

Corporate Apology for Environmental Damage

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Abstract

High profile apologies often follow high profile environmental disasters. Apologies have been shown to be effective at reducing punishment costs in bilateral settings, but environmental disasters are inherently multilateral. There are many injured parties and multiple parties possibly at fault, while expressions of remorse are made on behalf of organizations rather than individuals. What is the impact of expressions of organizational remorse on punishment and demand for compensation? How do these impacts depend on the form of the apology and the reputation of the transgressor? We evaluate the effect of apologies and reputational information in a multilateral context using a stated preference experiment. We presented respondents with an environmental damage scenario and varied the type of apology from the polluting firm's CEO as well as information about the polluting firm's environmental record and reputation. This study is the first to systematically investigate the impact of corporate apologies for environmental accidents on the public's preferred punishments.

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1 Introduction

“The responsibility for safety on the drilling rig is Transocean. It is their rig, their equipment, their people, their systems, their safety processes.”

- *Tony Hayward, BP CEO*

CNN interview, April 28 2010

“The explosion and fire aboard the Deepwater Horizon and the resulting oil spill in the Gulf of Mexico never should have happened - and I am deeply sorry that they did. None of us yet knows why it happened. But whatever the cause, we at BP will do what we can to make certain that an incident like this does not happen again.”

- *Tony Hayward, BP CEO*

U.S. House Testimony, June 17 2010

Expressions of remorse following transgressions are pervasive in civil society, but they can take many forms. The statements in the epigraph by former BP CEO Tony Hayward following the Deepwater Horizon oil spill differ in some obvious and some subtle ways. The obvious difference is that in the first statement, made soon after the April 20, 2010 explosion that caused the spill, Hayward shifts the blame to Transocean, the owner of the drilling rig that exploded. In the second statement, Hayward apologizes for the spill and pledges to avoid future harm. More subtle is that the second statement is only a partial apology; Hayward does not actually accept responsibility for the damage on behalf of his organization. Could such statements have affected the damages BP was required to pay, or the market response from BP’s customers? A similar and now somewhat infamous statement, made by Exxon Chairman Lawrence Rawl ten days after the 1989 Exxon Valdez spill in Prince William Sound, was seen as stoking public outrage over the spill:

“I want to tell you how sorry I am that this accident took place.”

- *Lawrence Rawl, Exxon Chairman & CEO*

Newspaper ads, 4/3/1989

This statement does not accept responsibility, was made with significant delay, and was made in a passive medium (newspaper advertisements) in which its sincerity could not be evaluated (O’Hara O’Connor, 2011); 40,000 customers subsequently cut up their Exxon credit cards in order to boycott the company (Behar, 1990). Rawl’s response has been extensively analyzed in the communications literature¹ and has influenced the development of corporate “crisis management” as a subset of reputation risk management². The effectiveness of a response to a public relations crisis may therefore depend on the firm’s previous investments in reputation management³.

A growing economics literature, and a vast literature on apology and remorse outside of economics, support the general conclusion that apology messages can substantially affect the punishments and compensation demanded by injured parties. The legal and economics case studies from civil litigation, medical malpractice, and even criminal cases show that an *effectively structured* apology can reduce liability, settlement amounts, malpractice claims and occasionally criminal sentences. According to O’Hara O’Connor and Yarn (2002), 83% of lawyers believe an apology alone could settle disputes in many cases that are escalated to litigation in the absence of apology (Boothman, et., al., 2009; Cohen, 2000; Ho and Liu, 2011; Korobkin and Guthrie, 1994; O’Hara O’Conner, 2004; O’Hara and Robbins, 2009; O’Hara and Yarn, 2002; Pace, et., al., 2010; Robbennolt, 2003). The bulk of the related literature considers the effect of remorse in well-defined bilateral contexts. But in the context of a corporate apology for environmental damage, many agents may be to blame, punishment must satisfy the combined preferences of many victims, and apologies are made on behalf of a corporation rather than a person. By contrast, the laboratory studies in economics and psychology tend to consist of subject pairs playing controlled bargaining, trust, and

¹See, for example, Benoit, 1997; Pauly & Hutchison, 2005; Small, 1991; Tyler, 1997; Williams & Treadaway, 1992.

²Effective reputation and crisis management is costly and valuable. Corporate crisis management specifically has been associated with long term stock price impacts (Knight and Pretty, 1997). A more recent Deloitte survey of global executives found that reputation risk is rated as the most important strategic business risk, with growing importance as firms surveyed plan to invest more in reputation and crisis management, and allocate direct responsibility for reputation risk at the chief executive and board level (Deloitte, 2014).

³This can include misleading information as in the case of greenwashing (e.g., Cherry & Sneider, 2011, and Delmas & Burbano, 2011) as well as real investments in corporate social responsibility that provide cover for socially irresponsible behavior, as in Kotchen & Moon (2012)

cooperation games over small sums of money; various apology messages with well-defined costs can be offered when one player deviates from cooperative or fair behavior. The general findings from these studies are that real information on an offender's innocent intentions and a credible apology can increase the chances that a victim will accept a given settlement, reduce the required punishment, and improve the return to trust and cooperative behavior (Bottom, et., al., 2002; De Cremer, et., al., 2011; De Cremer, 2010; De Cremer, et., al., 2010; Desmet, et., al., 2011; Gold and Weiner, 2000; Ho, 2012; Kim, et., al., 2004).

In this paper we use a stated preference experiment to study how corporate apologies for environmental damage affect the public's preferences for punishment and compensation. In a 3×3 design, we presented subjects with an oil spill scenario and randomly allocated them to one of three apology message treatments (No Apology, Sincere Apology, Shift the Blame), and one of three firm reputation treatments (No Reputation Information, Good Reputation, Bad Reputation). We then asked subjects about their likely personal responses to the firm and their preferred legal responses. Personal responses included the likelihood of boycotting the firm's products, opposing new development by the firm, or petitioning for criminal prosecution of the firm. Legal responses included the size of the fine subjects believe should be imposed, and the level of compensation they would accept in a class action lawsuit for lost passive use value. Respondents were not told the scenario and firms were fictional until the survey was complete. The apology messages were designed using the components of effective and ineffective apologies identified in a comprehensive review by O'Hara O'Connor (2011).

An effective apology recognizes shared norms between the transgressor and victim, expresses remorse at the violation of the shared norm, and promises to repair and avoid future offense (O'Hara O'Connor, 2011). "Conciliatory efforts can be seen as a way to economize punishment costs in the face of defection", according to O'Hara O'Connor (2011). Economists have more narrowly considered apologies as signals in the tradition of Spence (1973), as in Ho (2012) and Ho & Liu (2011), for example. In this framework, apology messages need not be conciliatory - they need only be costly signals that a transgressor is a "good type" experiencing transitory bad luck. These signals could include messages that

are not apologies at all, including blaming others as a way to preserve one's reputation or the perception of one's type. By varying the apology messages in our survey instrument, we are able to study the effect of the apology's content, which sociologists, psychologists, and legal scholars argue is important for influencing punishments, but is not addressed in the standard costly signalling model. Interacting these messages with variation in reputational information reveals whether the effectiveness of the apology signal depends on predetermined reputational investments.

Our results indicate that apologies matter, but their effectiveness depends strongly on the mode of punishment and reputational context. The sincerity of an apology significantly affects the subjects' desire to take individual punitive action against the firm, as measured by the stated likelihood a subject will boycott the transgressor's products, sign a petition urging criminal prosecution, or oppose local development projects by the transgressor. These effects are augmented by reputational information, although a sincere apology best augments a good reputation and most alleviates a bad one.

Conversely, when survey respondents are asked to act as "jurists" and decide the punishment (the size of a federal fine) on behalf of society, punishments are less severe when transgressors shift blame than when they sincerely apologize. The preferred fine hinges on both reputation and apology message, although subjects seek significantly larger punishments when the firm has a bad reputation. A sincere apology may be mildly effective at reducing the fine, but shifting the blame is at least as or even more effective, particularly if the firm has a good reputation.

