</b>	0.080*	0.05	0.069*	0.06	-0.067	0.069*	0.098*	0.081*	0.065	0.051	0.037
<b>34</b>	<b>Ethics Distinct</b>	-0.038	0.043	0.008	-0.02	0.031	0.032	0.048	0.001	-0.012	0.007	0.011
<b>35</b>	<b>Super. Asked</b>	0.296**	0.074*	-0.026	0.201**	0.166**	0.172**	0.248**	0.126**	0.115***	0.078*	0.080*
<b>36</b>	<b>Pollution 40</b>	0.127**	0.053	0.072*	0.016	0.102*	0.053	0.141**	0.014	-0.02	0.150***	0.076*
<b>37</b>	<b>Years Exp.</b>	-0.029	0.036	0.081*	-0.009	0.056	0.031	0.001	0.062	-0.062	0.081*	-0.06
<b>38</b>	<b>Marital Binary</b>	0.021	-0.02	-0.01	-0.012	0.027	-0.012	-0.012	0.024	0.044	-0.059	0.005
<b>39</b>	<b>Religion</b>	0.076*	0.048	0.076*	0.002	0.118**	0.074*	-0.066	-0.037	0.091**	0.037	0.096**
<b>40</b>	<b>coinvolve</b>	0.03	-0.008	0.039	0.011	0.084*	0.084*	-0.063	0.078*	0.06	0.029	0.039

		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
4 1	<b>personexp_no</b>	-0.033	-0.024	-0.054	-0.027	0.055	0.039	0.047	0.075*	-0.038	-	0.099**
4 2	<b>personexp_yes</b>	0.009	0.055	0.066	0.018	-	0.081*	-0.059	-0.051	0.092*	0.05	0.065
4 3	<b>Envcommit</b>	-0.011	-	0.116**	-0.039	-0.054	0.019	0.045	0.108*	-0.03	0.012	0.022
4 4	<b>Sit. Realistic</b>	0.183**	0.172**	-0.004	0.237**	-	0.103*	-0.039	-	0.221**	-0.028	0.102**
4 5	<b>Upper Level</b>	0.023	0.054	-0.009	0.021	-0.017	-0.02	-0.006	0.018	0.054	0.028	0.017
4 6	<b>Code of Ethics</b>	-0.026	-0.003	-	0.109*	0.018	0.048	0.044	0.039	-0.001	-0.057	-0.001
4 7	<b>Mand. Training</b>	-0.004	0.005	-0.068	-0.021	0.018	0.042	0.007	-0.052	-0.047	-0.045	-0.004
4 8	<b>Random Audits</b>	0.028	-0.024	-	0.125**	-0.034	0.033	0.04	0.026	-0.06	-0.039	-
4 9	<b>Anon. Hotline</b>	-	0.115**	-0.023	-	0.080*	-0.045	0.07	0.109*	0.086*	0.024	-0.044
5 0	<b>Top Man. Ethics</b>	0.031	0.032	0.059	0.029	0.011	-0.023	0.015	0.022	-0.012	0.013	0.007
5 1	<b>Company Policy</b>	-0.013	0.077*	0	0.092*	-	-0.001	0.006	-0.052	0.054	0.005	-0.006
5 2	<b>Size</b>	-0.02	-0.045	0.038	-	0.101*	0.002	-0.065	0.021	-0.043	-0.007	-0.034

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
			*							

**Table D. 2. Correlation Matrix, Overcompliance Scenario (cont.)**

	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	
<b>1</b> <b>2</b>	<b>Pride</b>	1									
<b>1</b> <b>3</b>	<b>Firm Social Cert. (OVER)</b>	0.530** *	1								
<b>1</b> <b>4</b>	<b>Firm Social Rewards</b>	0.478** *	0.600* **	1							
<b>1</b> <b>5</b>	<b>Mandated</b>	-0.031	0.064	0.056	1						
<b>1</b> <b>6</b>	<b>Public</b>	- 0.127** *	-0.04	- 0.087* *	- 0.001	1					
<b>1</b> <b>7</b>	<b>Foreign Comp.</b>	-0.037	-0.017	- 0.089* *	0.015	0.056	1				
<b>1</b> <b>8</b>	<b>Econ. Healthy</b>	0.047	0.022	0.034	- 0.006	-0.025	- 0.462** *	1			
<b>1</b> <b>9</b>	<b>Strengthens Comp.</b>	0.097**	0.03	0.002	- 0.016	0.115* **	-0.05	0.031	1		
<b>2</b> <b>0</b>	<b>Green Market.</b>	-0.037	0.005	-0.041	- 0.018	-0.008	0.025	0.04	-0.005	1	
<b>2</b> <b>1</b>	<b>Declining Rev.</b>	0.018	-0.028	-0.023	0.028	0.036	0.034	-0.029	-0.014	-0.001	1
<b>2</b> <b>2</b>	<b>Common firm</b>	0.005	0.04	0.001	0.033	-0.017	0.028	0.012	0.006	- 0.098* *	0.001
<b>2</b>	<b>Common industry</b>	0.014	0.032	0.063	-	-0.026	0.032	-0.01	-0.009	0.081* *	-0.017

		<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>
3					0.037					*	
2 4	<b>Exceed Stand.</b>	0.043	0.03	0.044	0.05	- 0.085* *	-0.01	-0.044	-0.04	-0.023	0.011
2 5	<b>Met Stand.</b>	-0.018	-0.023	-0.019	0.002	0.02	0.086**	-0.025	0.068*	0.055	0.002
2 6	<b>Voluntary Participant</b>	0.031	0.027	0.066	0.076 *	-0.016	0.009	0.048	0.063	-0.006	0.06
2 7	<b>Fired</b>	-0.036	0.058	0.019	0.012	0.007	-0.06	0.016	0.031	-0.054	-0.078*
2 8	<b>Reprimand</b>	0.064	-0.01	0.01	- 0.043	0.022	-0.01	0.058	0.045	0.034	0.032
2 9	<b>Hotline</b>	0.005	-0.002	-0.042	0.004	0.028	-0.047	0.027	-0.007	0.071*	0.0377
3 0	<b>Ethics Code</b>	0.019	0.075*	0.06	0.003	-0.027	0.055	- 0.084* *	0.048	-0.012	-0.018
3 1	<b>Audits</b>	-0.059	-0.041	-0.005	0.011	0.016	-0.001	0.042	-0.01	-0.02	-0.078*
3 2	<b>Self Reporting</b>	0.019	0.011	0.033	- 0.024	0.016	0.068	-0.009	-0.018	-0.003	0.049
3 3	<b>Ethics Guide</b>	0.087**	0.04	0.065	0.056	-0.077*	-0.011	-0.002	-0.044	0.076*	-0.012
3 4	<b>Ethics Distinct</b>	-0.029	0.063	0.034	0.021	0.028	-0.053	0.057	0.037	0.003	-0.039
3 5	<b>Super. Asked</b>	0.015	0.088* *	0.003	- 0.059	0.058	-0.02	0.034	0.048	0.028	-0.042
3 6	<b>Pollution 40</b>	-0.014	0.082* *	0.033	0.063	0.052	-0.013	0.025	-0.067	-0.006	0.005
3 7	<b>Years Exp.</b>	-0.085*	-0.008	-0.024	- 0.063	0.012	-0.055	0.058	- 0.089*	- 0.081*	-0.025

