Proactive environmental risk communication: Science reporters' evaluation of for-profit corporations' sustainability communication

Sun-A Park, Robert Morris University

Glen T. Cameron, University of Missouri

Abstract

This research expands understanding of corporate environmental communication beyond green advertising and environment responsibility reports of CSR (corporate social responsibility) into a more proactive environmental communication strategy accompanying accurate sustainability plans called corporate sustainability communication (CSC). By conducting a one-way within-subjects experimental design to examine a single factor—corporate discourse: (corporate sustainability communication vs. denial)—this study showed that corporate sustainability communication (CSC) is more effective in receiving science reporters' positive evaluations than a denial discourse on potential environmental risk issues that have not yet escalated into a crisis.

Introduction

Recently, the media have extensively covered national and international environmental issues, such as the 2010 BP oil spill and Japan's 2011 nuclear power plant disaster, and they have been actively discussed by business companies, consumers, environmental activist groups, and decision makers. For example, Greenpeace has campaigned globally since 2011 to stop the fashion industry contaminating waterways around the world with hazardous chemicals. In addition, a survey of consumers found that 72% of Americans are well aware of environmental issues and problems, and 28% of Americans seek out environmental information (GfK Custom Research North America, 2008). With the increasing ecological concerns and scepticism toward green marketing and green claims in advertising in recent years, many multinational for-profit companies are eager to tap into corporate sustainability communication (CSC) by changing or enhancing corporate values to develop an environmentally conscious business and by publishing sustainability reports.

Previously, public relations studies have not paid much attention to the theoretical framework of corporate sustainability communication (Roper & Toledano, 2005). Instead, most theoretical research has focused on the concept of corporate social responsibility (CSR). However, CSR has been recently criticised as a form of *greenwashing*, which was defined as "the act of misleading consumers regarding the environmental practices of a company or the environmental benefits of a product or service" (TerraChoice Environmental Marketing, 2009). On the other hand, CSC is a proactive, long-term, future-oriented plan for balancing financial, social, and environmental issues with a specific, sustainable plan. For example, as water scarcity and quality become serious environmental and health issues facing the world, global companies are actively engaging in CSC to conserve water. Specifically, Nike launched a long-term water stewardship campaign that borrows water responsibly from the communities where it is abundant and then returns it as clean to them. The Coca-Cola Company (2010) also announced that they spent $28.1 million for the watershed restoration project to protect the sustainability of watersheds and increase access to water supply in 22 countries.

The purpose of this study is to explore the effectiveness of the corporate discourse of sustainable development (corporate sustainability communication) on science reporters compared with a corporate discourse of denial on an environmental risk issue. This study examines how science reporters interpret corporate responses to a potential environmental risk caused by products or product processes. In relation to environmental risk issues, specific environmental risk information, such as detection of environmentally harmful substances from a product, may only be made available by professional scientists, not by the public. Thus, a for-profit company might not want to comment on any potential environmental risks caused by its products, because an environmental risk, if exposed by the media through professional scientists or science reporters, would bring about increased government oversight and regulation. For this reason, for-profit companies might not want to publicly announce in front of the media that they have full responsibility for the potential or actual environmental risks caused by its products. On the other hand, science journalists would be more likely to suspect a company that does not comment on environmental risk issues. Therefore, in contrast to defensive responses to the environmental risk of its products, corporate sustainability communication (CSC) that proactively reveals potential environmental risks and announces a long-term sustainability plan for dealing with these problems might better obtain positive evaluations from science reporters who trust more proactive communications.

By conducting an experiment with science journalists, this study provides reasons for why corporations need to care about environmental risk issues and employ proactive sustainability communication even though they have not yet caused any actual environmental crisis. Thus, this study investigates the effect of for-profit companies' proactive approach to environmental risk issues on science reporters' perception of an organisation's environmental performance and provides ways to deal with

environmental risk issues in order to maintain positive relationships with science reporters.

Literature review

A green agenda in corporate communication
The term, 'green', can be defined differently depending on the discipline (Saha & Darnton, 2005). For example, in a public health context, 'being green' means minimising the threats to public health, such as reducing toxic chemicals in the environment. On the other hand, from a marketing perspective, 'being green' is a corporate environmental standard, such as green labelling, green advertising or promoting as an environmentally friendly corporate identity. An emphasis on 'going green' in various fields has become an important issue among politicians or law makers along with environmental pressure groups, such as the National Audubon Society, Sierra Club, Environmental Defense Fund, Greenpeace, The Wilderness Society, and Defenders of Wildlife. In fact, along with these non-profit environmental organisations, the growing number of environmental regulations, such as the Clean Water Act, Clean Air Act, or the Toxic Substances Control Act enforced by the US Environmental Protection Agency (EPA), have also forced corporations in different industries to employ environmental marketing strategies, such as product or package design, since the mid-1980s (Banerjee, 1998; Menon & Menon, 1997).

