Managing product-harm crises

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Abstract


A new measure of organizational success in dealing with product-harm caused crises is developed. The measure is applied to a hypothetical crisis through the use of scenarios. Important factors during a product-harm crisis are identified and sixteen combinations of those factors’ levels are analyzed. Suggestions are then made regarding a troubled organization’s appropriate response to the crisis.

Introduction

Crises typically involve and affect multiple stakeholders. Besides the organization itself, individuals also pay a price after a crisis erupts. Consumers suffer injury and death, corporate managers lose their jobs, stockholders and investors experience financial losses and the public at large is put at risk. In the USA, premium increases ranging from 25% to more than 1,000% were faced by firms of all sizes for property and liability insurance (Wall Street Journal, August 5, 1985; Dudley et al., 1987). In sum, crises entail extensive damages and substantial costs for organizations, individuals and society as a whole.

Product-harm caused crises, in particular, have increased in frequency during recent years. Product liability claims (due to product-related injuries and illnesses) result in a $5.5 billion loss to the US economy annually. Moreover, injuries that require medical treatment have reached high levels; specifically, every year, 20 million such injury cases occur on the average, resulting in 110,000 permanent disabilities and 30,000 deaths (Dudley et al., 1987).

Product-harm crises can erupt from several causes, such as manufacturer’s negligence, product misuse or sabotage. Regardless of their cause, they all involve great financial costs for the troubled organization, since the company
usually recalls the product and devotes many of its resources to restore or improve its hurt public image associated with the defective product it markets.

Ford's Pinto case cost the company an estimated $200 million, due to the recall of approximately 16 million cars. Pintos had caused 500 burn deaths to people who would not have been seriously injured if their cars had not burst into flames. A.H. Robins filed for court protection under Chapter 11 because of the dangerous IUD litigation costs that it had to face. The company had paid $245 million in damage claims for 7,600 cases by the end of 1984; it had sold 2.8 million Dalkon Shield IUD's over the years. The famous Tylenol case, a product tampering case that involved seven deaths, cost Johnson & Johnson around $100 million for the recall of the product and company communications to the involved publics. In addition, Tylenol's market share dropped dramatically, and was only regained nine months after the crisis.

This research examines the fundamental components of a product-harm crisis and proposes an integrated perspective on examining crisis management. The study relies on consumer attitudes to develop a new measure of the degree of success of an organization's efforts in handling crises. Consumers' attitudinal structure (both before and after a crisis) can be used as the basis for monitoring consumers' reactions to a troubled organization's responses, and ultimately those responses' success levels. Attitude change is, therefore, suggested as an indicator of consumers' approval or disapproval of organizational responses to a product-harm crisis.

Prior research

Crises in general can be best looked upon on the basis of the "Organizational Crisis Management" perspective. However, product-harm caused crises, in particular, can be examined either on the basis of this perspective or on the basis of what we call here the "Consumer Behavior" perspective.

The Consumer Behavior perspective

The critical question of "How can an effective recall campaign be run?" has been addressed by Mowen and his colleagues, who conducted a series of studies (see Table 1). The main thesis of their research on product recalls is that quick or responsive product recalls may substantially lower an organization's risk in product liability trials.

The important aspects of this research stream lie with its rationale. The studies relied on attribution theory (Kelley, 1967), which suggests that people appear to weigh negative information more heavily than positive information.

Mowen and his colleagues identified several important variables that determine the degree of success of a product recall. These variables were manipulated by using scenarios that described different levels of them. Table 1 pre-
Table 1

Summary of Mowen et al. studies: effects of product recalls on consumer perceptions

A. Reputation
   Mowen and Ellis (1981), Mowen et al. (1980), Mowen (1979). The effect of crisis on well-known companies with a positive image may be minimal. For unknown companies, the effect can be devastating.

B. Response time
   Mowen (1979). A decision variable. If recall is initiated before serious harm, it enhances company’s reputation for social responsibility. Company perceived as more responsible if it acts before government agency steps in. More negative opinion of a company if consumers read that company was aware of the problem for a year rather than two weeks.