		<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>
									*		
3 8	<b>Marital Binary</b>	-0.03	-0.024	0.01	- 0.016	-0.042	0.01	-0.012	-0.024	-0.054	0.026
3 9	<b>Religion</b>	0.079*	0.032	0.015	0.014	0.007	-0.013	0.034	0.036	0.054	0.064
4 0	<b>coinvolve</b>	0.087**	0.043	0.016	-0.07	0.073*	-0.021	-0.051	0.024	-0.024	-0.028
4 1	<b>personexp_no</b>	-0.042	-0.079*	- 0.081*	- 0.003	-0.001	0.022	0.004	0.017	0.048	0.061
4 2	<b>personexp_yes</b>	0.048	0.081*	0.091* *	0.029	0.006	-0.03	-0.004	-0.052	-0.018	-0.057
4 3	<b>Envcommit</b>	0.003	-0.039	-0.04	-0.04	0.002	0.001	0.018	0.024	0.042	-0.011
4 4	<b>Sit. Realistic</b>	0.138** *	0.112* **	0.016	- 0.045	-0.01	0.005	0.037	0.105* *	0.01	0.001
4 5	<b>Upper Level</b>	0.044	0.044	0.003	0.04	0.015	-0.065	0.074*	0.03	-0.003	-0.041
4 6	<b>Code of Ethics</b>	-0.008	0.032	-0.039	0.025	-0.076*	-0.05	0.055	-0.028	-0.054	- 0.095**
4 7	<b>Mand. Training</b>	-0.075*	0.039	-0.026	0.005	0.04	-0.019	0.07	0.011	0.003	- 0.133** *
4 8	<b>Random Audits</b>	- 0.101**	0.035	-0.066	- 0.016	0.006	-0.05	0.100* *	0.002	-0.034	-0.037
4 9	<b>Anon. Hotline</b>	-0.078*	0.024	-0.024	- 0.007	0.015	-0.036	0.098* *	0.007	-0.03	0.016
5 0	<b>Top Man. Ethics</b>	0.014	0.051	0.07	0.016	-0.004	0.052	- 0.076*	0.032	- 0.078*	-0.007
5 1	<b>Company Policy</b>	-0.051	0.065	0.019	- 0.018	-0.015	0.011	-0.037	0.054	-0.046	-0.041
5	<b>Size</b>	0.007	-0.035	0.012	-	0.045	0.037	0.034	-0.064	-0.008	-

	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>
2				0.035						0.092**

**Table D. 2. Correlation Matrix, Overcompliance Scenario (cont.)**

	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	
<u>2</u> <u>2</u>	<b>Common firm</b>	1									
<u>2</u> <u>3</u>	<b>Common industry</b>	- 0.519** *	1								
<u>2</u> <u>4</u>	<b>Exceed Stand.</b>	-0.025	-0.056	1							
<u>2</u> <u>5</u>	<b>Met Stand.</b>	0.037	0.001	- 0.486** *	1						
<u>2</u> <u>6</u>	<b>Voluntary Participant</b>	-0.018	0.055	0.049	-0.02	1					
<u>2</u> <u>7</u>	<b>Fired</b>	-0.018	0.052	0.05	- 0.085* *	-0.014	1				
<u>2</u> <u>8</u>	<b>Reprimand</b>	0.035	-0.026	0.006	-0.003	0.056	- 0.520** *	1			
<u>2</u> <u>9</u>	<b>Hotline</b>	- 0.088**	-0.029	0.048	0.053	0.062	-0.025	-0.037	1		
<u>3</u> <u>0</u>	<b>Ethics Code</b>	0.055	- 0.140* **	-0.071*	0.059	-0.04	-0.037	-0.009	- 0.238** *	1	
<u>3</u> <u>1</u>	<b>Audits</b>	0	- 0.098* *	-0.038	-0.018	-0.007	-0.004	0.023	- 0.236** *	- 0.263** *	1
<u>3</u>	<b>Self Reporting</b>	0.042	-0.02	-0.023	-0.022	-0.016	-0.025	0.039	-	-	-

	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	
2								0.233** *	0.260** *	0.258** *	
3 3	<b>Ethics Guide</b>	0.01	-0.049	0.04	- 0.072*	0.04	-0.032	0.071*	0.036	-0.012	-0.062
3 4	<b>Ethics Distinct</b>	0.033	0.045	-0.005	0.004	0.001	0.037	-0.012	-0.034	0.024	0.003
3 5	<b>Super. Asked</b>	-0.02	0.100* *	-0.009	0.004	0.031	0.001	0.098* *	0.017	0.05	-0.035
3 6	<b>Pollution 40</b>	0.01	-0.018	0.049	0.01	0.03	-0.028	-0.015	-0.001	-0.04	0.001
3 7	<b>Years Exp.</b>	-0.05	-0.01	0.018	- 0.073*	-0.022	0.009	0.022	- 0.105**	0.025	0.07
3 8	<b>Marital Binary</b>	-0.024	0.066	0.056	-0.039	0.02	0.062	-0.039	-0.026	0.049	0.090**
3 9	<b>Religion</b>	-0.041	-0.025	-0.041	0.001	-0.061	0.005	-0.009	-0.003	-0.008	-0.067
4 0	<b>coinvolve</b>	0.017	-0.012	-0.003	0.014	0.016	-0.065	0.002	0.003	-0.035	0.037
4 1	<b>personexp_no</b>	-0.028	0.034	-0.021	0.015	-0.043	-0.02	0.055	-0.002	0.048	-0.027
4 2	<b>personexp_yes</b>	-0.016	-0.012	0.044	-0.041	0.035	0.014	0.002	-0.021	-0.047	0.029
4 3	<b>Envcommit</b>	-0.062	0.048	0.099**	-0.067	0.016	-0.01	0.038	-0.021	-0.077*	0.048
4 4	<b>Sit. Realistic</b>	0.007	0.018	- 0.092**	0.023	0.041	0.059	-0.067	-0.015	0.042	-0.005
4 5	<b>Upper Level</b>	-0.005	0.022	- 0.115** *	0.035	- 0.090* *	0.054	-0.065	-0.013	-0.003	0.032
4 6	<b>Code of Ethics</b>	0.04	-0.023	0.033	-0.003	-0.046	0.029	0.048	0.017	0.028	-0.037