Because of these external pressures and economic incentives of corporate environmental performance, the number of for-profit companies that have integrated green issues into marketing has increased since the late 1980s. For example, from document analysis and in-depth interviews of multiple companies, Saha and Darton (2005) found that these external pressures from stakeholders and government legislation were the primary motivation for green business activities, followed by the opportunities to save taxes, fines, or repair costs regarding environmental legislation, and to enhance a corporations'

image. Ramus and Montiel (2005) also found that companies are willing to adopt a 'green image' when there are external pressures and economic incentives as well. As a result of the emerging green agenda in corporate communication, green consumerism has originated and grown throughout the 1990s (Crane, 2000).

As the prominence of environmental issues has grown from a local scale to an increasingly global scale, people have become sceptical about what the companies are actually doing to be seen as green. Even though many companies want to be seen as 'green companies', their claims in advertising may not be accurate. Sometimes, green business activities have been seen as either environmentally responsible behaviours or an irresponsible short-term strategy. For example, a national survey of the DDB Needham Life Style Study showed that most people in the U.S. tend to think companies are not environmentally responsible and distrust corporate green advertising (Shrum, McCarty, & Lowrey, 1995). Thus, green business performance cannot be advertisements or product promotions that simply label unproven or inconclusive environmental practices with terms such as environmentally friendly, clean, natural, recyclable, and bio-based (Saha & Darnton, 2005; Stone & Wakefield, 2000). For example, researchers on corporations' environmental claims have found that green advertisements are deceptive because of exaggerated or misleading labelling (Carlson, Grove, & Kangun, 1993; Crane, 2000; Kangun, Carlson, & Grove, 1991; Rienzo & Lapinski, 2008). Moreover, the advertisement that was evaluated as the most honest and the most positive was a non-green advertisement from a company with high environmental concern instead of a green advertisement from a company with low environmental concern (Rienzo & Lapinski, 2008). In sum, as consumers require a company to be more accurate and offer achievable solutions for environmental problems caused by its products' components or manufacturing processes, a company should implement a future-oriented, long-term strategy beyond green advertising.

Corporate social responsibility (CSR) and greenwashing

As a consequence of consumers' distrust of green advertising, companies have emphasised environmental responsibility as one of the components of corporate social responsibility (CSR) activities and expressed that decision makers of the company take environmental issues seriously. However, since there is no regulatory system monitoring the statement of an environmental responsibility report to check whether they are actually implemented, corporations are not required by the law to verify that their environmental commitment to the public is truly implemented (Ramus & Montiel, 2005). Thus, companies may not report negative information, such as the excessive use of natural resources for their product manufacturing, but instead emphasise positive information, such as donations to environmental organisations, in order to enhance the public's perception of corporate reputation (Ramus & Montiel, 2005; Saha & Darnton, 2005). For instance, according to the report released by TerraChoice Environmental Marketing (2009), this action of misleading the public was classified as 'sin of no proof', referring to the case when companies cannot provide any evidence or cannot prove it with reputable third-party verification. Moreover, O'Connor and Meister (2008) found that the most important CSR attribute evaluated by a target public is corporate honesty and that the public perceives an organisation's attempts to purchase CSR credit through donations as suspect.

Claims against green advertising and CSR have brought about a term, 'greenwashing', which reflects companies' attempts to manipulate their activities and image as environmentally, socially, and culturally responsible without any actual plan or practices (Kangun et al, 1991). When a company does not have a serious intent to implement their environmental responsibility statement, their CSR report can be seen as a form of 'greenwashing'. This term can be explained by consumer scepticism or cynicism (Crane, 1997; Mendleson & Polonsky, 1995). Sceptics have a tendency to believe that using a green agenda is

just an image makeover strategy or spurious environmental strategy highlighting environmental attributes (Crane, 1997). In addition, consumers might think that corporations' concerns for the environment would not serve their primary goals, which is to enhance profits. Moreover, environmental activist groups might believe that CSR is just a deceptive tool or technique to protect a corporation's reputation. Scientists who have high expertise in environmental technology may require more detailed information about the CSR activities addressing an environmental responsibility in society. For example, a case study showed different frames on petroleum exploration activity in the Norwegian Sea between the petroleum industry and environmentalists (Ihlen & Nitz, 2008). Although the petroleum industry framed that petroleum production caused no threat to the environment and rather reduced and improved environmental risks, environmentalists emphasised potential hazards of petroleum production, such as climate change due to emission of CO2. For this reason, researchers and practitioners in environmental science have argued that corporate environmental responsibility should be performed proactively beyond green advertising, green marketing, and CSR (Saha & Darnton, 2005; Stone & Wakefield, 2000).