C. Problem reporting
   Mowen and Pollman (1981). It is best to initially overstate the problem to the public so that subsequent reports provide more favorable information about the product. This way, the company is perceived more favorably, as more honest, credible and concerned with consumer welfare. Result supports hypothesis of Jones and Davis (1965) according to which messages that are “in-role,” following the obvious interests of the communicator, tend to be perceived as less credible, and made for the sender’s benefit.

D. Prior recalls
   Mowen (1979), Mowen and Ellis (1981). Having made previous recalls can augment a recall’s negative consequences. This effect particularly (negatively) strong when an unknown firm initiates the recall.

E. Severity of injury
   Mowen (1979), Mowen and Ellis (1980). The more severe the injury associated with the product, the greater the negative impact on the company’s image and the greater the product liability award.

F. Press coverage
   Mowen (1979). The negative effects of a product recall are mitigated by the press reporting that company is acting in a socially responsible manner. Press coverage more influential than issue advertising. Statements by independent observers more influential than statements by company’s spokespeople.

G. Product category
   Mowen and Pollman (1981). An automobile defect is perceived highly negatively, more so than defects in lawn mowers or contact lenses.

H. Source of information
   Jolly and Mowen (1984). Government sources of information are perceived as more trustworthy and objective than a company’s ads.

I. Type of medium
   Jolly and Mowen (1984), Dommermuth (1974). The print medium is perceived as more trustworthy and objective than the sound medium. Dommermuth found print to be the best type of medium.
J. Favorable social responsibility information
Jolly and Mowen (1984). If favorable social information (e.g., the company acted in a socially responsible way) is given, consumers perceive the company in a more favorable light than if no such information is given.

K. (In)action by the CPSC
Mowen (1979), Mowen and Ellis (1980). Consumers perceive a company as being less responsible when the company acts prior to CPSC’s intervention. Counterintuitive? Explanation based on Jones and Davis (1965). Consumeristic attitude of company is the reason, or some other more self-serving factor is thought to be behind company’s actions.

L. Similar recalls by other manufacturers
Mowen (1979), Mowen and Ellis (1980), Mowen and Ellis (1981). The public receives its most favorable impression of a company (company would not be negatively influenced) when there are few injuries involved and other companies have experienced similar recalls.

M. Convenience of recall
Mowen and Ellis (1981). Surprising, strong effect: defect perceived as significantly more dangerous when its return (to the company) was highly convenient (similar explanation provided as in K above).

The Organizational Crisis Management perspective

Meyers and Holusha (1986) identified three distinct phases of a crisis: (a) the pre-crisis period, (b) the crisis period, and (c) the post-crisis phase, which finally results in the evolution of radical change. They provide ways through which an organization can get out of a product-failure crisis: quiz your customers; find the problem; respond; adjust production; revise the numbers; fix the problem; and return.

Smart et al. (1978) adopted a framework for identifying configurations of strategic, structural and behavioral attributes that affect vulnerability or susceptibility to crises. Their conceptual model recognizes the existence of both controllable and uncontrollable variables that relate to an organization.

Defining an organizational crisis, Milburn et al. (1983a) recognize that crises
have both objective and subjective aspects and they suggest (1983b) strategies and responses that organizations-in-crisis can or should follow. An underlying assumption here is that the way an organization responds to a crisis depends on how its individuals respond to the stress caused by the crisis.

Shrivastava (1986) developed a framework for understanding and explaining crises, adopting the context of evolution of industrial societies suggested by Habermas (1975). Crises are cases in which organized industrial activities cause major damage to human life and to physical and social environments. They are man-made disasters, i.e., human agents are responsible for the damage caused. A crisis can be caused by a complex set of human, organizational and technological factors which interact with environmental factors. Crises have large economic and social costs. In addition, multiple stakeholders are involved in the cause, communication and mitigation of the effects of a crisis.

Lerbinger (1986), recognizing the important role that the media play in influencing the public during a crisis, promotes the need for crisis communications planning. Pincus (1986) argues that the CEO of a troubled company is the one who can minimize the negative effects that a crisis has on a company’s stock price and restore investors’ confidence with a wise communication strategy.

Overall, the organizational crisis management perspective recognizes the important role that multiple stakeholders play during a crisis situation. The organization’s management and individuals are the focal points of interest. In addition, outside parties, especially the press and regulatory agencies, greatly influence organizational responses to a crisis.