		<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>
4 7	<b>Mand. Training</b>	-0.006	-0.037	-0.016	0.029	-0.029	0.048	0.003	0.079*	0.028	0.051
4 8	<b>Random Audits</b>	0.046	-0.003	0.022	-0.011	-0.066	0.014	0.025	-0.061	0.098**	0.054
4 9	<b>Anon. Hotline</b>	0.017	0.093* *	-0.037	0.049	-0.036	0.012	0.064	-0.053	0.069	-0.033
5 0	<b>Top Man. Ethics</b>	-0.003	0.007	-0.009	0.022	0	-0.05	-0.011	0.014	-0.013	0.03
5 1	<b>Company Policy</b>	0.023	0.012	-0.055	0.031	0.002	-0.006	-0.009	0.032	-0.046	-0.001
5 2	<b>Size</b>	0.011	0.021	0.014	0.001	-0.039	-0.064	0.122* **	-0.032	-0.007	0.075*

**Table D. 2. Correlation Matrix, Overcompliance Scenario (cont.)**

		<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41</u>
3 2	<b>Self Reporting</b>	1									
3 3	<b>Ethics Guide</b>	0.008	1								
3 4	<b>Ethics Distinct</b>	-0.009	- 0.470** *	1							
3 5	<b>Super. Asked</b>	- 0.094* *	0.019	- 0.078 *	1						
3 6	<b>Pollution 40</b>	0.044	-0.004	0.03	-0.024	1					
3 7	<b>Years Exp.</b>	-0.024	-0.011	0.073 *	-0.032	0.003	1				
3 8	<b>Marital Binary</b>	-0.07	-0.002	0.032	0.014	0.007	0.06	1			

		<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41</u>
39	<b>Religion</b>	0.068	0	0.04	-0.022	0.06	0.022	- 0.097* *	1		
40	<b>coinvolve</b>	-0.024	-0.007	-0.001	-0.023	0.06	0.110**	-0.053	0.011	1	
41	<b>personexp_no</b>	0.033	-0.011	0.004	0.001	-0.036	-0.053	0.091* *	-0.04	- 0.121** *	1
42	<b>personexp_yes</b>	-0.013	0.026	-0.03	-0.048	0.007	0.04	-0.037	-0.016	0.124** *	- 0.702** *
43	<b>Envcommit</b>	0.049	-0.018	0.001	0.036	0.024	-0.041	0.036	0.057	- 0.172** *	0.024
44	<b>Sit. Realistic</b>	0.033	0.049	-0.051	0.111** *	- 0.211** *	0.022	-0.04	-0.029	0.071	-0.017
45	<b>Upper Level</b>	0.016	0.019	-0.057	0.004	-0.042	0.047	0.003	-0.069	-0.037	0.077*
46	<b>Code of Ethics</b>	0.004	0.031	0.064	0.073*	-0.017	0.061	-0.028	-0.089**	-0.039	-0.102**
47	<b>Mand. Training</b>	-0.064	-0.001	0.075 *	-0.056	0.044	0	0.064	-0.046	- 0.164** *	-0.025
48	<b>Random Audits</b>	-0.072*	-0.04	0.077 *	-0.066	-0.006	0.158** *	0.096* *	- 0.134** *	0.029	0.008
49	<b>Anon. Hotline</b>	-0.007	0.021	0.058	-0.025	0.02	0.074*	0.010* *	-0.042	-0.06	-0.035
50	<b>Top Man. Ethics</b>	0.025	-0.038	0.056	- 0.111**	0	-0.012	-0.03	-0.032	0.116** *	- 0.137**

		<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>	<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>	<u>41</u>
					*						*
5 1	<b>Company Policy</b>	0.034	-0.007	0.049	-0.083*	0.01	0.031	0.014	- 0.149** *	0.082*	- 0.142** *
5 2	<b>Size</b>	-0.014	0.022	0.059	-0.033	0.007	0.013	0.05	-0.014	0.02	0.120**

**Table D. 2. Correlation Matrix, Overcompliance Scenario (cont.)**

		<u>42</u>	<u>43</u>	<u>44</u>	<u>45</u>	<u>46</u>	<u>47</u>	<u>48</u>	<u>49</u>	<u>50</u>	<u>51</u>	<u>52</u>
4 2	<b>personexp_yes</b>	1										
4 3	<b>Envcommit</b>	-0.061	1									
4 4	<b>Sit. Realistic</b>	0.084**	-0.075*	1								
4 5	<b>Upper Level</b>	-0.002	-0.072*	-0.006	1							
4 6	<b>Code of Ethics</b>	0.094**	-0.012	-0.006	0.012	1						
4 7	<b>Mand. Training</b>	0.047	0.085* *	-0.04	0.047	0.300** *	1					
4 8	<b>Random Audits</b>	0.012	-0.024	0.053	-0.029	0.121** *	0.376** *	1				
4 9	<b>Anon. Hotline</b>	0.032	0.039	- 0.089* *	0.032	0.281** *	0.440** *	0.420** *	1			
5 0	<b>Top Man. Ethics</b>	0.120** *	-0.042	0.043	- 0.081*	0.220** *	0.208** *	0.114** *	0.171** *	1		
5 1	<b>Company Policy</b>	0.185** *	- 0.104*	0.049	0.053	0.177** *	0.284** *	0.135** *	0.251** *	0.294** *	1	

			*									
5		-						0.214**	0.113**		-	
2	<b>Size</b>	0.100**	0.032	-0.051	-0.009	0.107**	0.110**	*	*	0.049	0.037	1