Environmental news reporting

For environmental issues, science journalists reporting on the topics of energy, medicine, technological development, or environmental issues play an important role in science public relations (Duke, 2002). This does not differ from existing findings of previous public relations research on the importance of journalists in corporate communication. In fact, research shows that U.S. environmental journalists say that environmental news production is similar to general news production, except in the kinds of information that they handle (Yang, 2004). However, reporters covering environmental issues have specialised knowledge and experience in environmental science (Sachsman, Simon, & Valenti, 2002, 2004; Storad, 1984). General media consumers are less knowledgeable about

environmental science; hence they usually learn about environmental issues directly from news media (Riffe, 2006). Since the science journalists' level of environmental scientific knowledge/science is high, they might insist on the importance of the corporation's environmental risk-free orientation. That is, science journalists are influential gatekeepers for corporations' environmental communication. Thus, it is important to examine the influence of a corporation's discourse on environmental issues on science journalists.

Environmental risk news has been reported either as a risk presence-claiming story or as a risk presence-denying story. A risk presence-claiming story describes the danger or potential danger from the substance of products and the presence of an environmental risk assumed to be harmful. A risk presence-denying story reports a company's denial of the presence of an environmental risk (Major & Atwood, 2004). To examine whether science reporters would be more likely to believe that the corporation is really harming the environment when it denies the potential impact of its business operation on the environment, Menon and Menon (1997) suggested that researchers test the effectiveness of defensive versus proactive environmental corporate discourse.

Corporate discourse: CSC (corporate sustainability communication) vs. denial

At the corporate level, corporate sustainability is a strategic management activity to balance economic, environmental, and social values (Signitzer & Prexl, 2008). These three goals are called sustainability's triple bottom line (Elkington, 1998). These three pillars of sustainability demonstrate that if one pillar is missing or uneven with the other two pillars, the sustainability structure falls down or becomes unstable (Brady, 2005). It means that environmental and social values are as important as economic values: the maximisation of profits. This triple bottom line of corporate sustainability also classifies corporate social responsibility as one of the components. Ultimately, sustainable business processes aim at obtaining long-term profit maximisation and favourable reputation in

stakeholders' minds via economically, environmentally, and socially responsible activities. Signitzer and Prexl (2008) defined corporate sustainability communication (CSC) as corporate communications about sustainability issues that incorporate environmental awareness with economic success. In addition, in the societal perspective, the concept of CSC becomes a new domain of public relations and focuses on two questions: "What can CSC directly contribute to the general communication about the issue of sustainable development within a given society, and how can it help societies move towards sustainable development?" (Signitzer & Prexl, 2008, p. 6) In the CSC management, as part of an overall management strategy, corporations should communicate with the public about their developing strategies or technologies to reduce adverse environmental impacts caused by its products (Casimir & Dutilh, 2003). For instance, a content analysis of the Federated Farmers of New Zealand's government relations for reducing methane emmisions showed that the Federated Farmers in New Zealand had focused on their short-term benefits but had failed to bring all the stakeholders together to maintain a long-term relationship with the environment (Roper & Toledano, 2005). Therefore, the long-term goal of CSC is to minimise the environmental impact of the products, or to improve the environment when an impact has already been diagnosed.

Several researchers have examined the impact of CSC on financial performance. Stone and Wakefield (2000) addressed whether the effect of eco-oriented communication had a positive influence on businesss performance and found that eco-oriented companies are more likely to yield better market performance. Menon and Menon (1997) also argued that the higher the levels of sustainable communication, the higher the level of business performance, as well as the greater the public's trust in the corporation, which in turn leads to favourable corporate reputation. Thus, CSC increases market share and improves the stakeholder's reactions to a company (Ramus & Montiel, 2005). Furthur, Menguc and Ozanne (2005)

showed that a higher order construct of natural environmental orientation (NEO), which is composed of all three first-order components—entrepreneurship, Corporate Social Responsibility (CSR), and commitment to the natural environment (sustainable development), is positvely related to business performance, such as net profit and market share. Interestingly, their survey data showed that sustainable development commitment explained the largest proportion of variance of NEO, whereas CSR explained the smallest proportion of variance. Overall, the reason for why CSC produces higher business performance is that stakeholders are more likely to invest in environmentally legitimate firms, which carry out pro-environmental actions ahead of government regulations (Bansal & Clelland, 2004). Thus, a positive relationship between environmental practices and business performance supports a concept of CSC that simultaneously encompasses all three pillars: economic, environmental, and social issues.