A new framework in examining success in organizational responses to crises

Organizations respond to a product-harm crisis because it affects performance, since negative information about the organization and the product is transmitted to the market. A troubled organization communicates its responses to the consumers. However, the organization acts within certain boundaries, which are set by the environment. Regulatory agencies concerned with consumers’ welfare and safety, along with the press, affect what the organization-in-crisis can do and say about it. Government agencies set standards about product performance and company responsibilities, and the press usually covers all aspects of a crisis in detail. In addition, comparisons with other manufacturers of similar products who have had the same problems as the troubled company affect the way consumers will evaluate organizational responses to a crisis.

The organization communicates the crisis situation and its responses to the consumers in an attempt to change their attitudes, i.e., to make them more positive than they are right after the crisis has occurred. The organization assumes that since a crisis is associated with negative events and information,
consumers' attitudes after a crisis will change toward a negative direction. The troubled organization, then, attempts to either minimize the extent of this change, or to hold consumers' attitudes toward the defective product and/or the company at their pre-crisis levels. Moreover, if the organization handles the crisis as an opportunity-to-take, rather than as a problem, then attitude change may even be positive. All these issues and possibilities are examined in this paper.

The communications are received by the consumers, who form perceptions and attributions about the extent and cause of a crisis. This process leads to the formation of attitudes that consumers hold about the organization, the defective product and the organization's communications.

Consumer attitude formation is affected by both the organizational and the environmental communications, since the firm, like the government agencies and the press, deals with a crisis by monitoring and reporting on it. Consumer attitude formation is then influenced by different sources of information, depending on each one's credibility. Attitudes that consumers hold can be monitored by the organization and taken into consideration during its decision making processes regarding optimal ways of handling a crisis.

Eventually, what the organization wants to accomplish is attitude change (positive), which will in turn determine how many consumers decide to remain brand- or organization-loyal. Positive attitude change can be translated, at the aggregate level, into increased sales (or market share) or profitability. The rate of improvement in consumers' attitudes determines whether a crisis persists or is eventually resolved.

**Factors affecting success in handling a crisis**

The study identifies and focuses on three main factors that are instrumental in determining a troubled organization's success in dealing with a crisis situation. These factors consist of groupings of several variables which have been separately examined in previous research work in the area. The three factors, along with relevant testable hypotheses are presented below.

1. **Company's reputation and image**

   Research has shown that the effect of a crisis on well-known companies with a positive image may be minimal. For unknown companies, on the other hand, the effect can be devastating (Mowen, 1979; Mowen et al., 1980; Mowen and Ellis, 1981). Moreover, it has been shown that if a firm had made previous recalls, this could augment a current recall's negative consequences, and this effect would be particularly strong (negatively) when an unknown firm initiated the recall (Mowen, 1979; Mowen and Ellis, 1981). One can notice that all these variables deal with a firm's history, or the degree to which a particular
firm is well-known or respected. This factor can be seen as consisting of two levels (well-known, respected companies vs. companies that are not well-known or respected). Therefore, we hypothesize:  

**H1**: Given the same levels of a product-harm crisis extent, organizational responses and various external effects, consumers will in general perceive a more well-known and respected company as more successful in handling the crisis (as this is measured by their attitudes, attitude change and interest in buying the new model) than a less well-known and less respected company.

**(2) External effects**

The same stream of research has dealt with the issue of how positively or negatively external parties (e.g., government agencies, the press, interest groups) influence a firm’s efforts to handle a crisis. Specifically, it was shown that the negative effects of a product recall are mitigated by the press reporting that the troubled organization is acting in a socially responsible manner (Mowen, 1979). Lebinger (1986) also recognized the important role of the media in influencing the public during a crisis. The same type of information or comments can also come from government agencies such as the Consumer Product Safety Commission (CPSC).

More specifically, it has been shown that if favorable social information (for example, showing that the company had acted in a socially responsible manner) is given, consumers perceive the company more favorably than if no such information is given (Jolly and Mowen, 1984). Even past problems of competitors can be involved here. Studies by Mowen (1979) and Mowen and Ellis (1980, 1981) concluded that the most favorable impression of a company-in-crisis (i.e., the consumer would not be negatively influenced) would be when crisis-related injuries had been few and other companies had experienced similar recalls. Therefore, during a crisis an organization can face either positive or negative external effects that directly influence its success in dealing with the crisis. We, then, hypothesize:  

**H2**: The more positive the external reactions (by government agencies and the press) are to the company’s responses during a crisis, the more successful the consumer will perceive the company to be in handling the crisis.