\* $p < 0.10$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

## Appendix E: Search Terms used in Finding Meta-analysis Articles

### Legal license

**Law** AND Environmental Crime

**Law** AND Environmental Compliance

**Law** AND Environmental Misconduct

**Law** AND Environmental Violations

**Law** AND Corporate Crime

**Law** AND Corporate Compliance

**Law** AND Corporate Misconduct

**Law** AND Corporate Violations

**Law** AND Business Crime

**Law** AND Business Compliance

**Law** AND Business Misconduct

**Law** AND Business Violations

**Law** AND Organizational Crime

**Law** AND Organizational Compliance

**Law** AND Organizational Misconduct

**Law** AND Organizational Violations

**Regulation** AND Environmental Crime

**Regulation** AND Environmental Compliance

**Regulation** AND Environmental Misconduct

**Regulation** AND Environmental Violations

**Regulation** AND Corporate Crime

**Regulation** AND Corporate Compliance

**Regulation** AND Corporate Misconduct

**Regulation** AND Corporate Violations

**Regulation** AND Business Crime

**Regulation** AND Business Compliance

**Regulation** AND Business Misconduct

**Regulation** AND Business Violations

**Regulation** AND Organizational Crime

**Regulation** AND Organizational Compliance

**Regulation** AND Organizational Misconduct

**Regulation** AND Organizational Violations

**Inspections** AND Environmental Crime

**Inspections** AND Environmental Compliance

**Inspections** AND Environmental Misconduct

**Inspections** AND Environmental Violations

**Inspections** AND Corporate Crime

**Inspections** AND Corporate Compliance

**Inspections** AND Corporate Misconduct

**Inspections** AND Corporate Violations

**Inspections** AND Business Crime

**Inspections** AND Business Compliance

**Inspections** AND Business Misconduct

**Inspections** AND Business Violations

**Inspections** AND Organizational Crime

**Inspections** AND Organizational Compliance

**Inspections** AND Organizational Misconduct

**Inspections** AND Organizational Violations

**Police** AND Environmental Crime

**Police** AND Environmental Compliance

**Police** AND Environmental Misconduct

**Police** AND Environmental Violations

**Police** AND Corporate Crime

**Police** AND Corporate Compliance

**Police** AND Corporate Misconduct

**Police** AND Corporate Violations

**Police** AND Business Crime

**Police** AND Business Compliance

**Police** AND Business Misconduct

**Police** AND Business Violations

**Police** AND Organizational Crime

**Police** AND Organizational Compliance

**Police** AND Organizational Misconduct

**Police** AND Organizational Violations

**Sanctions** AND Environmental Crime

**Sanctions** AND Environmental Compliance

**Sanctions** AND Environmental Misconduct

**Sanctions** AND Environmental Violations

**Sanctions** AND Corporate Crime  
**Sanctions** AND Corporate Compliance  
**Sanctions** AND Corporate Misconduct  
**Sanctions** AND Corporate Violations  
**Sanctions** AND Business Crime  
**Sanctions** AND Business Compliance  
**Sanctions** AND Business Misconduct  
**Sanctions** AND Business Violations  
**Sanctions** AND Organizational Crime  
**Sanctions** AND Organizational  
Compliance  
**Sanctions** AND Organizational  
Misconduct  
**Sanctions** AND Organizational  
Violations  
**Fines** AND Environmental Crime  
**Fines** AND Environmental Compliance  
**Fines** AND Environmental Misconduct  
**Fines** AND Environmental Violations  
**Fines** AND Corporate Crime  
**Fines** AND Corporate Compliance  
**Fines** AND Corporate Misconduct  
**Fines** AND Corporate Violations  
**Fines** AND Business Crime  
**Fines** AND Business Compliance  
**Fines** AND Business Misconduct  
**Fines** AND Business Violations  
**Fines** AND Organizational Crime  
**Fines** AND Organizational Compliance  
**Fines** AND Organizational Misconduct  
**Fines** AND Organizational Violations  
**lawsuits** AND Environmental Crime  
**lawsuits** AND Environmental  
Compliance  
**lawsuits** AND Environmental  
Misconduct  
**lawsuits** AND Environmental Violations  
**lawsuits** AND Corporate Crime  
**lawsuits** AND Corporate Compliance  
**lawsuits** AND Corporate Misconduct  
**lawsuits** AND Corporate Violations  
**lawsuits** AND Business Crime  
**lawsuits** AND Business Compliance  
**lawsuits** AND Business Misconduct  
**lawsuits** AND Business Violations  
**lawsuits** AND Organizational Crime

**lawsuits** AND Organizational  
Compliance  
**lawsuits** AND Organizational  
Misconduct  
**lawsuits** AND Organizational Violations

### **Social License**

**Community** AND Environmental Crime  
**Community** AND Environmental  
Compliance  
**Community** AND Environmental  
Misconduct  
**Community** AND Environmental  
Violations  
**Community** AND Corporate Crime  
**Community** AND Corporate  
Compliance  
**Community** AND Corporate  
Misconduct  
**Community** AND Corporate Violations  
**Community** AND Business Crime  
**Community** AND Business Compliance  
**Community** AND Business Misconduct  
**Community** AND Business Violations  
**Community** AND Organizational Crime  
**Community** AND Organizational  
Compliance  
**Community** AND Organizational  
Misconduct  
**Community** AND Organizational  
Violations  
**Non-profit** AND Environmental Crime  
**Non-profit** AND Environmental  
Compliance  
**Non-profit** AND Environmental  
Misconduct  
**Non-profit** AND Environmental  
Violations  
**Non-profit** AND Corporate Crime  
**Non-profit** AND Corporate Compliance  
**Non-profit** AND Corporate Misconduct  
**Non-profit** AND Corporate Violations  
**Non-profit** AND Business Crime  
**Non-profit** AND Business Compliance  
**Non-profit** AND Business Misconduct  
**Non-profit** AND Business Violations

**Non-profit** AND Organizational Crime  
**Non-profit** AND Organizational Compliance  
**Non-profit** AND Organizational Misconduct  
**Non-profit** AND Organizational Violations  
**Publicity** AND Environmental Crime  
**Publicity** AND Environmental Compliance  
**Publicity** AND Environmental Misconduct  
**Publicity** AND Environmental Violations  
**Publicity** AND Corporate Crime  
**Publicity** AND Corporate Compliance  
**Publicity** AND Corporate Misconduct  
**Publicity** AND Corporate Violations  
**Publicity** AND Business Crime  
**Publicity** AND Business Compliance  
**Publicity** AND Business Misconduct  
**Publicity** AND Business Violations  
**Publicity** AND Organizational Crime  
**Publicity** AND Organizational Compliance  
**Publicity** AND Organizational Misconduct  
**Publicity** AND Organizational Violations  
**Boycotts** AND Environmental Crime  
**Boycotts** AND Environmental Compliance  
**Boycotts** AND Environmental Misconduct  
**Boycotts** AND Environmental Violations  
**Boycotts** AND Corporate Crime  
**Boycotts** AND Corporate Compliance  
**Boycotts** AND Corporate Misconduct  
**Boycotts** AND Corporate Violations  
**Boycotts** AND Business Crime  
**Boycotts** AND Business Compliance  
**Boycotts** AND Business Misconduct  
**Boycotts** AND Business Violations  
**Boycotts** AND Organizational Crime

**Boycotts** AND Organizational Compliance  
**Boycotts** AND Organizational Misconduct  
**Boycotts** AND Organizational Violations

### **Economic License**

**Stocks** AND Environmental Crime  
**Stocks** AND Environmental Compliance  
**Stocks** AND Environmental Misconduct  
**Stocks** AND Environmental Violations  
**Stocks** AND Corporate Crime  
**Stocks** AND Corporate Compliance  
**Stocks** AND Corporate Misconduct  
**Stocks** AND Corporate Violations  
**Stocks** AND Business Crime  
**Stocks** AND Business Compliance  
**Stocks** AND Business Misconduct  
**Stocks** AND Business Violations  
**Stocks** AND Organizational Crime  
**Stocks** AND Organizational Compliance  
**Stocks** AND Organizational Misconduct  
**Stocks** AND Organizational Violations  
**Profits** AND Environmental Crime  
**Profits** AND Environmental Compliance  
**Profits** AND Environmental Misconduct  
**Profits** AND Environmental Violations  
**Profits** AND Corporate Crime  
**Profits** AND Corporate Compliance  
**Profits** AND Corporate Misconduct  
**Profits** AND Corporate Violations  
**Profits** AND Business Crime  
**Profits** AND Business Compliance  
**Profits** AND Business Misconduct  
**Profits** AND Business Violations  
**Profits** AND Organizational Crime  
**Profits** AND Organizational Compliance  
**Profits** AND Organizational Misconduct  
**Profits** AND Organizational Violations  
**Profitability** AND Environmental Crime  
**Profitability** AND Environmental Compliance