However, how can a for-profit company maximise its profits while it executes green operations by considering potential environmental risks that are related to its products or manufacturing processes? Saha and Darnton (2005) found that corporations were uncertain as to how to achieve a long-term goal of sustainability. For example, multinational chemical companies presented their commitments and concerns about their environment, health, and safety performance on their websites, whereas information about potential chemical risks was insufficient and poorly presented (Capriotti, 2007). Capriotti (2007) argued that the proactive emergency response model, which informs the public about what to do in the event of an emergency and when to take those emergency response steps, is effective because it lessens lay persons' concerns about risks from toxic or hazardous materials and also increases their sense of control. In addition, Winn and Angell (2000) demonstrated how the corporate green process should be implemented beyond CSR by proposing a comprehensive model of processes of corporate greening:

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Corporate Greening starts with top management *awareness* of the need for corporate responses to environmental issues, leads to policy *commitment* and, ideally, ends with *implementation* at the operational level (Winn & Angell, 2000, p. 1121).

Based on the levels of commitment and implementation and the categories of reactive and proactive approach, Winn and Angell (2000) developed four types of corporate greening, such as 'deliberate reactive' greening, 'deliberate proactive' greening, 'unrealized' greening, and 'emergent active' greening. 'Deliberate proactive' greening is the most advanced greening activity in which the environment is considered in all functional decisions. On the other hand, 'unrealized' greening activity claims high commitment to environment while there is no intention of committing resources to implementing environmental performance, such as CSR or greenwashing. Thus, the actual practices of CSC need to be more proactive by communicating the future change in a corporation's technology development for environment, such as a new way of producing or packaging products or removing environmental harmful material in the operating system to make toxic-free products, in order to obtain more positive evaluations from the public. The special issue of *Academy of Management Review* (1995) on sustainable development also supported that environmentally oriented management should be the consensus over environmental ethics, such as CSR commitment (Hart, 1995; Shrivastava, 1995). For example, Insch (2008) investigated how an environmentally sensitive industry, e.g., the electric and gas retail sector, communicates its environmental issues on its web pages and found that 'achieving energy efficiency through the use of enhanced technology and energy sources' were the most frequently cited environmental issues, followed by 'minimizing adverse environmental impacts through the use of clean and green energy sources'. Thus, CSC should include a specific plan of the implementation of a proactive environmental management system beyond the publication of CSR or environmental commitment (Ramus & Montiel, 2005).

In terms of a proactive environmental corporate performance, Karna, Hansen, and Juslin (2003) noted that sustainable development is a proactive strategy because it should be voluntarily executed ahead of government regulations. If a company remains one step ahead of regulations and pressure groups' demands, a company will obtain competitive advantages, and in turn, enhance their profits and reputation. Therefore, environmentally proactive CSC represents a corporate discourse on potential risks related to environmental issues even in the case that any possible risks have not yet actually occurred. Thus, CSC is viewed as an a priori solution, in this case referring to a long-term process in which the public is provided with accurate information about any potential risks that have not yet occurred (Veil & Kent, 2008). If the commitment to environmental risk issues is presented by an organisation *before* these environmental issues become a crisis and appear in the media, an organisation would be perceived as being socially and environmentally responsible, and obtain positive evaluations from the public. As an issue management tool, the expression of the company's environmental commitment produces a moderating effect on the negative relationship between corporate environmental legitimacy and stock market risk, such that a corporation with low environmental legitimacy attenuates the corporation's financial risk by expressing its commitment to the natural environment (Bansal & Clelland, 2004). In this sense, a proactive CSC helps corporations that are subject to producing environmental harms to shape future regulations that are consistent with their own environmental standards (Shrivastava, 1995).

In contrast, a denial strategy is the most defensive strategy, which refers to an organisation's claim that the organisation itself does not perform anything wrong (Benoit, 1997). In crisis communication, denial strategies have been suggested for use when an organisation wants to remove any association

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with the crisis, by asserting that no crisis exists, or by shifting the blame to others outside of the organisation (Benoit, 1995, 1997; Coombs, 1995, 1998, 2006). A denial strategy has been considered appropriate to use only when rumours or unwarranted challenges emerge (Coombs, 2006). When an organisation maintains that there is no crisis or shifts the blame to another entity within or outside the organisation, people perceive that the organisation is not responsible for any negative events.

Further, in order to match the best crisis response strategies to the crisis situation, Situational Crisis Communication Theory (SCCT) recommends the use of the crisis response strategies that are matched to the characteristics of the crisis situation (Coombs, 1995, 2006; Coombs & Holladay, 1996). According to SCCT, the denial strategy is appropriate to utilise when no evidence exists for the relationship between an organisation and the supposed crisis, or when an organisation can prove that no crisis exists. Additionally, an ambiguous situation in which there is uncertainty whether a crisis exists is also suitable for the use of denial strategies because the ambiguity can lead stakeholders to believe there is no crisis (Coombs, 1995). However, denial is a risky response strategy if stakeholders feel an organisation does hold some crisis responsibility (Coombs, 2006). Thus, SCCT recommends a denial strategy for crisis situations in which an organisation is also a victim of rumours or unfair challenges. When false and damaging information about an organisation is being circulated or an external agent causes damage to an organisation, for instance, it is suitable to use denial strategies (Coombs, 2006; Coombs & Holladay, 2002).