Our results also differ from the existing literature on bilateral apologies in that the compensation subjects are willing to accept (WTA) in a hypothetical legal settlement is largest from a firm that offers a sincere apology with an admission of fault, and from a firm with a bad reputation that tries to shift the blame. Although point estimates are imprecise we find qualitatively that, conditional on firm reputation, the firm's best response in order to minimize demanded compensation is to make no apology, sincere or otherwise. A firm with no reputation or an already bad reputation can make matters worse by apologizing, while a firm with a good reputation cannot reduce demanded compensation with an apology. Insofar

as the existing bilateral literature measures a combined effect of rent-seeking (or willingness to accept compensation in our context) and punishment (the preferred fine here), our results suggest that apologies operate differently on these two mechanisms.

Having established how public apologies affect the various means of punishment and compensation-seeking that stakeholders can undertake, we then compare these effects to how subjects *think* they respond to an apology. In debriefing questions, subjects were strongly split on whether they thought the apology affected their preferred fine and WTA, based on whether the firm's reputation was good or bad. The subset of subjects who believe the apology was influential for them tended to believe it reduced their WTA and preferred fine. This is, however, not entirely consistent with how this subset actually responded to the treatments. The present study is, to the best of our knowledge, the first to systematically investigate the impact of corporate apologies for environmental accidents on the punishments demanded by the public.

2 Experiment and Methods

We administered an online survey in which all subjects were shown a common fictional oil spill scenario, and were then randomly allocated into one of three apology treatments combined with one of three reputation treatments in a 3×3 design. The treatments are described below. A sample of respondents that matches demographics of the 2010 U.S. Census was recruited from U.S. states in the Midwest by the online survey research firm Qualtrics. Respondents were paid \$5 for a completed survey. Respondents were not told the scenario was fictional until a debriefing message was offered at the end of the survey. The survey instrument is included in the appendix.

The oil spill scenario described a spill on the coast of California near a small wildlife and marine reserve. We attempted to describe an event that was small enough not to have been widely reported in the Midwest but damaging enough that Midwest residents might have some passive use value for the damages. We described an area with sensitive habitat and some endangered species and showed pictures of species that lived in the reserve. It is important to note that we were not interested in eliciting precise passive use values for the

environmental amenities in this fictional reserve, but in measuring the difference in desired punishments for damage to the reserve, and behavior in a legal setting, across apology signals and reputation information.

The apology messages included a “No Apology” message, a “Sincere Apology” message, and a “Shift the Blame” to a third-party message. The reputation treatments included “No Reputation Information”, a “Good Reputation” message with objective information that the firm has previously been a good environmental steward, and a “Bad Reputation” message with objective information that the firm has multiple previous environmental violations.

O’Hara O’Connor (2011) identifies four key components of an effective apology that persist across the literature in different disciplines:

1. Identify wrongful act & accept responsibility
2. Express remorse
3. Promise effort to avoid future damage
4. Offer resources to repair damage

Ineffective apologies are also marked by

- Delay
- Passive medium
- Unwillingness to accept burden

Our “Sincere Apology” treatment contains all four components of O’Hara O’Connor’s effective apology and none of the ineffective components, while our “Shift the Blame” treatment includes the word “apology” but leaves out key elements for an effective apology and includes some of the ineffective elements.

The “Sincere Apology” was stated as follows:

“On behalf of our management team, I would like to convey our deep remorse over the damage this spill has caused to our environment and extend our sincerest apology.

We are disappointed by this lapse in our safety protocol and we are adjusting our procedures to minimize the chances of, and impacts from, future spills. We would like to pledge whatever resources we can to assist in the cleanup and plan to open a fund to cover the damages.”

The “Shift the Blame” message was stated as follows:

“On behalf of our management team, I would like to extend our sincerest apology for this incident. We are investigating an engineering contractor whose negligence we believe is at fault for the spill. We have also sent a clean-up crew that will be sufficient to remove the oil, although damages will be minimal because the spill covers such a small area. Again, we apologize and hope that this matter can be resolved swiftly at the least cost to all parties.”

Notice that the sincere apology includes the four elements of an effective apology outlined by O’Hara O’Connor (2011): the wrongful act is correctly identified, remorse is expressed, resources are offered for repair and a pledge is made to avoid future damage. The shift the blame message, on the other hand, blames an engineering contractor, attempts to downplay the damages, and emphasizes minimizing costs rather than repairing damages.

The good reputation treatment was stated as follows:

“In the last 10 years, this company has had no other sizeable oil spills (one of the lowest rates in the industry), and they have won awards from multiple local communities for good stewardship. After the recent spill, the firm sent a large force of clean-up workers and worked hand-in-hand with local volunteers and nonprofit groups.”

The bad reputation treatment was stated as follows:

“In the last 10 years, this company has had more than 20 spills of at least 50 barrels of oil (one of the highest rates in the industry), and they have appeared on multiple watchdog groups’ “worst of the worst” lists for their handling of environmental accidents. After the recent spill, the number of clean-up workers sent by the firm was not sufficient to remove the oil and clean up was handled primarily by local volunteers and nonprofit groups.”

Notice that objective information in the bad reputation treatment conflicts with statements in the shift the blame signal, so respondents that received the combined treatment were told that the firm claimed to send a sufficient clean-up crew, but that the firm’s resources were in fact not sufficient.

All subjects were told that the firm has already paid mandated clean-up costs and compensation for those directly affected by the spill, so that the effects we measure are for punishment and compensation above and beyond the firm’s direct responsibilities. We evaluate the effect of apologies and firm reputation by estimating the impact of these treatments on the likelihood of punitive personal responses, the preferred federal fine size, and the willingness to accept a compensation settlement in a hypothetical class action lawsuit. We also gathered information about general demographics and environmental attitudes such as whether the subject had ever visited an ocean or a national park, their self-reported environmental preferences on a scale of 1 to 5, the presence of children in their household, their age, and their income. Summary statistics for these variables are given in table 1. Income was measured in \$25,000 increments on a scale of 1 to 8, so the table indicates the average income was a little more than \$50,000.

2.1 Personal responses

Subjects were asked on a seven-point Likert scale how likely they would be to “boycott the firm’s products”, “oppose local development projects if this company is involved”, or “sign a petition urging federal prosecution of this company, if asked”.

We estimate the following model by ordered logit⁴:

$$y_i = \beta_0 + \beta_T Treat_i + x_i' \gamma + u_i, \tag{1}$$

where y_i is the Likert scale response for subject i , $Treat_i$ is an indicator variable for the combination of apology and reputation messages shown to subject i , and x_i is the vector of control variables described above.

⁴Results are robust to ordered probit and ordinary least squares, and to the exclusion of control variables from the model. These results are available upon request.

2.2 Preferred fine size

Subjects were asked how large of a fine the oil company should pay *in addition* to the cleanup costs. Dollar amounts were given in a sequence of dichotomous choices between \$0 and “more than \$15 million”.

We estimate the following model by ordinary least squares with the “more than \$15 million” response hard coded as \$17.5 million, a tobit regression with the dependent variable censored at \$15 million, and ordered logit⁵:

$$f_i = \beta_0 + \beta_T Treat_i + x_i' \gamma + u_i, \quad (2)$$

where f_i is the fine preferred by subject i . We report results with and without the vector of control variables x_i .

2.3 Willingness to accept

Before beginning the survey, subjects were asked which of the two statements best describes them: “I do not value the conservation of marine species and habitats at all” versus “I have at least some value for the conservation of marine species and habitats in U.S. waters”. Subjects agreeing with the first statement (5.3%) were coded as having a willingness to accept compensation of \$0. The remaining 94.7% of subjects who agreed with the second statement were asked to consider themselves part of a settlement negotiation for compensation for those indirectly affected by the spill. In a double-bounded dichotomous choice framework, subjects were asked if they would vote to accept the settlement if all eligible parties, including the subject, would be compensated \$100. Subjects who said “yes” were then asked if they would vote to accept \$50, whereas subjects who said “no” to \$100 were asked if they would vote to accept \$200.

⁵OLS results are robust to using different numbers of the top-coded response. Additionally, preferences for environmental fines may not be monotonic in the population, so we also estimated the effects on fine size using an unordered discrete choice conditional logit model. In the conditional logit model, the left hand side variable is equal to one for subject i 's preferred fine and zero for every other fine option, and the right hand side variables include a continuous variable for fine size in addition to interactions between the continuous fine variable and the treatment dummies. Results from this model confirm those reported here and are available upon request.