This, of course, is not to suggest that all organizations are simply reactive to a crisis. They may instead attempt to control their external environment by influencing the media as well as regulatory agencies, along with influencing consumers. This study, however, only examines the effect that external factors have on a firm’s attempts to handle a crisis.

**(3) Organizational response**

The issue of what constitutes an appropriate organizational response during a crisis is crucial and has received a great deal of research attention. Meyers
and Holusha (1986) suggest ways through which an organization can get out of a product-failure crisis. Milburn et al. (1983b) present more strategies and responses that organizations-in-crisis can or should follow. The latter researchers, however, rely mostly on a firm's individuals' responses as determinants of organizational responses to a crisis.

Ever since the early work on crisis management, response time has been identified as one of the primary determinants of crisis-handling success. Response time is a decision variable, and Mowen (1979) showed that a company is perceived as more responsible if it acts before a government agency steps in. If consumers read that the company has been aware of the problem for a year rather than two weeks, for example, there is going to be a more negative opinion of the company. Consumers perceive a company as more responsible when it acts prior to the CPSC's intervention after a crisis erupts. However, research has shown the opposite (Mowen, 1979; Mowen and Ellis, 1980), counterintuitive as this may sound. The explanation offered by the researchers is that the problem lies in the consumeristic attitude of the company or some other self-serving factor behind the company's actions. This issue is reexamined in the present study.

Organizational responses to a crisis can vary. A firm can simply deny any responsibility for a defective product that it markets, or can recall it only after a government agency orders it to do so. Many companies, however, choose to recall a defective product even before a government agency order is issued. These are involved in voluntary product recall. Still other companies may choose to respond by employing a "super effort," to show their customers that they are really concerned with their welfare, and that they are socially responsible and extremely honest. They go far beyond simply informing the public of the dangerous product and the voluntary recall they have decided upon. They may make the recall process extremely easy for the customers, they may give out free samples or coupons for some of their other products, and advertise the recall widely.

Therefore, we identify an "organizational response continuum" which includes four levels of the organizational response factor (from low to high: denial — involuntary product recall — voluntary product recall — super effort), and hypothesize:

H3: Given the same levels of a product-harm crisis extent and various external effects, a company will be more successful in handling a crisis than another company if its responses to the crisis lie higher in the "organizational response continuum" than the responses of the other company.

Dependent variables and their measurement

The study utilized the following dependent variables. Each is presented here along with its operationalization and measurement.
Pre-crisis attitude toward the company \((A_1)\)

Subjects responded on a 7-point scale \((1 = \text{Extremely negative}, 7 = \text{Extremely positive})\) to the question: "What is your general impression of [Company]?" They were also asked whether they agreed with the following statements: "[Company] is socially responsible"; "[Company] is very much concerned with consumer welfare"; and "[Company] is honest." The last three items were 7-point strongly agree/disagree statements. Correlations among these four items were very high (.7 and above), and therefore \(A_1\) was defined as follows, after a Principal Components Analysis had been run:

\[
A_1 = a_{11}X_1 + a_{21}X_2 + a_{31}X_3 + a_{41}X_4
\]

where \(X_1\) to \(X_4\) represent the values of the four items (manifest variables), and \([a_{11}, a_{21}, a_{31}, a_{41}]\) denotes the characteristic vector, or the first eigenvector. Note that one derives \(a_{11}\) to \(a_{41}\) by dividing the factor correlations by the square root of the first eigenvalue. Here, we assume that consumer attitudes are a linear combination of the four manifest variables.

Post-crisis attitude toward the company \((A_2)\)

The same question items were used to measure \(A_2\) as the ones used to measure \(A_1\) above. Therefore, after a separate Principal Components Analysis was run with the post-crisis attitude items (again, these were highly correlated), \(A_2\) was expressed as:

\[
A_2 = b_{11}X_1 + b_{21}X_2 + b_{31}X_3 + b_{41}X_4
\]

Having operationalized \(A_1\) and \(A_2\), we can now define attitude change.