A guideline for selecting the crisis response strategy, depending on a crisis situation, has been developed in order to maximise the protection of reputational assets of an organisation during or after a crisis. However, companies might use denial strategies as a tool for decreasing the public's blame for environmental damage caused by the products when evidence of adverse impact on the environment have not yet been investigated.

Otherwise, the use of denial can be questioned because science reporters may have a sceptical view of denials made by an organisation in association with environmental potential risk. Science reporters might interpret organisational denial as a disguised action for minimising the public's resentment if they see an organisation face an environmental crisis. Indeed, they might be more likely to highlight a company that does not comment on environmental risk issues. Thus, CSC that reveals potential environmental risks and announces a long-term sustainability plan for managing these problems might better obtain the trust of stakeholders who expect more proactive sustainability communications. This study explores the effectiveness of a proactive corporate sustainability communication versus a defensive denial strategy on science reporters' perceptions of an organisation's 1) environmental legitimacy; 2) stance on a given environmental issue, and 3) reputation. Thus, the following hypotheses about the main effects of corporate discourse (H1~ H3) are proposed.

H1: Corporate sustainability communication (CSC) will produce greater environmental legitimacy among science reporters in comparison to a denial strategy.

H2: CSC will be evaluated as a more accommodative stance on a given environmental issue by science reporters compared to a denial strategy.

H3: CSC will produce a more positive corporate reputation when compared to a denial strategy.

Method

Design
This study employed one-way within-subjects experimental design with a single factor—Corporate discourse: (*corporate sustainability communication vs. denial*). The order of messages between CSC and denial strategy consisted of six conditions with combinations of three different messages at each level of corporate discourse to control carryover effect of treatment (See Table 1). In this way, the order factor and the message replication combination factor served as control variables.

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To avoid carryover effects, science journalists were randomly assigned to one of six conditions based on combinations of the order of corporate discourse and message replication factors. Thus, all participants read two news stories of each level of corporate discourse but in a different order with different versions of messages.

Table 1: Experimental designs

	Science reporters
Condition1	CSC 1, denial 2
Condition2	Denial 2, CSC 3
Condition3	CSC 3, denial 1
Condition4	Denial 1, CSC 2
Condition5	CSC 2, denial 3
Condition6	Denial 3, CSC 1

Stimuli

Three different news stories about a potential environmental risk from for-profit companies' products or production processes were created as stimuli materials based on actual news stories. Potential adverse environmental effects from manufacturing processes and products include use of hazardous materials, or release of toxic and environmentally damaging chemicals to air, water, land, or soil and ground water. Thus, three different environmental risk issues used in this study were environmentally harmful effects of 1) plastic bottles, 2) PVC plastic products, and 3) water print. Associated Press (AP) news stories reporting those environmental risk issues related to products or manufacturing processes of products were first created. Then, news stories presenting the level of a corporate discourse—either CSC or denial—on environmental risk issues were manipulated. In news coverage manipulated as the condition of CSC, a company provided a plan for any potential environmental risks before any fatal disaster happens. These a priori plans were to minimise use and disposal of toxic chemicals and to look after products at the end of their useful life, or to minimise the presence of toxic chemicals in the environment and public ambivalence about their products. In the condition of the discourse of denial stimuli, a company claimed that nothing happened and that there had not been environmental crisis caused by its products, and that products or manufacturing processes were not harmful to any consumers. Except for the manipulations of corporate discourse, other content of the story was the same.

Procedure

Data were collected through the online experiment system. To recruit science reporters, this study used the database listing science reporters from the *National Association of Science Writers* and from the *News Media Yellow Book* (2010). An invitation email to the experiment with a link to one of six different experimental conditions based on treatment, order, and message combinations, were sent to science reporters. Once they agreed to participate by clicking the consent button, they participated in the experiment. Before participants read any environmental risk issues, they were asked to describe their experimental knowledge and prior attitudes toward organisations. They then read AP news stories reporting a potential environmental issue related to products or manufacturing processes. After that, they also read news stories describing an organisation's response (the first within-treatment factor) to the environmental issue they just read. When they finished reading news stories covering the organisation's response, they were asked to answer questions measuring their perceptions of a company's environmental performance described in the news stories. After the first set of instruments, participants were asked to read a different environmental risk issue from the first stimulus and a following corporate discourse (the second within-treatment factor) to that environmental issue. They were also asked to answer the same questionnaires measuring perceptions of a company's environmental performance described in the news stories. Finally, they answered questions concerning their demographic information.