It is important to note that this is not an incentive compatible elicitation mechanism for a subject's true, lost passive use value associated with the damaged marine reserve. Our results should therefore be interpreted as predicted behavior during a settlement negotiation. These estimates are nonetheless policy relevant, particularly for environmental damage lawsuits.

Following the standard approach in the literature to estimating WTA from a double-bounded dichotomous choice procedure⁶, if we let v_i , the compensation offer that subject i is just willing to accept, be logistically distributed, then the probability of a “yes” vote at a particular compensation offer (or “bid”) is related to the bid, treatment, and other covariates according to

$$\ln \left[\frac{Pr(yes)}{1 - Pr(yes)} \right] = \beta_0 + \beta_b bid + \beta_T Treat_i + x_i' \gamma + u_i. \quad (3)$$

We estimate the parameter vector $\theta = (\beta, \gamma)$ using the log-likelihood function,

$$\begin{aligned} \ln L(\theta) = \sum_{i=1}^N \left\{ d^{nn} \ln Pr(v_i \geq 200) + d^{ny} \ln \left[Pr(v_i \leq 200) - Pr(v_i \leq 100) \right] \right. \\ \left. + d^{yn} \ln \left[Pr(v_i \leq 100) - Pr(v_i \leq 50) \right] + d^{yy} \ln Pr(v_i \leq 50) \right\}. \quad (4) \end{aligned}$$

We then calculate the mean WTA and median WTA for each treatment T using the formulas below, where \bar{x} is the vector of sample means of the control variables.

$$\begin{aligned} Mean WTA_T &= 1 / \beta_b \left(\ln(1 + \exp(\beta_0 + \beta_T + \bar{x}' \gamma)) \right) \\ Median WTA_T &= \frac{\beta_0 + \beta_T + \bar{x}' \gamma}{\beta_b} \end{aligned} \quad (5)$$

Confidence intervals for these estimates were simulated using the method of Krinsky & Robb (1986)⁷

⁶See, e.g., Haab & McConnell, 2002; Park et al., 1991.

⁷We use Wilner's (2007) Stata package “wtpcizr” for simulating Krinsky & Robb confidence intervals, which is based on Krinsky & Robb (1986) as well as Loomis & Ekstrand (1998) and Poe et al. (2005). When confidence intervals are a nonlinear function of estimated standard errors, this method provides better

3 Results

3.1 Personal responses

Table 2 reports results from an ordered logit model for the effect of apology and reputation treatments on individual acts of retribution against the firm, measured by a Likert scale indicator for the likelihood of boycotting the firm’s products (column 1), opposing local development by the firm (column 2), and signing a petition urging criminal prosecution of the firm (column 3).⁸ Because the effects of treatment are similar across the three types of personal responses, we will refer to a “personal response” as one of these outcomes that occurs outside the formal (hypothetical) judicial system. Each of the treatment coefficients represents the average change in the log odds of moving to a higher Likert scale likelihood of a personal response, relative to the baseline group of no apology or blame signal and no objective reputational information. For example, a good reputation with no apology message reduces the log odds of moving up the Likert scale for boycotting the firm’s products by 0.49 (column 1) relative to the no apology, no reputation information baseline, whereas the combined good reputation, shift the blame treatment has the same estimated effect relative to the baseline. In other words, blame shifting has no additional effect when the firm already has a good reputation.

Across the personal responses, having a good (bad) reputation decreases (increases) the stated likelihood of punitive personal responses to the offending firm. A sincere apology is a more effective way to augment a good reputation, and to alleviate a bad reputation than is shifting the blame, however. For example, adding a sincere apology to a good reputation reduces the effect on the log odds of moving up the Likert scale for boycotting from -0.49 to -0.89 (column 1). Regardless of firm type, relative to the no apology treatment, blame shifting has little observable effect on the likelihood of a personal response.⁹ However, the differences

estimates than the delta method. The method uses the estimated covariance matrix from the maximum likelihood model to simulate 5000 predicted mean and median WTA for different random draws of the error, and then chops off the smallest and largest 2.5% of the draws.

⁸In unreported results, we also estimated these effects by ordered probit and OLS with similar results which are available upon request.

⁹The sole exception being the likelihood of signing a petition. For this outcome, shifting the blame reduces the likelihood of a personal response relative to the bad reputation, no apology treatment.

in the coefficients obtained by adding an apology message to a reputational treatment are not statistically significant; for the majority of treatment combinations and personal response types, a statistically significant change relative to the baseline is driven by the reputation effect.

Analyzing the additional controls reveals that subjects that think of themselves as environmentalists (either very strongly or somewhat so) are more likely to support personal responses. Age has a quadratic relationship in which the likelihood of a personal response peaks around age 45. The remaining controls mostly enter the model insignificantly.

We consider heterogeneous treatment effects by splitting the sample according to whether subjects 1) are environmentalists and 2) have ever visited an ocean.¹⁰ Tables 3 - 5 give the subsample results for the three personal responses: boycotting, opposing, or petitioning for criminal prosecution of the firm. The results broadly suggest that reputational information and apologies are most effective on non-environmentalists, and people who have never visited an ocean. One interpretation of these results is that environmentalists, and people with (perhaps) stronger preferences for marine environments, also have stronger prior beliefs regarding oil companies that are less responsive to new information.

3.2 Size of fine

Table 6 shows the effect of each treatment on the preferred fine, using several regression specifications. The first two columns report OLS regression results with and without control variables, with the preferred fine in millions of dollars as the dependent variable. The largest fine available in the survey was “More than \$15 million”, which we coded as \$17.5 million for the results in the first two columns. Because we don’t know the maximum preferred fine, the middle two columns report tobit regression results (with and without control variables) with the fine size censored at \$15 million. For robustness, we also estimated these specifications

¹⁰Subjects were asked in a follow up survey, “Do you think of yourself as an environmentalist?”. Subjects that responded “Yes, very strongly” or “Yes, somewhat” were coded as being environmentalists. We also separated the sample according to whether subjects had visited a national park. These results yielded largely insignificant and confounding results, perhaps due to the fact that so many people have visited parks, regardless of their preference for marine ecosystems. These results are available upon request from the authors.

using an ordered logit with discrete fine size options as the dependent variable. The results are robust across specifications, but the statistically significant “Tobit σ ” parameter indicates that the tobit model is preferred to OLS.

It’s important to keep in mind that this fine is purely a punishment; in this section subjects were asked to consider the fine the firm should have to pay *in addition* to clean up costs and stakeholder compensation. The results suggest that shifting the blame, i.e., creating uncertainty about who was responsible for the loss, is a weakly better strategy for reducing fines than silence or sincere apologies in almost any reputation environment. The coefficients on the “Blame” treatments are lower for each of the three reputational environments than the reputation alone or the reputation combined with a sincere apology. However, the differences between these coefficients are not statistically significant. The exception to this pattern occurs in the bad reputation treatments, where the relative ranking of the sincere apology and blame treatments depends on whether control variables are included in the model.

In the treatments with no reputation information, the “Sorry” and “Blame” coefficients are imprecisely estimated but have opposite signs. This suggests that any kind of apology by itself has no effect on punishment, but that again, a “shift the blame” strategy is at least as effective as sincerely apologizing. Either type of apology is most effective when a firm has a good reputation, but is even slightly effective when the firm has a bad reputation, although neither of these effects is statistically different than its “reputation only” comparison. This may be because people expect apologies from bad actors¹¹. Most surprising is that even with objectively bad information on the firm’s reputation, the firm’s signals (apology or blame) seem to weakly reduce the preferred fine so that it is no longer statistically different than the baseline treatment.

Although the largest impacts come from objective reputational information, interestingly an objectively good reputation does not influence the fine much unless it’s combined with a signal - specifically a signal that shifts the blame rather than offers a sincere apology. Conditional on a good reputation, shifting the blame causes a reduction in the preferred

¹¹In criminal trial settings, for example, many jurisdictions require statements of remorse from violent criminals upon conviction and before sentencing.

fine of between \$1.4 and \$1.7 million, although this is only statistically significant at the 10% level. On the other hand, bad reputational information has the biggest impact of all information types, leading to preferred fines that are between \$1 and \$2 million dollars more than in the baseline treatment.