Attitude change \((\Delta A)\)

Defined as (after–before) attitude toward the company; or,

\[
\Delta A = A_2 - B_{(\text{post-pre})}A_1
\]

where \(B_{(\text{post-pre})} = r_{(\text{post-pre})}\cdot [sd_{(\text{post})}/sd_{(\text{pre})}]\). The definition of the attitude change measure as such takes into consideration the likely influence of \(A_1\) on \(\Delta A\). \(\Delta A\) is dependent on the initial level of \(A_1\). Therefore the regression coefficient \(B_{(\text{post-pre})}\) of post-crisis attitude on pre-crisis attitude was computed and then the pre-crisis attitude was weighted by the \(B\) in the computation of the change scores. A positive value for this variable would indicate that attitudes after the crisis became more positive than they were before the crisis, an indication that the company was really successful in eliminating the negative effects associated with the crisis. On the other hand, a negative value for \(\Delta A\) would imply that consumers’ attitudes toward the company deteriorated after the crisis erupted, and given the organizational responses to it. Different degrees of positive or negative values of this variable would show the relative success that a given company has in handling the same crisis, given the external effects it faces, its responses, and how well-known and reputable it is.
Interest in new model (NEW)

This variable can be used as an indicator of the degree of customer dissatisfaction with or fear of the product defect and the model to replace it. It is similar to the attitude measures presented above, but is more specific and lies closer to an action-orientation on the part of customer reaction to the crisis. NEW can also be interpreted as a measure of organizational responses’ success. NEW was operationalized as “How interested would you be in buying the new model to replace the defective?” (1 = Very much interested; 7 = Not at all interested).

Methodology

Research design

The study utilized a $2 \times 2 \times 4$ factorial experimental design. The three factors are given below:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
<th>Levels</th>
</tr>
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<tbody>
<tr>
<td>Company’s reputation and image</td>
<td>Well-known and respected company vs. not that (or less) well-known and respected company</td>
<td>High/low</td>
</tr>
<tr>
<td>External effects</td>
<td>How positively or negatively external parties (e.g., government agencies, the press, interest groups) influenced the company’s efforts to handle the crisis</td>
<td>$+/-$</td>
</tr>
<tr>
<td>Organizational response</td>
<td>How the company responded to the crisis</td>
<td>- super effort, - voluntary, - involuntary, - denial</td>
</tr>
</tbody>
</table>

Therefore, 16 treatments or manipulations were defined.

Procedure

Scenarios were used for the manipulation of variables. The experiment was conducted in two stages. Subjects received a set of scenarios and were told that what they were being presented with was taken from a Business Week article. A date for the article’s publication was also given. Then subjects were asked to respond to the first set of questions, which measured their pre-crisis attitudes toward the company. Following this, the subjects were provided with a second set of scenarios, which described the crisis, the organizational responses to it,
and the external effects. Subjects were told that the second set of scenarios also appeared in the same magazine, but at a later date than the first (i.e., two months later). Finally, subjects’ post-crisis attitudes were measured through a second set of questions. After the responses had been collected, subjects were debriefed. It was made clear to them that the articles used in the study were mock magazine articles. In addition, the reason for using mock magazine articles, the purposes of the study and the expected results were explained to them.

**Subjects and product**

The sample comprised 192 (16 cells @ 12 observations) graduate and undergraduate business students who were asked to voluntarily participate in the study. Subjects varied by age (49.9% of them were under 25 years old and 51.6% were over 25), by sex (49.5% male; 50.5% female), and by student status (40% undergraduate; 60% graduate, holding at least one bachelor’s degree). Subjects were randomly assigned to one of 16 treatment groups differing in the levels of the three factors. The product selected was a hair dryer model manufactured by a fictitious company, named “DryAire.” The selection process looked for a product that the subjects could associate with (wide use and acceptance, especially among younger people of both sexes, and a defective model which could cause considerable harm). In this sense, students can be considered representative of the general consumer of the particular product.

**Scenarios**

Each of the two sets of scenarios described pre- and post-crisis characteristics through the manipulation of the appropriate variables, as was explained before. The manipulation followed Mowen’s development of similar scenarios. A few illustrative examples follow.