**Profitability** AND Environmental  
Misconduct  
**Profitability** AND Environmental  
Violations  
**Profitability** AND Corporate Crime  
**Profitability** AND Corporate  
Compliance  
**Profitability** AND Corporate  
Misconduct  
**Profitability** AND Corporate Violations  
**Profitability** AND Business Crime  
**Profitability** AND Business  
Compliance  
**Profitability** AND Business Misconduct  
**Profitability** AND Business Violations  
**Profitability** AND Organizational  
Crime  
**Profitability** AND Organizational  
Compliance  
**Profitability** AND Organizational  
Misconduct  
**Profitability** AND Organizational  
Violations  
**Earnings** AND Environmental Crime  
**Earnings** AND Environmental  
Compliance  
**Earnings** AND Environmental  
Misconduct  
**Earnings** AND Environmental  
Violations  
**Earnings** AND Corporate Crime  
**Earnings** AND Corporate Compliance  
**Earnings** AND Corporate Misconduct  
**Earnings** AND Corporate Violations  
**Earnings** AND Business Crime  
**Earnings** AND Business Compliance  
**Earnings** AND Business Misconduct  
**Earnings** AND Business Violations  
**Earnings** AND Organizational Crime  
**Earnings** AND Organizational  
Compliance  
**Earnings** AND Organizational  
Misconduct  
**Earnings** AND Organizational  
Violations

## Appendix F: Coding Sheet for Entering MA Data

### CC Meta Analysis Coding Sheets: Study-Level Coding Protocol

Bibliographic Reference (APA format): \_\_\_\_\_

#### I. Source Descriptors

<u>Variable Name</u>	<u>Code</u>	<u>Item</u>												
ID		1) Study ID number: <ul style="list-style-type: none"> <li>- First 3 letters of first author’s last name followed by year</li> <li>- If duplicates, add an “A” or “B” based on alphabetical order of titles</li> </ul>												
PUBTYPE		2) Type of Publication: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">1. Book</td> <td style="width: 50%;">2. Book chapter</td> </tr> <tr> <td>3. Journal article</td> <td>4. Thesis or dissertation</td> </tr> <tr> <td>5. Government report (state/local)</td> <td>6. Government report (federal)</td> </tr> <tr> <td>7. Working paper</td> <td>8. Conference paper</td> </tr> <tr> <td>9. Regulatory Agency report</td> <td>10. Corporate Report</td> </tr> <tr> <td colspan="2">11. Other (specify)</td> </tr> </table>	1. Book	2. Book chapter	3. Journal article	4. Thesis or dissertation	5. Government report (state/local)	6. Government report (federal)	7. Working paper	8. Conference paper	9. Regulatory Agency report	10. Corporate Report	11. Other (specify)	
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7. Working paper	8. Conference paper													
9. Regulatory Agency report	10. Corporate Report													
11. Other (specify)														
PUBTYPE_OTH		2b) Type of Publication—specify other publication type:												
YEAR		3) Year of Publication												

DISCIPLINE		4) Disciplinary Affiliation of Publication/Journal <sup>35</sup> : 1. Criminology 2. Sociology 3. Business/Marketing 4. Political Science 5. Environmental Science/Biology 6. Psychology 7. Public Policy 8. Economics 9. Other 10. Multiple disciplines (list under DISC_OTH)
DISC_OTH		4b) Disciplinary Affiliation of Publication/Journal—specify other discipline:
FUNDING		5) Source of funding for the research: 0. No funding/None reported 1. Government agency 2. University 3. NGO/Non-profit 4. Private business 5. Other (specify)
FUND_OTH		5b) Source of funding for the research—specify other:
NAT_PUB		6) Country of Publication
DATE		7) Date coded
CODER ID		8) Coder: 1. Natalie 2. Patricia 3. Melissa

## II. Study Characteristics

### DECISION RULES AND NOTES ABOUT VARIABLES

<sup>35</sup> If book or unclear, code from author bio

STUDYTYPE	1) Type of study: 1. Randomized experiment (in-basket or lab; e.g., conditions are randomized at the individual level or everyone receives the same survey) 2. Randomized experiment (vignette survey; e.g., conditions within scenarios are randomized) 3. Nonequivalent control group (quasi-experimental)—has a comparison group that is not randomly assigned (e.g., matched pairs comparison or propensity score matching) 4. Time-series/pre-post test (no control group) 5. Time-series/pre-post test (with control group) 6. Non-experimental (i.e., multiple regression or correlation) 7. Other (specify)
STTYPE_OTH	1b) Type of study—specify Other:
STARTDATE	2) Date Range of Research: First year of data
ENDDATE	3) Date Range of Research: Last year of data
NAT_STUD	4) Country where study conducted:
NUMOUT	5) Number of crime/misconduct outcomes reported in study <sup>36</sup>
UOA	6) What is the unit of analysis in this study (i.e., the type of outcome)? 1. Individual decision-making/behavior 2. Company decision-making/behavior 3. Geographic area (e.g., state, country) 4. Other (specify)

<sup>36</sup> For our purposes, we will include studies that examine criminal and regulatory violations by corporations or their employees. The majority of corporate offenses are handled by regulatory agencies, like the EPA & OSHA. Thus, a focus on strictly criminal behaviors would limit this study and miss a great deal of corporate misconduct. According to Clinard and Yeager (1980), corporate crime is “any act committed by corporations that is punished by the state, regardless of whether it is punished under administrative, civil, or criminal law” (p. 16). **This offense-based definition encompasses a wide range of behaviors such as antitrust offenses, intentionally polluting the environment, unsafe labor practices, and tax and securities violations.**

UOA_OTH		6b) What is the unit of analysis in this study? Specify other:
DATARLBTY		7) Did the researcher empirically assess the reliability of the data collected? 1. Yes 0. No
DATAVLDY		8) Did the researcher assess the validity of the data collected (e.g., discussed whether measures used accurately represented the construct of interest)? 1. Yes 0. No
DATACONC		9) Did the researcher express any concern over the quality of the data or data collection procedures? (Even if the author thinks he/she addressed them adequately, include as a concern and describe solution in 9b) 1. Yes 0. No
DATAPROB		9b) If yes, what was the nature of the concern?