In summary, signals can influence preferred fine sizes only slightly in the presence of bad objective information, but good objective information must be combined with a signal from the firm in order to influence households, and blame signals are at least as effective as apologies unless the firm already has a bad reputation. These results suggest that blaming another party may sow doubt in the subject’s mind about how severely they should punish the offender, which has implications for how juries may award damages in court.

3.3 Willingness to Accept

Estimates from the Willingness to Accept model (equations (3) - (5)) are given in Table 7. The first two columns report the effect of treatment on the probability of accepting a given bid, with and without control variables and with the baseline treatment (no apology, no information) as the omitted dummy variable. The bid coefficient is positive and statistically significant as expected. The coefficient on the “Sorry” (sincere apology, no information), and “Bad, Blame” treatments are statistically significant at the 10 percent level and of comparable magnitude, suggesting that these treatments make respondents on average less likely to accept a given compensation bid. None of the other treatment effects have a statistically significantly different probability than the baseline treatment of accepting a given bid. However, the “Bad” information treatment (with no apology message) is numerically closest to zero, suggesting that subjects are least likely to seek compensation from a notoriously bad actor. Subjects may be weighing strategic aspects of the bid setting along with their desire to punish the firm as well as their own WTA for lost passive use value, which may explain the nonmonotonic pattern in WTA estimates across apology types and reputation quality shown in Table 7 and Figure A.

We used the coefficients and covariance matrix from the model in column 2 in order to estimate the median and mean WTA for each treatment group and to simulate the 95%

confidence intervals with the Krinsky & Robb (1986) method. The WTA estimates are given in the last two columns, and the simulated distributions are shown in the box plot in Figure A. While these two measures of expected WTA are not statistically different across treatments, the estimates qualitatively mirror the regression results; there seems to be no strong case that an apology reduces the compensation demanded by stakeholders. The “Sorry” and “Bad, Blame” treatments induce not only the largest compensation demanded, but also the greatest variance in the estimated mean and median.

3.4 Perceived versus actual effect of apologies and reputation information

Lastly, we ask whether the apology messages and reputation information have a perceived effect that differs from how subjects actually respond. In debriefing questions, we asked subjects who received an apology treatment whether they thought the apology affected their valuation decisions, and if so in what way - a smaller fine or WTA, a larger one, or neither. We also asked a similar question for the information treatments. In this subsection we compare these responses to the actual treatment effects, separately estimating the effects for the subgroup who felt the apology or reputation information influenced them.

Table 8 compares these results for the apology treatments, where treatment dummies are defined relative to the “Sorry” treatment (sincere apology only, no reputation information). The first column shows that good or bad reputation information makes subjects more or less likely to believe the apology affected their decisions, but that blame shifting does not have this effect. The second and third columns show that, among subjects who believe the apology affected their decisions, those receiving good reputation information also *believe* they are less likely to demand a larger fine. Consistent with the “size of fine” results in Table 6 discussed above, this effect is larger when the “shift the blame” message is paired with a good reputation. However, the results are much stronger here, in column 3 of Table 8, for the *perceived* effect on a subject’s preferred fine among subjects who believe the apologies matter to them. Compare this perceived effect to column 6 of Table 8 which separates the treatment effects on preferred fine size by whether or not the subject believes the apology

mattered to them. In this column we reestimate equation (2) with an interaction between treatment dummies and a dummy that is equal to one if the subject stated the apology affected their decisions. In this column, the baseline group consists of subjects in the “Sorry” (sincere apology) treatment with no reputation information, who do not believe the apology mattered to them. Relative to that group, subjects in the same treatment group who believe the apology affected them demanded a \$3.48 million *smaller* fine on average. However any additional reputation information works in the opposite direction for this group to partially undo the extent of their forgiveness. So while the apology-affected group did not demand larger fines on average or in any specific treatment, consistent with column 3, they seem to extend additional judgments when more information is provided. Notably, the “Good, Blame” treatment which we noted earlier when discussing Table 6 was most effective at reducing the demanded fine is most effective among the group who believes apologies did not matter to them; this group demanded a \$2.26 million smaller fine in this treatment.

Similarly, the fourth and fifth columns of Table 8 show that subjects who believe the apology influenced them also say they are more likely to demand less compensation if the apology is combined with a good reputation, and less likely to demand more compensation if a firm with a bad reputation apologizes. Yet we saw in Table 7 that sincere apologies combined with reputation information had almost no effect on compensation demanded. We again compare this perceived effect in columns 4 and 5 of Table 8 to column 7. As with the fine size, in this column we reestimate equation (3) with an interaction between treatment dummies and a dummy for whether or not the subject believed the apology mattered to them. Subjects in the “Sorry” treatment with no reputation were significantly more likely to accept a given compensation bid if they believe apologies matter - which suggests there is considerable heterogeneity in the response given that the average effect of the “Sorry” treatment (Table 7) was to *increase* WTA. However, as with the fine size, this effect is at least partially offset by any additional reputation information or alternative apology message, as the interactions of the treatment dummies with the “Apology Matter” dummy show.

Table 9 shows a similar cognitive dissonance between the perceived and actual effect of reputation information. The first column shows that treatments have no effect on whether

subjects think the information influenced their decisions. The second and third columns show that subjects who believe they responded to reputation information also say that they are less likely to advocate for a lower fine if the firm has a bad reputation unless the firm offers some form of apology. This *is* consistent with the average treatment effects on the preferred fine described in Table 6 and the ranking of interaction coefficients in the second to last column of Table 9. However, the fourth and fifth columns of Table 9 show that subjects think they behave in the same way regarding compensation, which is clearly not consistent with the last column of interaction coefficients on the likelihood of accepting a given bid, or results from Table 7.

4 Conclusion

Asking respondents to choose the punishment that should satisfy all affected parties is a bit like asking a member of a jury to decide the same thing. Individuals may view this task differently than they would the decision of how they personally would react to different information about a transgressor. Our results suggest that in a multilateral setting, shifting the blame creates doubt about the firm's guilt which is more effective than apologizing for minimizing the size of the fine. However, when it comes to personal responses to the damage, individuals are more influenced by apologies. In either case, objective information has a greater impact than stated signals. Objective bad information alone has a large impact in either case, but objective good information has a bigger impact when combined with a stated signal. These effects vary across respondent groups. Respondents without strong pro-environmental preferences or personal experience with the damaged environmental good are more responsive to both reputation information and apology messages. Lastly, WTA is more difficult to measure *ex post* because of the difficulty in constructing an incentive compatible elicitation mechanism; our WTA estimates are therefore confounded by strategic considerations that would nonetheless be present in practice in a lawsuit.

A large body of evidence shows that apologies are very effective in reducing punishment costs in controlled settings. In the lab, the cost of different signals can be written into the protocols. In many legal case studies, the identity of the transgressor is clear and only one

offended party requires compensation. In these controlled, bilateral contexts, it is clear that apologies can have somewhat remarkable impacts on compensation and punishment. Our results suggest that in settings more applicable to loss of a public good like environmental amenities, the multilateral nature of the problem creates uncertainty. In this setting, the optimal signaling strategy for the firm depends on the punishment mechanism most relevant to the firm.