The manipulation for a well-known company described the company as successful, with an excellent sales record, operating a Consumer Affairs department which handles consumer complaints, placing a great emphasis on consumers’ welfare and satisfaction, and never faced with a product-defect problem. The not-well-known company manipulation, on the other hand, presented the company as an aggressive product seller, its main concern being to capture as big a market share as possible, with a history of earlier product recall incidents for some of its other products.

Scenarios manipulating the post-crisis organizational responses and external effects were also developed. An excerpt of the positive external effects scenario included: “...Checks with the CPSC revealed that other manufacturers of hair dryers were having difficulties similar to DryAire. Investigations are proceeding on four manufacturers for producing hair dryers with defective electrical circuits ... A check with CPSC ... indicated that the government organization hasn’t determined yet whether the hair dryer presents a serious enough hazard to warrant a recall. Therefore, CPSC has issued a temporary recall order only for the hair dryers manufactured in May 1984...” A negative external effects
scenario, on the other hand, besides reversing the above description, also added that "... the issue of the defective hair dryer was covered by the majority of the popular press which seems to agree that the company’s reactions were socially irresponsible."

Four scenarios dealing with the manipulation of the organizational responses were developed. The denial scenario reported: "... The tests, according to a company spokesperson, were inconclusive, and no electrical short circuits were found. The company kept on producing and marketing the hair dryer, even after a recall order by the CPSC was issued. The company attempted to avoid any negative publicity about the defect by still maintaining that it was marketing a safe product..." An involuntary recall response scenario included: "... the company... recalled it [the product] only after the CPSC ordered it to do so... gave the recall limited publicity, only through print media... In the ads used to inform consumers about the recall, the company still maintained that it was marketing a safe product; however, it was willing to replace any hair dryer that was produced during May 1984..." A voluntary recall scenario reported that "... the company ran multiple performance tests on the model... and immediately decided to recall it... publicized the recall by making announcements of its decision using local radio stations and newspaper ads... informed consumers of how to identify a defective hair dryer model, as well as how to return it and receive a full refund..." Finally, a "super effort" organizational response, in addition to the description of the voluntary recall above, included other actions, such as "... to publicize the recall, the company spent millions of dollars, ... planned a media campaign that included slide presentations on prime-time television and announcements in nearly every major newspaper... gave very detailed instructions to consumers about identifying the defective model, returning it, replacing it, or receiving a full refund..."

The crisis extent was kept at exactly the same level in all scenarios, so that the manipulations would not get affected by this factor. Specifically, all subjects read that: "... approximately 450 incidents of electric shocks received by people using the hair dryer were reported, 18 of which required medical attention. What is involved are some 30,000 hair dryers manufactured in May 1984 that may be defective..." The reason that crisis extent was not included as a factor in the study was because a pilot study showed no significant main effects of variation in the extent of the crisis.

**Results**

**Manipulation checks**

The analysis of the collected data started with examining whether the manipulations worked. In other words, we asked, "Did subjects perceive the well-known and reputable company as such; and did they believe the stories pre-
Table 2

Dependent variables: means

<table>
<thead>
<tr>
<th>Manipulation</th>
<th>Variables</th>
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<tbody>
<tr>
<td></td>
<td>$A_1$</td>
<td>$A_2$</td>
<td>$\Delta A$</td>
<td>NEW</td>
</tr>
<tr>
<td>Rep. $^a$</td>
<td>Resp. $^b$</td>
<td>Ext. $^c$</td>
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<td>L</td>
<td>4</td>
<td>+</td>
<td>4.5</td>
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<tr>
<td>L</td>
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<td>-</td>
<td>3.7</td>
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<tr>
<td>L</td>
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<td>+</td>
<td>4.3</td>
<td>9.4</td>
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<tr>
<td>L</td>
<td>3</td>
<td>-</td>
<td>4.8</td>
<td>6.4</td>
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<tr>
<td>L</td>
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<td>+</td>
<td>6.5</td>
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<td>L</td>
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<td>5.9</td>
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<td>L</td>
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<tr>
<td>L</td>
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<td>-</td>
<td>6.3</td>
<td>3.8</td>
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<td>10.4</td>
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<td>H</td>
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<td>-</td>
<td>11.2</td>
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<tr>
<td>H</td>
<td>1</td>
<td>-</td>
<td>11.4</td>
<td>5.3</td>
</tr>
</tbody>
</table>

$^a$ Company's reputation: L = Low; H = High.