### III. Sample Descriptors

SAMPLEN		1) Sample size
SAMP_INDCOR		2) Does the sample consist of individuals or corporations? 1. Individuals 2. Corporations 3. Other (specify; e.g., court cases)
SAMP_OTHER		2b) Does the sample consist of individuals or corporations? Specify other:
SAMP_MIX		3) Was the sample drawn from more than one organization? 1. Yes 0. No

**If the sample consists of individuals, answer the following questions. Otherwise, skip to question #9:**

AGE		4) Mean Age of Sample (if mean age cannot be determined, enter 888)
RACE		5) Predominant Race of sample 1. Mostly white 2. Mostly black 3. Mostly hispanic 4. Mostly asian 5. Mixed, none more than 50% 6. Mixed, cannot estimate proportion 888. Unknown/Not reported
SEX		6) Predominant Sex of sample 1. 60% or more male 2. 60% or more female 3. Even mix of male and female 888. Unknown/Not reported
MGMT		7) Predominant management level of sample: 1. 60% or more non-managerial employee 2. 60% or more middle managers or supervisors 3. 60% or more CEO/Executives (or highest-level employees such as law firm partners) 4. Even mix of multiple levels 5. Other (Specify) 888. Unknown/Not reported
MGMT2		7b) Management level of sample—specify other:
PRTCNT		8) Who were the participants of the study? 1. Unemployed students 2. Working students 3. Both unemployed and working students 4. Professionals 5. Both students and professionals

EDUCATION		<p>9) Predominant education level of sample</p> <ol style="list-style-type: none"> <li>1. 60% or more: High school degree or less</li> <li>2. 60% or more : Some college education (or currently in college)</li> <li>3. 60% or more: College graduates</li> <li>4. 60% or more: Some graduate education (or currently in graduate program)</li> <li>5. 60% or more: Completed graduate degree</li> <li>6: Even mix of multiple education levels</li> <li>888. Unknown/Not reported</li> </ol>																												
EMPLENGTH		<p>10) Length of employment of the target population:_____</p> <ol style="list-style-type: none"> <li>1. No work experience</li> <li>2. Less than 5 years</li> <li>3. Between 5 – 10 years</li> <li>5. More than 10 years</li> <li>6. Multiple levels of experience included in sample</li> <li>888. Unknown/Not reported</li> </ol>																												
INDUSTRY		<p>11) From what industry was the sample drawn? (choose all that apply)</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">1. Agriculture</td> <td style="width: 50%;">2. Accounting</td> </tr> <tr> <td>3. Advertising</td> <td>4. Airline</td> </tr> <tr> <td>5. Banking</td> <td>6. Biotechnology</td> </tr> <tr> <td>7. Computer/Technology</td> <td>8. Consumer products</td> </tr> <tr> <td>9. Defense</td> <td>10. Education</td> </tr> <tr> <td>11. Energy</td> <td>12. Food, beverage, or tobacco</td> </tr> <tr> <td>13. Health care</td> <td>14. Investment banking</td> </tr> <tr> <td>15. Legal</td> <td>16. Manufacturing</td> </tr> <tr> <td>17. Marketing/Business</td> <td>18. Pharmaceuticals</td> </tr> <tr> <td>19. Real Estate</td> <td>20. Retail</td> </tr> <tr> <td>21. Securities and Commodities</td> <td>22. Service</td> </tr> <tr> <td>23. Telecommunications</td> <td>24. Transportation</td> </tr> <tr> <td>888. Unknown/Not reported</td> <td>25. Other (specify)</td> </tr> <tr> <td colspan="2">26. Multiple categories (list under IND_OTH)</td> </tr> </table>	1. Agriculture	2. Accounting	3. Advertising	4. Airline	5. Banking	6. Biotechnology	7. Computer/Technology	8. Consumer products	9. Defense	10. Education	11. Energy	12. Food, beverage, or tobacco	13. Health care	14. Investment banking	15. Legal	16. Manufacturing	17. Marketing/Business	18. Pharmaceuticals	19. Real Estate	20. Retail	21. Securities and Commodities	22. Service	23. Telecommunications	24. Transportation	888. Unknown/Not reported	25. Other (specify)	26. Multiple categories (list under IND_OTH)	
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26. Multiple categories (list under IND_OTH)																														

IND_OTH		11b) From what industry was the sample drawn? Specify other:
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**If the sample consists of corporations, please answer the following questions:**

COMPSIZE		12) Average number of employees in sample companies (if UOA is firm and information is not given, record 888)
COMPPROF		13) Average profit of companies in sample (not given = 888)
COMPSALES		14) Average annual sales of companies in sample (not given = 888)

**IV. Methods and Procedures**

RANDOM		1) Was the sample randomly selected? 1. Yes 0. No 888. Unclear or not reported
SAMPPROC		2) Sampling procedures 1. Random probability sample 2. Stratified random sample 3. Matched-pairs 4. Snowball sampling 5. Convenience sample (drawn from individuals to which researchers have easy access) 6. Secondary data analysis (without specification of sampling procedures) 7. Other (specify)
SAMPPR_OTH		2b) Sampling procedures—specify other:
SURVEY		3) Survey design 1. Mail 2. Phone 3. Face-to-face Interview 4. Other (specify) 777. Not applicable (not a survey)

SURVEY_OTH		3b) Survey design—specify other:
CROSSSEC		4) Is the research design cross-sectional or longitudinal? 1. Cross-sectional 2. Longitudinal 3. Both
BIAS		5) Did the authors assess the differences between survey respondents' and non-respondents' background characteristics? 1. Yes 0. No 777. Not applicable (not a survey)
BIAS_YES		5b) If yes, were significant differences found between responders' and nonresponders' background characteristics? 1. Yes 0. No 777. Not applicable
BIAS_ADD		5c) If yes, what did the authors do to address these differences?
RESPRATE		6) Response rate to survey (777 if not a survey)
ATTRITION		7) If longitudinal, rate of attrition (put 777 if not a longitudinal panel survey)
SIGLEVEL		8) Level of statistical significance used (usually .05)
CONTROL		9) Nature of control group 1. Randomly assigned—no treatment 2. Randomly assigned—alternative treatment 3. Natural—no treatment 4. Natural—alternative treatment 5. Time-series—pre/post 6. Propensity-score matching/Matched pairs 7. No control group

PRETEST		<p>10) Did the authors assess pre-test differences between tx/control groups?</p> <p>1. Yes 0. No</p>
PRTST_DIFF		<p>10b) If so, were differences found between groups?</p> <p>1. Yes 0. No</p>
PRTST_ADD		<p>10c) If yes, what did the researchers do to address these differences?</p>

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**V. Description of Independent Variable**