Participants

A total of 28 science/environment reporters completed the study. An equal number of male (50%) and female science writers (50%) participated. Age of science writers ranged from 31 to 67 years with a mean of 48 ($SD = 10$ years).

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Table 2: Bortree's (2009) environmental legitimacy scale items

Utility dimension
a. "act responsibly toward the environment"
b. "reputation in regard to the environment is good"
c. "engages in sustainable behaviors"
d. "is making adequate progress in changing its behaviors that damage the environment"
Responsibility dimension
e. "is addressing environmental issues that are of concern to its customers"
f. "as concerned about the environment as they are"
g. "doing enough to protect the environment"
h. "responding to environmental issues that concern the communities in which it does business"

The education level of participants was as follows: 38% had master's degrees, 36% had doctoral degrees, 21% had bachelor's degrees, and the remainder (4%) had professional degrees, such as MD or JD. Represented ethnic groups were Caucasian (93%) and Asian (7%).

Measurements

Environmental legitimacy. Environmental legitimacy, referring to the generalised perception or assumption that a firm's corporate environmental performance is desirable, proper, or appropriate (Bansal & Clelland, 2004), was measured along the dimensions of utility and responsibility using eight items adopted from Bortree's (2009) 7-point Likert-scale environmental legitimacy scale (See Table 2). The coefficient alpha value for environmental legitimacy was .93.

Organisation's stance. This variable refers to certain positions adopted by an organisation toward the public, or a degree of willingness to adopt a position toward the public. It was measured along the dimensions of *action-based* accommodation and *qualified-rhetoric-mixed* accommodation using ten items adopted from Jin and Cameron's (2006) 7-point Likert-scale organisational stance scale. The coefficient alpha value for an organisation's stance was .95.

Organisational reputation. Reputation, referring to an aggregate evaluation the public make about how well an organisation is meeting the public's expectation, was measured using five items adopted from Coombs and Holladay's (1996) 7-point Likert-scale organisational reputation scale. The coefficient alpha value for organisational reputation was .85.

Manipulation check. The manipulated independent variable of this study was the level of corporate discourse. To assess the proactive and defensive corporate discourse, this study used one item measuring the degree of defensiveness and proactiveness as the manipulation check. Using a 7-point semantic differential scale adopted from Lyon and Cameron's (2004) study, participants were asked to rate whether an organisation's response to environmental risk issues are more closely related to either (1) a denial or to (7) a proactive action to prevent environmental harm.

Prior attitudes toward an organisation. This variable was measured as a covariate variable before manipulated stimuli were presented by using three bipolar adjective pairs (bad/good, unfavourable/favourable, and unpleasant/pleasant) on a 7-point bipolar scale. The coefficient alpha value for prior attitudes toward an organisation was .95.

Results

Manipulation check

The repeated measures ANOVA showed significant differences between CSC and denial strategies across three messages, $F (1, 27) = 138. 51$, $p < .001$, $\eta^2 = .84$. The results of repeated measures ANOVA test showed that participants rated an organisation's CSC discourse to environmental risk issues as a more proactive action to prevent environmental harm ($M = 5.43$, $S.E.= .21$), whereas they considered an organisation's denial strategy to environmental risk issues as being closely related to a denial ($M =1.79$, $S.E.= .18$). Besides the effect of a within-treatment factor, levels of corporate discourse, there were no significant differences across six different conditions consisting of order, treatment, and message combination factors. That is, there were no order effects or carryover effects of treatment.

Hypotheses testing

To estimate the main effects of discourse on environmental issues on the public's perception of an organisation's environmental legitimacy, H1 predicted that CSC would produce greater environmental legitimacy among participants in comparison to a denial strategy after adjusting for differences in covariates. The result of repeated measures ANCOVA showed that there was a significant difference in environmental legitimacy between CSC and denial strategy, $F (1, 27) = 45.60$, $p < .001$, $\eta^2= .63$. Participants evaluated a company as having greater environmental legitimacy in a condition of CSC discourse ($M = 3.98$, $S.E.=.19$) than denial ($M = 2.38$, $S.E.=.19$). Thus, hypothesis 1 was supported.

Regarding the main effects of discourse on environmental issues on the public's perception of an organisation's stance on a given environmental issue, H2 predicted that a company implementing CSC for environmental risk issues would be evaluated as taking a more accommodative stance by participants compared to denial. As predicted, the result of repeated ANCOVA demonstrated that there was a significant difference in an organisation's stance between CSC and denial strategies $F (1, 27) = 40.90$, $p < .001$, $\eta^2= .60$. Participants believed that an organisation takes a more accommodative stance in a condition of CSC ($M = 3.88$, $S.E.= .17$) than denial ($M = 2.64$, $S.E.= .18$). Therefore, hypothesis 2 was supported.