$^b$ Organizational response: 1 = Denial; 2 = Involuntary product recall; 3 = Voluntary product recall; 4 = Super effort.

$^c$ External effects: + = Positive; - = Negative.

Indeed, by looking at Table 2, one can note that subjects' attitudes toward a company were lower when the company was presented in the stories as low in reputation and not-well-known. Comparing that against the attitudes for a company presented as well-known, or high in reputation, one notes that attitudes toward the latter company were systematically higher (min = 10.4; max = 11.8) than the attitudes toward the earlier (min = 3.7; max = 6.5). Therefore, we can conclude that the manipulations employed in the study worked.

Hypotheses testing

Analysis of Variance (ANOVA) was used to test the hypotheses presented earlier. ANOVA results (F-Ratios) appear in Table 3. The model allows the examination of all main effects as well as the two- and three-way interactions.

Starting the interpretation of the results from the post-crisis attitude ($A_2$), certain important conclusions can be drawn. The factor of the company's reputation is significant according to the F-test (Table 3). Reputation signifi-
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Table 3
Summary of ANOVA results: F-ratios

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>$A_2$</th>
<th>$\Delta A$</th>
<th>$NEW$</th>
</tr>
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<tbody>
<tr>
<td>Main Effects:</td>
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<tr>
<td>Reputation (A)</td>
<td>30.7*</td>
<td>1.0</td>
<td>12.4*</td>
</tr>
<tr>
<td>Response (B)</td>
<td>47.0*</td>
<td>61.0*</td>
<td>2.7b</td>
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<tr>
<td>External (C)</td>
<td>38.9*</td>
<td>44.8*</td>
<td>21.7*</td>
</tr>
<tr>
<td>Interaction Effects:</td>
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<tr>
<td>A × B</td>
<td>2.9b</td>
<td>2.3c</td>
<td>1.4</td>
</tr>
<tr>
<td>A × C</td>
<td>.8</td>
<td>.7</td>
<td>.7</td>
</tr>
<tr>
<td>B × C</td>
<td>.7</td>
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<td>1.8</td>
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<tr>
<td>A × B × C</td>
<td>.4</td>
<td>.5</td>
<td>3.5b</td>
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*p < 0.005
b *p < 0.05
c *p < 0.10

Significantly affects consumers' post-crisis attitudes. At the .005 level, hypothesis $H1$ is clearly supported. The same results apply for the external effects factor. At the same level of significance (.005), the factor affects consumers' attitudes and, in turn, $H2$ is also supported. Moreover, we notice that the (reputation) × (response) interaction is significant. By examining the corresponding means, we conclude that for both the high- and low-reputation companies, the values that $A_2$ takes increase as we go to higher levels of organizational response (from denial to super effort). In terms of post-crisis attitudes, the low-reputation firms rated 6.39 ($n=96$) on average, and the high-reputation firms rated 8.26 ($n=96$) on average. Similarly, mean attitudes for the external effect factor were 6.28 ($n=96$) for firms that faced negative external effects, and 8.38 ($n=96$) for those facing positive external effects during a crisis. Here, only the main effects of the two factors were significant. The interactions, although going in the right direction, were not significant. As far as the organizational response factor is concerned, the main effect was also significant at the same level (.005).

An interesting result here comes from the observation of the means. From the denial to the super effort responses, the mean post-crisis attitudes ($A_2$) along the continuum were: 5.22, 5.44, 9.43 and 9.22 ($n=48$ in each). In other words, greater average values for $A_2$ apply as one goes from denial to involuntary to voluntary response; greater attitudes do not apply, however, when a firm goes from voluntary recall to super effort. This does not provide evidence for support of $H3$, but it may suggest a very important conclusion; i.e., although super effort requires more organizational resources in handling a crisis, a firm may
be better off following the voluntary recall response (requiring less of an effort and being more effective in the end).