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TREATMENT	<p>1) What form did the treatment take?<sup>37</sup></p> <ol style="list-style-type: none"> <li>1. Class/training on compliance with standards or procedures</li> <li>2. Law (including case law)</li> <li>3. Official sanction/Fine (e.g., conviction, prosecution, prison) OR punishment avoidance (e.g., acquittal)</li> <li>4. Regulatory Policy (e.g., inspections, agency resources, deregulation)</li> <li>5. Corporate policy (e.g., procedures, employee participation)</li> <li>6. Corporate structure (e.g., corporate governance initiative, percent outside members on board)</li> <li>7. Compliance program (e.g., internal monitoring, voluntary organizational programs involving more than education)</li> <li>8. Membership in external professional organization</li> <li>9. Consultant participation (e.g., accounting firm or others)</li> <li>10. Unionization/Employee Committees</li> <li>11. Workers' benefits (e.g., workers' compensation)</li> <li>12. Organizational climate (e.g., supervisory support or punishment by the company)</li> <li>13. Informal sanctions (e.g., bad publicity)</li> <li>14. Other (specify)</li> <li>15. Multiple treatments involved</li> </ol>
	<p><sup>37</sup> We are looking for variables that measure:</p> <ul style="list-style-type: none"> <li>- Extralegal or legal interventions and their primary policy-relevant effects (can be the subject of an intervention).       <ul style="list-style-type: none"> <li>o "General organizational climate" is not relevant unless this includes specific policies in the organization that affect compliance.</li> <li>o We are NOT interested in personality characteristics (e.g., morality) or a person's approval of the law, job, policy, etc.</li> </ul> </li> <li>- Things we ARE interested in include       <ul style="list-style-type: none"> <li>o Civil or criminal laws or sanctions (including civil cases)</li> <li>o Ethical or safety policies within the company</li> <li>o Internal compliance/monitoring programs</li> <li>o Market devices such as shaming (e.g., bad publicity)</li> <li>o Membership in external professional organizations that can sanction members</li> <li>o Internal/external audits</li> <li>o Corporate structure, including           <ul style="list-style-type: none"> <li>▪ Insider vs. outsider members on the board of directors (including gray and independent directors)</li> <li>▪ Public vs. private ownership</li> <li>▪ Whether CEO is head of the board of directors</li> </ul> </li> <li>o People's perceptions of risks (e.g., of getting caught or being sanctioned either formally or informally)</li> </ul> </li> <li>- We are mainly interested in the <b>presence vs. absence</b> of such variables, not descriptions about these IVs or gradations/dosage of the treatment (e.g., we are not interested in the size of the auditing company).       <ul style="list-style-type: none"> <li>o If the independent variable is related to corporate compliance programs or something that seems to be of interest, include it only if you can dichotomize it and if there is not already a dichotomous variable of interest (e.g., company expenditures on compliance—could be dichotomized if companies report \$0 versus non-zero values).</li> </ul> </li> <li>- When an intervention includes multiple components but only has one data point, just record one case and list all of the categories of the treatment variable under which it could fall, separate by commas.</li> </ul>

TREAT_DES		1b) Brief description of treatment:
TREAT_BIN		1c) Was the independent variable binary or continuous? 1. Binary 2. Continuous
TREATCON_DES		2) Description of continuous independent variable measurement:
AUTHRTY		3) What “authority” implemented the treatment/ was perceived to be implementing the treatment?? 1. Researcher 2. Manager/Company policy 3. Regulatory Agency 4. External professional organization 5. Consultants (e.g., accounting firms) 6. Police/FBI (or other law enforcement agency) 7. Co-workers 8. Self-imposed 9. Not applicable (Non-experimental) 10. Other (specify) 11. Multiple authorities involved (specify under AUTH_OTH)
AUTH_OTH		3b) What “authority” implemented the treatment? Specify other:
IV_SOURCE		4) What data sources were used to measure the independent variables? (Select all that apply) 1. Official data 2. Self-report data (e.g., surveys or interviews) 3. Observations/site visits of places or environments 4. Other (specify)
IVSRCE_OTH		4b) What data sources were used to measure the independent variables? Specify other:

CONTROLS		5) Did the authors control for potentially spurious variables? 1. Yes 0. No
<b>VI. Dependent Variable Descriptors</b>		
OUTCM_ACT		1) Did the outcome describe <i>actual</i> behavior (e.g., arrests) or <i>intentions</i> (e.g., hypothetical situations)? 1. Actual behavior 2. Intentions/Opinions about behavior 3. Both
OUTCM_DSC		1b) Brief description of outcome <sup>38</sup> :
OUTCMDTA		2) What type of data was used to measure the outcome covered on this coding sheet? 1. Official data 2. Self-report data (e.g., surveys or interviews) 3. Observations/site visits of places or environments 4. Other (specify)
OUTDTA_OTH		2b) What type of data was used to measure the outcome covered on this coding sheet? Specify other:
OUTMSRE		3)How was the DV measured? 1. Scale—1 item 2. Composite 3. Raw number of violations (or rates: #/unit of opportunity) 4. Dichotomous measure 5. Other (specify)—e.g., dollar amounts

<sup>38</sup> Regarding measures of the dependent variable, we are not looking at overcompliance in and of itself.

- If overcompliance is measured, it can be used if compared to noncompliance (and should be combined with compliance if applicable).
- We ARE interested in severity measures (e.g., the amount of money lost, number of injuries) as well as compliance vs. noncompliance.

OUTMSRE_OTH		3b) How was the DV measured? Specify other:
OUTMSRE_DES		4)Description of continuous outcome measure:
ILL_UNETH		5) Is the DV measured using illegal or unethical behavior? <sup>39</sup> 1. Illegal (e.g., can be sanctioned by law enforcement or regulatory sanctions, or is subject to auditing) 2. Unethical (morally ambiguous but not subject to sanctions) 3. Both 4. Other (specify): (Unclear whether sanctionable/only related to company policies) 888. Unknown/Not reported
ILLUNETH_OTH		5b) Is the DV measured using illegal or unethical behavior? Specify other:
COMP_SOC		6)Does the behavior affect the company or society, according to Akers' (1977) list? 1. Company 2. Society 3. Both 4. Not specified on Aker's list/Other (specify)
COMP_SOC_OTH		6b)Does the behavior affect the company or society, according to Akers' (1977) list? Specify other:

## **VII. Effect Size Data**<sup>40</sup>

<sup>39</sup> An illegal act is one that has been formalized as a law or regulatory statute—i.e., you can be sued, cited, or arrested for it.

- Unethical practices are those that are not punishable under the law but are morally questionable.

<sup>40</sup> Decision rules on including ESs:

- If two or more tables/models are presented on the same IV and same operationalization of the DV, include all **unique measures** of the variables of interest.
- Prioritizing the table/model that 1) includes more IVs of interest and 2) has the full (more final) model.
- If alternative modeling strategies (e.g., OLS as well as Poisson) are used and there is no significant difference between the two use the simpler model.