Focusing on the main effects of corporate discourse on environmental issues on the public's perception of corporate reputation, H3 assumed that CSC would be more effective in producing a more positive reputation than denial. As predicted, the result of repeated measures ANCOVA showed that there was a significant difference in corporate reputation between CSC and denial strategies, $F (1, 27) = 23.37$, $p < .001$, $\eta^2= .46$. Participations evaluated CSC discourse more positively ($M = 4.27$, $S.E. = .17$) than denial ($M = 3.23$, $S.E. = .16$). Thus, hypothesis 3 was supported.

Discussion

This study examined how corporate sustainability communication (CSC) is more effective in receiving science reporters' positive evaluations than a denial discourse on potential environmental risk issues, which have not yet escalated into a crisis. Regarding the main effects of corporate discourse, the results of this study showed that CSC is more effective in establishing environmental legitimacy than a denial for science reporters. In addition, a company implementing CSC was viewed as taking a more accommodative stance toward consumers by science reporters than a company taking a denial discourse on potential environmental risk issues. Additionally, when a potential environmental risk issue related to a product or an industry sector of a company exists, CSC was also more effective in building more positive corporate reputation than a denial for science reporters.

As previous research on corporations' green initiatives demonstrated (Bortree, 2009), this study confirms the effectiveness of corporate environmental communication. Distinctively, this study expands understanding of corporate environmental communication beyond green advertising and environment responsibility reports of CSR into CSC, a more proactive environmental communication strategy

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accompanying accurate sustainability plans. While CSR is a short-term approach, sustainable development is a continuous long-term approach. Menguc and Ozanne (2005) examined whether the CSR and sustainable development would be distinct factors and the results showed that they were distinct from each other. A long-term oriented sustainability development means that organisations should show their responsibility for future generations, especially their future environmental impact (Casimir & Dutilh, 2003; Menon & Menon, 1997). In other words, just simply demonstrating a concern for environmental issues in a CSR report without definite plans of changing systems or processes in products, services, or technologies cannot sustain the future. Thus, this study provides several theoretical implications of CSC to the area of crisis communication and environment communication.

This study introduces CSC as an important risk management tool that can be used at the pre-crisis stage of crisis management. At the pre-crisis stage, issue management, emergency management, and risk management should be prepared and planned (Cameron, Wilcox, Reber, & Shin, 2008; Heath, Lee, & Ni, 2009). CSC in crisis communication represents an a priori solution: a long-term process in which the public is provided with accurate and specific plans addressing any potential risks that have not yet occurred (Veil & Kent, 2008). Even though news media covers environmental risk news either as a risk presence-claiming story or as a risk presence-denying story (Major & Atwood, 2004), it is more convincing for a company to acknowledge the full range of potential environmental risks related to its products through the media in order to receive the public's positive evaluations of its green initiatives, rather than taking a more advocative strategy (such as a denial) even before an environmental risk becomes a crisis. As predicted, this study also found that an organisation obtains favourable evaluations from science reporters when it presents the sustainability commitment to environmental risk issues potentially associated with its products or manufacturing processes *before* these environmental issues become a crisis.

Conceptually, a risk is a probabilistic event that is predictable and preventable (Palmlund, 1992). Thus, risk is not the actual but the expected damage, which is strongly dependent on a decision maker's action (Oppe, 1988). Risk management is the process of analysing the probability or magnitudes of risks in order to proactively mitigate reputational damage (Heath et al., 2009; Palenchar & Heath, 2007). Given the nature of risk, environmental risk issues can result in either positive or negative outcomes. For instance, if a risk manifests itself it becomes a crisis and the organisation's environmental legitimacy and reputation are then threatened. However, if an organisation prepares a planned outcome for a potential environmental risk in advance and reveals a situation to which it is capable of responding appropriately with detailed sustainability commitment, the organisation will be seen as socially and environmentally responsible. Taking account of the positive views of risks, this study demonstrates how effectively CSC can influence an organisation's environmental legitimacy and reputation among science journalists at the pre-crisis stage compared to a denial discourse.

In addition to significant implications of CSC on environmental risk communication, this study's findings have further important implications for the theories of crisis and conflict management. Situational crisis communication theory (SCCT) provides a guideline for understanding why certain crisis response strategies should be used for certain crisis situations in order to best protect organisational reputation (Coombs & Holladay, 2002). Corporate sustainability communication can also be explained by the comprehensive, prescriptive, and situational approach of SCCT. That is, SCCT can incorporate the best use of CSC for environmental crisis, even before a crisis occurs. Even though crisis communication researchers have applied SCCT to post-crisis communication to find what to say and do after a crisis, this study suggests SCCT would be applicable to pre-crisis communication, especially for environmental

communication. For instance, CSC would be the best corporate discourse to prevent the diminishing of its environmental legitimacy damage when a situation within or outside of a for-profit company is predicted to be associated with environmental crisis, such as water or air pollution from toxic substances in products or manufacturing process. Typically, a denial has been recommended for a situation before the onset of a threat when consumers have not yet experienced a crisis (Bennett & Holmes, 1975) or when an organisation is not accountable for any evidence of a crisis (Coombs, 2006). However, this study confirmed that a denial is not an effective strategy for environmental crisis situations if threat outcomes are expected to cause hazardous impacts on the environment.