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A Tables & Figures

Figure 1: Distribution of WTA

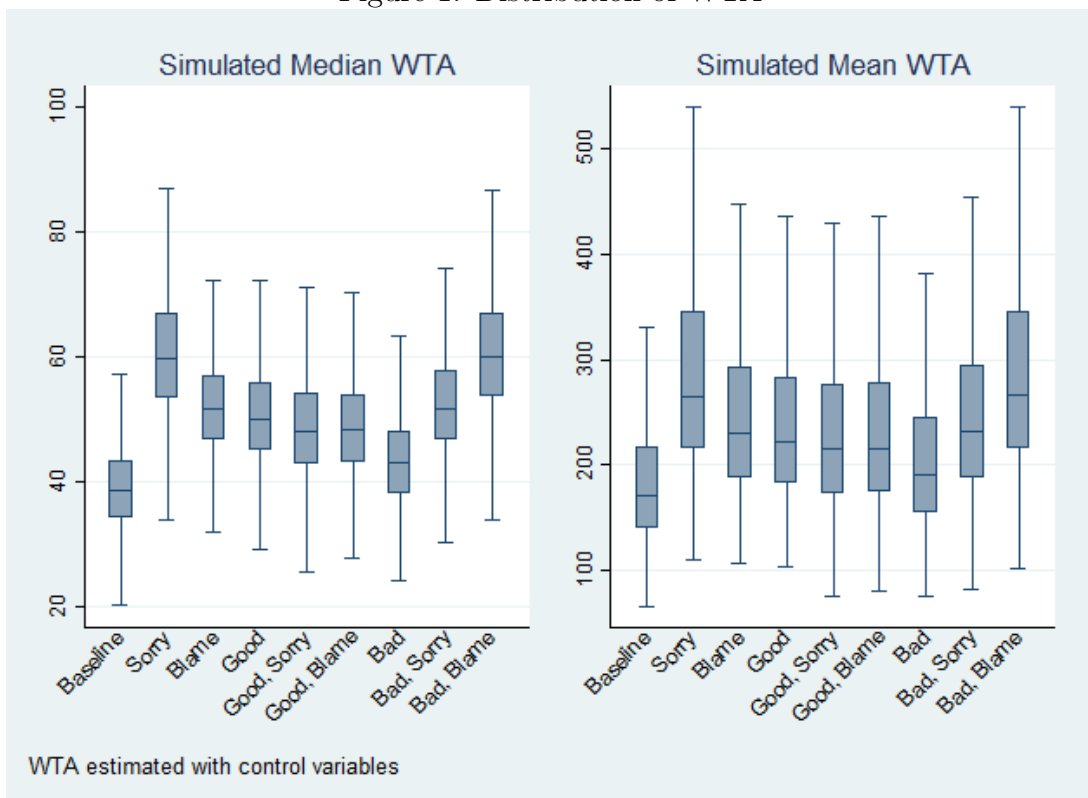


Table 1: Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Max
Baseline	750	0.109	0.312	0	1
Sorry	750	0.121	0.327	0	1
Blame	750	0.125	0.331	0	1
Good	750	0.113	0.317	0	1
Good, Sorry	750	0.100	0.300	0	1
Good, Blame	750	0.105	0.307	0	1
Bad	750	0.100	0.300	0	1
Bad, Sorry	750	0.123	0.328	0	1
Bad, Blame	750	0.103	0.304	0	1
Visit ocean	747	0.210	0.408	0	1
Visit park	747	0.763	0.425	0	1
Environmentalism	747	2.50	0.842	1	5
Age	750	49.8	14.1	19	84
Children Dummy	750	0.353	0.478	0	1
Income Category	746	2.61	1.48	0	8
Apology Matter (% Yes)	508	0.307	0.462	0	1
Smaller Fine	31	0.199			
Larger Fine	33	0.212			
No Difference	85	0.545			
Not Sure	7	0.449			
Smaller WTA	40	0.270			
Larger WTA	24	0.162			
No Difference	71	0.480			
Not Sure	13	0.878			
Information Matter (% Yes)	483	0.718	0.450	0	1
Smaller Fine	91	0.262			
Larger Fine	168	0.484			
No Difference	72	0.208			
Not Sure	16	0.461			
Smaller WTA	77	0.232			
Larger WTA	131	0.395			
No Difference	103	0.310			
Not Sure	21	0.633			

Table 2: Treatment effects on likelihood of a personal response

	Boycott Products	Oppose Local Development	Sign Petition for Prosecution
Sorry	0.21 (0.262)	0.34 (0.252)	0.38 (0.281)
Blame	-0.16 (0.276)	0.017 (0.273)	-0.046 (0.274)
Good	-0.49* (0.286)	-0.52* (0.275)	-0.30 (0.294)
Good, Sorry	-0.89*** (0.310)	-0.68** (0.310)	-0.73** (0.301)
Good, Blame	-0.49* (0.274)	-0.40 (0.262)	-0.43 (0.272)
Bad	0.68** (0.281)	0.75*** (0.280)	1.06*** (0.286)
Bad, Sorry	0.54** (0.275)	0.57** (0.275)	0.52* (0.283)
Bad, Blame	0.67** (0.296)	0.67** (0.279)	0.75*** (0.281)
Visit ocean	0.20 (0.190)	0.26 (0.185)	0.32* (0.183)
Visit Park	-0.17 (0.155)	-0.14 (0.154)	-0.25 (0.158)
Enviro	0.66*** (0.0937)	0.66*** (0.0956)	0.69*** (0.0958)
Age	0.061** (0.0295)	0.087*** (0.0302)	0.052* (0.0314)
Age ²	-0.70** (0.299)	-0.92*** (0.312)	-0.61* (0.324)
Kids	0.16 (0.154)	0.20 (0.153)	0.038 (0.154)
Income	-0.054 (0.0486)	-0.073 (0.0524)	-0.054 (0.0503)
<i>N</i>	741	741	741
Pseudo <i>R</i> ²	0.048	0.048	0.051

Note. Respondents stated the likelihood that they would engage in each action on a seven point Likert scale. Regressions are estimated by ordered logit, but results are robust to ordered probit and OLS estimation and those results are available upon request. Treatment dummies are relative to the baseline (no apology, no information) treatment. Robust standard errors are given in parentheses below regression coefficients, with statistical significance indicated by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The Age² variable was divided by 1,000 to rescale its coefficient.

Table 3: Heterogeneous treatment effects: Boycott Products

	Enviro	Non Enviro	Visited Ocean	Never Visited Ocean
sorry	-0.12 (0.384)	0.49 (0.376)	-0.39 (0.620)	0.41 (0.298)
blame	0.013 (0.389)	-0.48 (0.392)	0.35 (0.650)	-0.23 (0.312)
good	-0.58 (0.423)	-0.54 (0.383)	0.81 (0.762)	-0.82*** (0.317)
goodsorry	-0.77 (0.469)	-1.13*** (0.388)	0.0033 (0.786)	-1.17*** (0.341)
goodblame	-0.61 (0.394)	-0.45 (0.394)	-0.37 (0.676)	-0.53* (0.307)
bad	0.53 (0.441)	0.72* (0.385)	0.40 (0.753)	0.84*** (0.309)
badsorry	0.55 (0.414)	0.60 (0.416)	0.0072 (0.649)	0.75** (0.308)
badblame	0.71 (0.456)	0.52 (0.401)	1.19 (0.810)	0.59* (0.333)
visitoccean	0.34 (0.236)	-0.22 (0.328)	0 (.)	0 (.)
visitpark	0.18 (0.262)	-0.38* (0.194)	0.59 (0.443)	-0.24 (0.168)
environmentalist	-0.46 (0.284)	-0.38** (0.182)	-0.82*** (0.214)	-0.63*** (0.107)
age	0.10** (0.0445)	0.017 (0.0383)	0.16* (0.0937)	0.037 (0.0306)
age2	-0.0010** (0.000450)	-0.00033 (0.000392)	-0.0016 (0.00103)	-0.00048 (0.000308)
kidum	0.22 (0.221)	0.22 (0.223)	0.20 (0.387)	0.19 (0.175)
income	-0.077 (0.0670)	-0.040 (0.0756)	-0.0038 (0.106)	-0.059 (0.0561)
<i>N</i>	384	357	155	586
Pseudo R^2	0.033	0.038	0.062	0.055

Note. Respondents stated the likelihood that they would engage in each action on a seven point Likert scale. Regressions are estimated by ordered logit, but results are robust to ordered probit and OLS estimation and those results are available upon request. Treatment dummies are relative to the baseline (no apology, no information) treatment. Robust standard errors are given in parentheses below regression coefficients, with statistical significance indicated by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The Age² variable was divided by 1,000 to rescale its coefficient.