ATT_PROB		1) Was attrition a problem for this outcome? 1. Yes 0. No 777. Not Applicable (not a panel survey) 888. Not reported/unknown
ATT_CASES		2) If attrition was a problem, how many cases were lost?
ATT_REAS		3) If attrition was a problem, why were cases lost?
RAWDIFF		4) Raw difference favors (i.e. shows more success for): 1. Treatment group (or post period) 2. Control group (or pre period) 3. Neither (exactly equal) 888. Unknown 777. Not applicable
SIGDIFF		5) Did a test of statistical significance indicate statistically significant differences between either the control and treatment groups or the pre and post tested treatment group? 1. Yes 0. No 888. Unknown 777. Not applicable
STANDES		6) Was a standardized effect size reported? 1. Yes 0. No
ES		7) If yes, what was the effect size
ES_PAGE		8) If yes, page number where effect size data is found

- 
- After including all of the variables of interest from the final model, include any other (not already included) variables of interest from other models that may have been dropped from the final model.

NOES		<p>9) If no, is there data available to calculate an effect size?</p> <ol style="list-style-type: none"> <li>1. Yes</li> <li>0. No</li> </ol>
NOES_DATA		<p>10) Type of data effect size can be calculated from:<sup>41</sup></p> <ol style="list-style-type: none"> <li>1. Means and standard deviations</li> <li>2. <i>t</i>-value or <i>z</i>-value</li> <li>3. <i>F</i>-value</li> <li>4. Chi-square (df=1)</li> <li>5. Frequencies or proportions (dichotomous)</li> <li>6. Frequencies or proportions (polychotomous)</li> <li>7. Pre and post</li> <li>8. Standardized regression coefficients</li> <li>9. Unstandardized regression coefficients</li> <li>10. Correlations (Pearson's <i>r</i>)</li> <li>11. Other (specify)</li> </ol>
NOES_OTH		<p>10b) Type of data effect size can be calculated from—specify other:</p>
NOES_REG		<p>10c) If the data presented is an <i>unstandardized</i> regression coefficient, what type of regression was used?</p> <ol style="list-style-type: none"> <li>1. OLS</li> <li>2. Logistic</li> <li>3. Tobit</li> <li>4. Poisson</li> <li>5. Other (specify)</li> <li>6. Ordered logit</li> </ol>

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<sup>41</sup> Anytime an article has more than one model, NOES\_DTA should only have one value and there needs to be another case. **There needs to be a new case anytime you have a new independent variable, dependent variable, or model (e.g., anytime you have data coming from a different place).**

- When both unstandardized and standardized coefficients, just record that you have standardized coefficients in NOES\_DTA but record both in their appropriate places
- When both means and *t*-tests, just record that you have a *t*-test in NOES\_DTA but record both in their appropriate places
- If you have a regression coefficient and descriptive statistics (means, SD), just record the regression in NOES\_DTA but give all of the information in the appropriate place

NOES_REG2		10d) If the data presented is an <i>unstandardized</i> regression coefficient, what type of regression was used? Specify other:
TX_N		11) Treatment group sample size <sup>42</sup>
CON_N		11b) Control group sample size
TX_propN		12) Proportion of sample in treatment group (Tx/Tx+Control)
CON_propN		12b) Proportion of sample in control group (Con/Tx+Control)
TXMEAN		12) Treatment group mean (dependent variable)
CONMEAN		12b) Control group mean (dependent variable)
TXSD		13) Treatment group standard deviation (dependent variable)
CONSD		14) Control group standard deviation (dependent variable)
SUCCTX_N_a		15a) <i>n</i> of treatment group with successful outcome
SUCCON_N_c		15b) <i>n</i> of control group with successful outcome
FAILTX_N_b		16a) <i>n</i> of treatment group with unsuccessful outcome
FAILTX_N_d		16b) <i>n</i> of control group with unsuccessful outcome
PROPTX_SUCCa		17) Proportion of treatment group with successful outcome
PROPCON_SUCCc		18) Proportion of control group with successful outcome

<sup>42</sup> For time-series, the baseline/pre-intervention numbers belong under the “control group.” The post-test is the treatment group.

TVALUE		19) <i>t</i> -value (for independent/dependent-samples means comparisons only)
TVALUE_P		19b) <i>t</i> -test <i>p</i> value
ZVALUE		20) <i>z</i> -value
ZVALUE_P		20b) <i>z</i> -test <i>p</i> value
FVALUE		21) <i>F</i> -value
FVALUE_P		21b) <i>F</i> -test <i>p</i> value
CHISQ		22) Chi-square value (df=1)
CHISQ_P		22b) Chi-square <i>p</i> value
SD_X		23) Standard deviation of the independent variable
SD_Y		24) Standard Deviation of the dependent variable (note: for dichotomous dependent variables, this can be calculated using the formula $\sqrt{p(1-p)}$ )
UNSTNDRGS		25) Unstandardized regression coefficient
STNDRGSS		26) Standardized regression coefficient
PRSONR		27) Pearson's <i>r</i>
OTHDATA		28) Type of data effect size can be calculated from: (specify other—actual data)

**VIII. Conclusions made by the author**

CNCLS_IMM		<p>1) Did the assessment find evidence for the effectiveness of the treatment? (e.g., significant statistical test in the hypothesized direction)</p> <p>0. No 1. Yes 2. Not tested</p>
CNCLS_REL		<p>2) Did the author(s) conclude there a relationship between the corporate crime prevention technique and a reduction in illegal corporate activities/violations, regardless of significant finding?</p> <p>0. No 1. Yes 2. Can't tell/Author did not discuss</p>
CNCLS_ADD		<p>3)Additional notes about conclusions:</p>
UNIQUESAMPLE		<p>4) Was this sample used in this study used in another article included in this meta-analysis? If yes, list other study IDs that use this sample.</p>
CALC_ESd		29) Calculated effect size—mean difference
CALC_ESr		30) Calculated effect size—correlation
CALC_ODDS		31) Calculated effect size—Odds ratio
CALCES_LOGR		32) Calculated effect size (Logistic <i>r</i> )
CALCES_PROBD		33) Calculated effect size (Probit <i>d</i> )
CALCES_PROBR		34) Calculated effect size (Probit <i>r</i> )

CALC_ES_P		35) Calculated effect size—proportion(direct method)
CALC_ES_L		36) Calculated effect size—proportion(logit method)
CALC_UNBIAS_d		37) UNBIASED effect size—mean difference
CALC_UNBIAS_r		38) UNBIASED effect size—correlation
CALC_UNBIAS_OR		37) UNBIASED effect size—odds ratio
INVVRNCE		38) Calculated inverse variance weight
pooledSD		39) calculated pooled SD
STNDER		40) Calculated standard error
LowCI		41) Calculated lower bounds of Confidence Interval
hiCI		42) Calculated higher bounds of Confidence Interval
ES_notes		43) Notes on ES calculations

## Reference List

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