Along the same line of proactive approaches to crisis communication, previous research on contingency theory of strategic conflict management also found connections between an organisation's strategy and its stance movement (Hwang & Cameron, 2009; Jin, Park, & Len-RÌos, 2010; Pang, 2006). According to a factor-stance-strategy driven approach of contingency theory of strategic conflict management, recognising *factors* within and outside an organisation initiates and leads to its *stance*, which then determines its response *strategies* (Pang, 2006). When applying sustainability communication to this factor-stance-strategy driven approach, environmental risk or sustainability issues would be factors driving the public's demands for a company's pure accommodative stance toward consumers or non-profit environment organisations. The findings of this study demonstrated that the science journalists evaluates a company utilising CSC as taking a more accommodative stance toward consumers compared with a company responding to the public with a denial. Thus, this study suggests that corporate sustainability communication would be viewed as a more acceptable and supportive manner by the public at the pre-crisis stage where there might be potential environment risk issues around a company.

The findings of this study yield several practical implications for public relations practitioners. The results of this study help public relations practitioners understand how science reporters respond to corporate response messages to environment risks issues covered by media. It would be beneficial for public relations practitioners to employ more intensive green public relations strategies than green advertising, or statements of environmental commitment. Specifically, the innovation of sustainable development of products or product processes should be accompanied with public relations messages. The public, especially those with high environmental knowledge or personal relevance of environmental risk, attends to environment risk information systematically and critically. Thus, they further require a company to implement and communicate a long term, future-oriented sustainable plan for future environment. In sum, public relations practitioners should realise that CSC is more effective than any other strategies to balance a company's social, environmental values, and economic success in the multiple publics' mind.

As previous research confirmed that sustainability communication results in more positive financial profits, this study also found positive impacts on science reporters' judgment of corporate sustainability communication. That is, environmental innovation is potentially profitable by itself. Therefore, public relations practitioners should recognise that environment issues are very important topics to protect corporate reputation and receive favourable acceptance from science reporters. Decision makers or public relations practitioners should take potential environmental risk issues seriously by monitoring whether there are any environmentally hazardous substances or risk issues arising from its products or manufacturing processes.

In conclusion, this study proposes an operational concept of corporate sustainability communication (CSC). This is different from CSR and also provides public relations practitioners with information about how to apply a proactive approach communicating to environmental risk issues prior to a crisis occurring. Compared to denial discourse, CSC turns out to be crucial to bring into play at the pre-crisis stage. Even though for-profit

companies have generated environmentally friendly images by just bringing green colour into their advertisements or brand logo, they should recognise that these superficial 'greening' actions would be criticised by the public as a 'greenwashing' effort. Thus, public relations practitioners should adopt CSC for environmental risk issues potentially associated with for-profit companies' products or product manufacturing processes.

There are some limitations of this study that should be taken into account in future research. The sample size of this study was not big enough to compare the effectiveness of CSC and denial among science reporters. Thus, replication of this study using a bigger sample size (e.g., $N = 100$) would help to increase the power to find a significant difference in the effectiveness of CSC and denial strategies among science reporters.

In addition, this study examines only two different corporate discourses on environmental risk issues. The effect of CSC was compared with the most used advocacy strategy, denial. This study examined a denial discourse because denial discourse concerning the existence or gravity of the environmental problems have been used across all areas of global environmental risks, such as global climate change, deforestation, and desertification (Adger, Benjaminsen, Brown, & Svarstad, 2001). However, other corporate discourses rather than a denial, such as defeasibility, which claims a lack of information to control over a crisis, might be also frequently implemented in a real corporate environment. Thus, an additional study comparing the effects of less dramatic corporate discourses for environmental communication is needed.

Furthermore, adopting the concept of the heuristic-systematic model, future studies could measure other possible psychological variables in order to identify influences of individuals' psychological and demographic characteristics on their environmental risk information processing of corporate sustainability communication (CSC).

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Author contact details:

Sun-A Park, Ph.D.
Assistant Professor
Department of Communication
Robert Morris University
6001 University Blvd.
Moon Township, PA 15108
Email: park@rmu.edu

Glen T. Cameron, Ph.D.
Professor
Maxine Wilson Gregory Chair in Journalism
Research and Professor of Family and
Community Medicine
Missouri School of Journalism
Columbia, MO 65211
Email: camerong@missouri.edu

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