Table 4: Heterogeneous Treatment Effects: Oppose Local Development

	Enviro	Non Enviro	Visited Ocean	Never Visited Ocean
sorry	0.30 (0.374)	0.32 (0.352)	0.40 (0.559)	0.34 (0.293)
blame	0.16 (0.377)	-0.17 (0.392)	0.35 (0.585)	-0.041 (0.322)
good	-0.70* (0.411)	-0.47 (0.362)	0.86 (0.680)	-0.88*** (0.312)
goodsorry	-0.56 (0.440)	-0.91** (0.411)	0.27 (0.674)	-0.97*** (0.363)
goodblame	-0.40 (0.373)	-0.50 (0.347)	-0.34 (0.633)	-0.42 (0.295)
bad	0.35 (0.425)	1.02*** (0.381)	0.32 (0.697)	0.92*** (0.315)
badsorry	0.51 (0.395)	0.69* (0.411)	0.066 (0.634)	0.79*** (0.302)
badblame	0.87** (0.423)	0.41 (0.373)	1.16 (0.882)	0.61** (0.304)
visitoccean	0.25 (0.232)	0.20 (0.318)	0 (.)	0 (.)
visitpark	0.35 (0.261)	-0.45** (0.199)	0.18 (0.412)	-0.19 (0.170)
environmentalist	-0.57* (0.306)	-0.42** (0.184)	-0.73*** (0.211)	-0.65*** (0.110)
age	0.11** (0.0460)	0.061 (0.0395)	0.17* (0.0988)	0.069** (0.0315)
age2	-0.0011** (0.000476)	-0.00071* (0.000407)	-0.0018* (0.00107)	-0.00075** (0.000326)
kidum	0.25 (0.220)	0.25 (0.225)	0.17 (0.377)	0.23 (0.173)
income	-0.11 (0.0753)	-0.049 (0.0795)	-0.078 (0.120)	-0.073 (0.0582)
<i>N</i>	384	357	155	586
Pseudo R^2	0.036	0.035	0.049	0.055

Note. Respondents stated the likelihood that they would engage in each action on a seven point Likert scale. Regressions are estimated by ordered logit, but results are robust to ordered probit and OLS estimation and those results are available upon request. Treatment dummies are relative to the baseline (no apology, no information) treatment. Robust standard errors are given in parentheses below regression coefficients, with statistical significance indicated by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The Age² variable was divided by 1,000 to rescale its coefficient.

Table 5: Heterogeneous Treatment Effects: Sign a Petition

	Enviro	Non Enviro	Visited Ocean	Never Visited Ocean
sorry	0.18 (0.425)	0.49 (0.387)	-0.20 (0.640)	0.60* (0.321)
blame	-0.19 (0.409)	0.080 (0.376)	0.14 (0.594)	-0.041 (0.319)
good	-0.58 (0.460)	-0.17 (0.374)	0.71 (0.673)	-0.52 (0.333)
goodsorry	-0.82* (0.467)	-0.80** (0.372)	-0.30 (0.671)	-0.84** (0.347)
goodblame	-0.65 (0.401)	-0.32 (0.367)	-0.65 (0.673)	-0.36 (0.303)
bad	0.46 (0.448)	1.55*** (0.378)	0.94 (0.735)	1.20*** (0.323)
badsorry	0.49 (0.425)	0.52 (0.406)	-0.20 (0.625)	0.79** (0.315)
badblame	0.84** (0.425)	0.60 (0.384)	1.43 (0.887)	0.74** (0.308)
visitoccean	0.34 (0.224)	0.15 (0.335)	0 (.)	0 (.)
visitpark	0.20 (0.285)	-0.50*** (0.189)	-0.11 (0.490)	-0.28 (0.172)
environmentalist	-0.61** (0.309)	-0.39** (0.166)	-0.80*** (0.243)	-0.67*** (0.109)
age	0.086* (0.0468)	0.014 (0.0434)	0.20** (0.0900)	0.024 (0.0342)
age2	-0.00087* (0.000485)	-0.00029 (0.000448)	-0.0021** (0.000935)	-0.00032 (0.000354)
kidum	0.089 (0.217)	0.0064 (0.230)	0.011 (0.396)	0.078 (0.170)
income	-0.087 (0.0719)	-0.039 (0.0741)	-0.042 (0.108)	-0.042 (0.0577)
<i>N</i>	384	357	155	586
Pseudo R^2	0.037	0.037	0.067	0.053

Note. Respondents stated the likelihood that they would engage in each action on a seven point Likert scale. Regressions are estimated by ordered logit, but results are robust to ordered probit and OLS estimation and those results are available upon request. Treatment dummies are relative to the baseline (no apology, no information) treatment. Robust standard errors are given in parentheses below regression coefficients, with statistical significance indicated by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The Age² variable was divided by 1,000 to rescale its coefficient.

Table 6: Treatment effects on preferred fine size

	OLS		Tobit		Ordered Logit	
Sorry	0.25 (0.864)	0.41 (0.842)	0.27 (0.920)	0.48 (0.890)	0.081 (0.275)	0.15 (0.279)
Blame	-0.55 (0.868)	-0.29 (0.857)	-0.58 (0.914)	-0.25 (0.900)	-0.23 (0.291)	-0.11 (0.300)
Good	-0.30 (0.890)	-0.22 (0.883)	-0.32 (0.940)	-0.19 (0.926)	-0.099 (0.292)	-0.051 (0.302)
Good, Sorry	-0.70 (0.916)	-0.40 (0.930)	-0.73 (0.962)	-0.41 (0.967)	-0.25 (0.307)	-0.14 (0.322)
Good, Blame	-1.63* (0.845)	-1.36 (0.864)	-1.70* (0.880)	-1.40 (0.890)	-0.50* (0.272)	-0.44 (0.287)
Bad	1.67* (0.878)	1.87** (0.890)	1.81* (0.959)	2.04** (0.964)	0.50* (0.281)	0.65** (0.297)
Bad, Sorry	1.15 (0.825)	1.24 (0.819)	1.20 (0.883)	1.35 (0.871)	0.37 (0.260)	0.47* (0.272)
Bad, Blame	1.06 (0.876)	1.49* (0.862)	1.13 (0.943)	1.62* (0.920)	0.33 (0.276)	0.49* (0.284)
Visit ocean		0.81* (0.493)		0.87 (0.532)		0.31* (0.160)
Visit park		-0.76 (0.495)		-0.79 (0.519)		-0.30* (0.168)
Enviro		1.24*** (0.263)		1.34*** (0.281)		0.45*** (0.0993)
Age		0.020 (0.0903)		0.021 (0.0963)		0.0050 (0.0315)
Age ²		-0.78 (0.920)		-0.82 (0.974)		-0.25 (0.324)
Kids		-0.49 (0.477)		-0.55 (0.510)		-0.18 (0.165)
Income		0.0095 (0.135)		0.0084 (0.144)		-0.0056 (0.0450)
Intercept	8.85*** (0.626)	13.4*** (2.336)	8.93*** (0.667)	13.8*** (2.506)		
<i>N</i>	741	741	741	741	741	741
<i>R</i> ² / Pseudo <i>R</i> ²	0.030	0.088	0.0055	0.017	0.0086	0.027
Tobit σ			5.74*** (0.157)	5.56*** (0.153)		

Note. Treatment dummies are relative to the baseline (no apology, no information) treatment. Robust standard errors are given in parentheses below regression coefficients, with statistical significance indicated by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The largest option for preferred fine size was “More than \$15 million.” OLS regressions top code this response at \$17.5 million, while tobit regressions censor values at \$15 million and above, and the ordered logit treats each potential response as a discrete choice with an ordinal ranking. The Age² variable was divided by 1,000 to rescale its coefficient.

Table 7: Estimating WTA with double-bounded dichotomous choice bids

	MLE Dependent Variable:		WTA Estimates	
	WTA Bid Yes/No		Median	Mean
Baseline			38.6 (26.8, 54.5)	169 (101, 452)
Sorry	-0.51* (0.303)	-0.54* (0.302)	59.7 (42.8, 82.6)	262 (151, 766)
Blame	-0.34 (0.280)	-0.35 (0.284)	51.3 (38.0, 68.5)	225 (136, 621)
Good	-0.25 (0.291)	-0.32 (0.297)	50.1 (35.7, 69.3)	220 (130, 602)
Good, Sorry	-0.21 (0.298)	-0.27 (0.310)	48.0 (33.8, 68.6)	211 (125, 593)
Good, Blame	-0.25 (0.293)	-0.28 (0.297)	48.3 (34.8, 66.6)	212 (125, 614)
Bad	-0.15 (0.293)	-0.13 (0.301)	42.7 (30.6, 59.7)	187 (112, 509)
Bad, Sorry	-0.36 (0.290)	-0.36 (0.297)	51.5 (37.7, 71.4)	226 (135, 639)
Bad, Blame	-0.51* (0.291)	-0.54* (0.295)	59.6 (43.5, 81.9)	262 (154, 734)
Bid	1.20*** (0.0775)	1.24*** (0.0797)		
Intercept	-4.38*** (0.381)	-4.26*** (0.879)		
Control variables	No	Yes	Yes	Yes
<i>N</i>	741	741		
<i>LL</i>	-909	-890		

Note. Treatment dummies are relative to the baseline (no apology, no information) treatment. Robust standard errors are given in parentheses below regression coefficients, with statistical significance indicated by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The 95% confidence intervals given in parentheses below the WTA estimates were estimated using the method of Krinsky & Robb (1986), based on the model in column 2 (including control variables). Control variable coefficients are suppressed for brevity but are available upon request. Control variables were: ocean and national park visitation dummies, environmental sentiment, age, age squared, income, and children dummy.

Table 8: Comparing perceived effect of apology to actual treatment effects

	Debriefing Questions				Valuation Questions		
	Logit	Multinomial Logit		Multinomial Logit		Tobit	MLE
	Did Apology Matter	Apol. affect Lower	preferred Higher fine	Apol. affect Lower	Higher WTA	Preferred Fine Size	WTA Bid
Blame	0.054 (0.331)	1.03 (0.803)	0.38 (0.739)	1.4 (0.890)	0.21 (0.763)	-1.43 (1.016)	0.49 (0.326)
Good, Sorry	0.60* (0.337)	-0.11 (0.756)	-2.21*** (0.794)	1.96** (0.838)	-1.35 (1.169)	-1.17 (1.320)	0.84** (0.402)
Good, Blame	0.51 (0.339)	0.76 (0.675)	-3.31** (1.305)	1.11 (0.824)	-1.95 (1.246)	-2.26** (1.071)	0.32 (0.364)
Bad, Sorry	-1.02*** (0.375)	-1.02 (1.265)	-1.34 (1.193)	-0.68 (1.537)	-2.58* (1.375)	0.18 (0.937)	0.43 (0.332)
Bad, Blame	-0.54 (0.379)	0.32 (0.918)	-0.56 (0.936)	0.52 (1.197)	0.97 (0.990)	0.059 (0.992)	0.18 (0.329)
Apol. Matter						-3.48*** (1.150)	1.14** (0.518)
Apol. Matter X Blame						2.12 (1.678)	-1.13* (0.663)
Apol. Matter X Good, Sorry						1.73 (1.773)	-1.69** (0.685)
Apol. Matter X Good, Blame						2.00 (1.651)	-0.56 (0.658)
Apol. Matter X Bad, Sorry						1.10 (1.733)	-0.81 (0.718)
Apol. Matter X Bad, Blame						3.51* (1.966)	-0.49 (0.789)
Intercept	0.77 (1.173)	0.9 (2.532)	1.6 (2.824)	-1.9 (2.821)	-0.73 (3.063)	15.4*** (2.814)	-4.63*** (1.118)
N	502		146		132	502	502
Pseudo R^2	0.089		0.27		0.28	0.026	
Tobit σ						5.33*** (0.179)	

Note. This table compares responses to debriefing questions about whether and how an apology mattered, to the responses given in the valuation tasks. Treatment dummies are relative to the sincere apology only, no reputation information treatment. In the last two columns, which investigate the valuation tasks, treatment dummies are interacted with a dummy for whether the respondent believed the apology affected their valuations. All specifications included control variables. Coefficients are suppressed for brevity but are available upon request. Control variables were: ocean and national park visitation dummies, environmental sentiment, , age, age squared, income, and children dummy. Regressions with debriefing questions also control for preferred fine size and WTA. Robust standard errors are given in parentheses below regression coefficients, with statistical significance indicated by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The Age² variable was divided by 1,000 to rescale its coefficient.

Table 9: Comparing perceived effect of reputation information to actual treatment effects

	Debriefing Questions				Valuation Questions		
	Logit	Multinomial Logit		Multinomial Logit		Tobit	MLE
	Did Info Matter	Info affect Lower	preferred fine Higher	Info affect Lower	WTA Higher	Preferred Fine Size	WTA Bid
Good, Sorry	0.59 (0.380)	-0.047 (0.540)	-1.44** (0.723)	0.31 (0.540)	-0.78 (0.714)	0.48 (1.872)	0.45 (0.485)
Good, Blame	0.59 (0.368)	-0.25 (0.525)	-0.83 (0.637)	0.0027 (0.505)	-0.49 (0.665)	-1.19 (1.583)	0.70 (0.516)
Bad	0.49 (0.366)	-16.2*** (0.543)	0.98* (0.594)	-16.2*** (0.495)	0.62 (0.584)	-0.96 (1.641)	1.31** (0.612)
Bad, Sorry	0.38 (0.330)	-3.38*** (1.185)	0.95 (0.581)	-2.28*** (0.871)	0.68 (0.579)	-1.22 (1.538)	1.97*** (0.509)
Bad, Blame	0.53 (0.358)	-3.13*** (1.149)	1.30** (0.596)	-3.15*** (1.138)	1.04* (0.572)	-0.38 (1.750)	0.89* (0.477)
Info Matter						-2.25* (1.313)	1.14*** (0.418)
Info Matter X Good, Sorry						-0.59 (2.176)	-0.67 (0.621)
Info Matter X Good, Blame						0.37 (1.875)	-1.03 (0.627)
Info Matter X Bad						4.73** (1.991)	-1.63** (0.706)
Info Matter X Bad, Sorry						4.20** (1.835)	-2.85*** (0.617)
Info Matter X Bad, Blame						3.17 (2.046)	-1.67*** (0.595)
Intercept	0.52 (1.153)	-1.82 (2.095)	-2.67 (1.860)	2.69 (2.351)	0.87 (2.163)	16.4*** (3.021)	-5.54*** (1.180)
<i>N</i>	478		329		309	478	478
Pseudo R^2	0.044		0.37		0.32	0.022	
Tobit σ						5.39*** (0.189)	

Note. This table compares responses to debriefing questions about whether and how reputation information mattered, to the responses given in the valuation tasks. Treatment dummies are relative to the “good” reputation information, no apology treatment. In the last two columns, which investigate the valuation tasks, treatment dummies are interacted with a dummy for whether the respondent believed the information affected their valuations. All specifications included control variables. Coefficients are suppressed for brevity but are available upon request. Control variables were: ocean and national park visitation dummies, environmental sentiment, , age, age squared, income, and children dummy. Regressions with debriefing questions also control for preferred fine size and WTA. Robust standard errors are given in parentheses below regression coefficients, with statistical significance indicated by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Evaluating ex-post perception of offending firm

	Debriefing Question:	
	Will firm change safety practices?	
	Yes	No
Sorry	-0.34 (0.362)	-0.20 (0.475)
Blame	-0.95** (0.371)	-0.39 (0.460)
Good	0.39 (0.386)	-0.99 (0.652)
Good, Sorry	0.30 (0.381)	-0.77 (0.620)
Good, Blame	-0.0019 (0.374)	-0.81 (0.578)
Bad	-0.33 (0.426)	0.90* (0.481)
Bad, Sorry	-0.71* (0.394)	0.70 (0.444)
Bad, Blame	-0.56 (0.420)	0.85* (0.474)
Intercept	0.16 (1.046)	-0.53 (1.343)
<i>N</i>	651	
Pseudo R^2	0.077	

Note. Estimates are from a multinomial logit model in which “Don’t know” is the base response. Treatment dummies are relative to the baseline (no apology, no information) treatment. All specifications included control variables. Coefficients are suppressed for brevity but are available upon request. Control variables were: ocean and national park visitation dummies, environmental sentiment, , age, age squared, income, and children dummy. Fine and WTA are the subject’s preferred fine size and WTA from the valuation task. Robust standard errors are given in parentheses below regression coefficients, with statistical significance indicated by: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B Survey Instrument

Consent

Hi! We are doing some public opinion research using a five-minute survey. Your answers may be used to improve public policy. If you don't like the survey that's totally fine - you can quit at any time and your answers will not be recorded. (If you don't finish, however, you will not receive compensation for taking the survey.)

We will describe a scenario and ask a few questions about your preferences. Some of the scenarios may be hypothetical; we'll let you know which part, if any, is hypothetical after the survey is over. We are interested in *your personal* preferences even if the scenario occurred far from your home.

If you have read the research description and agree to participate please click below.

Compensation Eligibility

Which option below best describes you?

- I do not value the conservation of marine species and habitats at all
- I have at least some value for the conservation of marine species and habitats in U.S. waters

Scenario Part A

Last year a tanker delivering oil from U.S. reservoirs in Alaska to the Continental U.S. ran aground off the coast of Northern California near a wildlife and marine reserve.

The area had been classified as one of 34 coastal habitats with "Special Biological Significance" and was home to one of the few remaining colonies of two endangered species: a butterfly and a flower species. The reserve includes a three-mile stretch of beach, a marsh, and cypress and eucalyptus forests on the Pacific Ocean. The property is managed by government agencies on behalf of the U.S. public as a park and nature preserve.

The tanker spilled enough oil to heavily damage the marine life and tidepool habitat in and around the reserve. Hundreds of hours of clean-up work have been performed in the year since the oil spill but the reserve has not recovered.

Despite removing all the oil, scientists do not expect the habitat to support its former abundance of sea lions, shore bird colonies, and intertidal sea life. The fate of the endangered species colonies in the area is not known, although the spill did not affect colonies at other locations.



Species that were abundant in the reserve:

Sea anemone



Sea urchin



Cormorants



California sea lions



Endangered species with colonies in the reserve:

San Bruno elfin butterfly



Hickmans potentilla



Had you heard of either of these endangered species before?

- Yes
 No

California

Have you ever been to California?

- Yes
 No

How many times have you been there?

- Once
- Twice
- Three to five times
- More than five times

What year were you there last?

Did you visit the central California coast?

- Yes
- No

Scenario Part B

Now we're going to discuss the company involved in the spill.

The tanker owner is a Texas-based energy firm who employs 15,000 people around the U.S.

In these cases, government agencies often decide how much the responsible party will pay towards clean-up, fines, and compensation for the American people. We are using this survey to try to improve these decisions.

Now we're going to discuss the company involved in the spill.

The tanker owner is a Texas-based energy firm who employs 15,000 people around the U.S.

Shortly after the spill the CEO told reporters, "On behalf of our management team, I would like to convey our deep remorse over the damage this spill has caused to our environment and extend our sincerest apology. We are disappointed by this lapse in our safety protocol and we are adjusting our procedures to minimize the chances of, and impacts from, future spills. We would like to pledge whatever resources we can to assist in the cleanup and plan to open a fund to cover the damages."

In these cases, government agencies often decide how much the responsible party will pay towards clean-up, fines, and compensation for the American people. We are using this survey to try to improve these decisions.

Now we're going to discuss the company involved in the spill.

The tanker owner is a Texas-based energy firm who employs 15,000 people around the U.S. In the last 10 years, this company has had no other sizeable oil spills (one of the lowest rates in the industry), and they have won awards from multiple local communities for good stewardship. After the recent spill, the firm sent a large force of clean-up workers and worked hand-in-hand with local volunteers and nonprofit groups.

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Now we're going to discuss the company involved in the spill.

The tanker owner is a Texas-based energy firm who employs 15,000 people around the U.S. In the last 10 years, this company has had more than 20 spills of at least 50 barrels of oil (one of the highest rates in the industry), and they have appeared on multiple watchdog groups' "worst of the worst" lists for their handling of environmental accidents. After the recent spill, the number of clean-up workers sent by the firm was not sufficient to remove the oil and clean up was handled primarily by local volunteers and nonprofit groups.

In these cases, government agencies often decide how much the responsible party will pay towards clean-up, fines, and compensation for the American people. We are using this survey to try to improve these decisions.

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In these cases, government agencies often decide how much the responsible party will pay towards clean-up, fines, and compensation for the American people. We are using this survey to try to improve these decisions.

Size of Fine

Suppose the oil company has paid the mandated clean-up costs and compensation for those directly affected. In addition to these payments, how big of a fine do you think the oil company should have to pay?

- Less than \$5 million
- \$5 million
- \$10 million
- More than \$10 million

You said the oil company should have to pay a fine larger than \$10 million. Which do you prefer?

- Between \$10 million and \$15 million
- More than \$15 million

You said the oil company should pay a fine of less than \$5 million. Which do you prefer?

- Between \$2 million and \$5 million
- Less than \$2 million
- No fine in excess of the compensation for damages and clean-up costs already paid

Compensation Prep

We are going to ask you to make a series of choices. For each choice, please vote for the one you prefer. Consider each choice independently, as if it were the only choice you had to make.

Although these choices are hypothetical, please vote as if whichever option the majority chooses will be provided. In doing so, please keep in mind your budget for expenses like food, housing, entertainment, and recreation.

Compensation

Suppose the oil company has paid all of its fines in addition to the mandated clean-up costs and compensation for those directly affected.

Now government agencies must negotiate a settlement for those *indirectly* affected, such as people who valued the habitat and species but did not depend on them for their livelihood.

Earlier you said you have at least some value for the conservation of marine life in U.S. waters. Imagine that this makes you eligible for compensation.

Consider the following settlement: the oil company will pay each eligible person, including you, \$100 in compensation. A majority of eligible parties must vote to accept this deal.

Based on what you know of the marine reserve and how much *you personally* value it, and taking into account your normal budget for expenses like food, housing, clothes, and recreation, would you vote to accept or reject this offer?

- Accept
 Reject

You voted to accept the settlement. Would you have voted to accept or reject the offer if it were \$50 per person?

- Accept
 Reject

You voted to reject the settlement. Which of these most accurately states your reasoning?

- \$100 is not enough for me
 \$100 is enough for me, but I think we could get more
 \$100 is more than I should be compensated

You said \$100 per person was too high. Would you have voted to accept the offer if it were \$50 per person?

- Yes
 No, that's too small
 No, that's still too large. I don't require much compensation for this.

You said \$100 per person was too low. Would you have voted to accept the offer if it were \$200 per person?

- Yes
 No, that's still too small
 No, that's too large. I don't need that much compensation for this.

Other Retribution

Please state how likely you would be to do each of the following:

	Very Unlikely	Unlikely	Somewhat Unlikely	Undecided	Somewhat Likely	Likely	Very Likely
Boycott this company's products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Oppose local development projects if this company is involved	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sign a petition urging federal prosecution of this company, if asked	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Follow Up

Now we would like to ask a few questions about what you had in mind while making these choices.

When you were making your choices, did the apology from the company's CEO influence your decisions?

- Yes
 No

If so, did you want a smaller fine or a larger fine as a result of the apology?

- smaller
 larger
 no difference
 not sure

Did the CEO's apology make you more likely to accept a smaller settlement or require a larger one?

- smaller
 larger
 no difference
 not sure

When you were making your choices, did this company's track record with oil spills influence your decisions?

- Yes
 No

If so, did the company's track record make you support a smaller fine or a larger fine?

- smaller
 larger
 no difference
 not sure

Did the company's track record make you more likely to accept a smaller settlement or a larger one?

- smaller
- larger
- no difference
- not sure

Do you think the energy company intends to improve its safety practices?

- Yes
- No
- Maybe
- Not sure

Does anyone in your household visit the ocean frequently?

- Yes
- No

Has anyone in your household ever visited a National Park?

- Yes
- No

Do you think of yourself as an environmentalist?

- Yes, very strongly
- Yes, somewhat
- No, not really
- No, definitely not
- Not sure

Do you watch television shows about ocean life?

- Not At All
- Occasionally
- Frequently

In what year were you born?

What is the last level of formal education you completed?

- Middle school
- Some high school
- High school diploma or equivalency
- Some college
- Associates degree, trade school, or certificate program
- Bachelors degree
- Some graduate school
- Graduate or professional degree

How many people under the age of 18 live with you?

What was your total household income before taxes last year?

- Less than \$25,000
- \$25,000 to \$50,000
- \$50,000 to \$75,000
- \$75,000 to \$100,000
- \$100,000 to \$125,000
- \$125,000 to \$150,000
- \$150,000 to \$250,000
- More than \$250,000