When examining the attitude change variable, the response and external main effects are significant at the .005 level. The (response) × (reputation) interaction was significant here, as it was for the $A_2$ case. For low-reputation companies, average $\Delta A$ values along the organizational response continuum were: 3.24, 3.31, 6.67 and 6.87. For their high-reputation counterparts, the corresponding values were: 2.72, 2.87, 8.14 and 7.64. For the latter cases, we notice a decrease going from voluntary to super effort responses. This suggests that the change of consumers' attitudes toward a high-reputation organization is largest when the organization uses the voluntary recall response to overcome the crisis.

Schematically, Fig. 1 presents the mean attitude change of each of the 16 treatments. As one can notice, attitude change ($\Delta A$) was greater for all the treatments that involved either a super effort (4) or a voluntary recall (3), than it was for the cases involving a denial (1) or an involuntary product recall (2), no matter whether the corresponding external effect was positive or negative, or whether the reputation of the company was high or low. In addition, attitude change was greater for those cases that involved positive external

<table>
<thead>
<tr>
<th>MANIPULATION</th>
<th>ATTITUDE CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>H 4 +</td>
<td>(8.3)</td>
</tr>
<tr>
<td>H 4 -</td>
<td>(5.5)</td>
</tr>
<tr>
<td>H 3 +</td>
<td>(8.2)</td>
</tr>
<tr>
<td>H 3 -</td>
<td>(5.1)</td>
</tr>
<tr>
<td>H 2 +</td>
<td>(4.1)</td>
</tr>
<tr>
<td>H 2 -</td>
<td>(2.5)</td>
</tr>
<tr>
<td>H 1 +</td>
<td>(4.3)</td>
</tr>
<tr>
<td>H 1 -</td>
<td>(2.2)</td>
</tr>
<tr>
<td>L 4 +</td>
<td>(8.8)</td>
</tr>
<tr>
<td>L 4 -</td>
<td>(6.4)</td>
</tr>
<tr>
<td>L 3 +</td>
<td>(9.1)</td>
</tr>
<tr>
<td>L 3 -</td>
<td>(7.2)</td>
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<td>L 2 +</td>
<td>(4.0)</td>
</tr>
<tr>
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<td>(1.7)</td>
</tr>
<tr>
<td>L 1 +</td>
<td>(3.1)</td>
</tr>
<tr>
<td>L 1 -</td>
<td>(2.3)</td>
</tr>
</tbody>
</table>

Fig. 1. Mean attitude change (for key, see footnotes to Table 2).
effects than it was for those that involved negative external effects. There was no exception to that. As far as the reputation of the company is concerned in relation to attitude change, it seems that ΔA was greater for the low-reputation company than for the high-reputation one, in 5 out of the 8 pairs. The highest attitude change was observed for the (L3+) and (L4+) treatments, and the lowest for the (L2−) treatment.

Finally, average ΔA for (L) treatments was 5.02 (n=96), vs. 5.34 (n=96) for (H) treatments. ΔA for (+) treatments was 6.24 (n=96) and 4.12 for (−) treatments. Organizational response continuum values for ΔA were (going from 1 to 4), 2.98, 3.09, 7.40 and 7.25. The same pattern appears here as the one for A2. Specifically, going from denial to super effort, ΔA improves until the point going from (3) to (4), where, even though there is a positive ΔA, it is lower for the super effort case. Thus, again, based on the analysis of ΔA, H2 is supported, but not H1 or H3.

Turning to the examination of the NEW variable (i.e., whether consumers are interested in buying the new model which is to replace the defective one), interestingly enough, along with the significant main effects, the three-way interaction is also significant at the .05 level. Keeping in mind that the anchor values of this scale were 1 = Very much interested and 7 = Not at all interested, NEW was 5.38 for the low-reputation company cases (n=96), and 4.60 for the high-reputation ones (n=96). Similarly, NEW was 5.50 for the (−) external effects cases (n=96), and 4.48 for the (+) external effects treatments (n=96). Although these figures are not particularly high, we can conclude that it is more likely for consumers to be interested in buying a new model of the defective product from the same company if this company faces positive external effects during the crisis, or it is well-known and highly reputable. In terms of organizational responses, the “continuum” values were 5.33, 5.21, 4.52 and 4.90 (n=48 for each), implying that consumers are generally more interested in buying the new model if the organizational response to the crisis was one of voluntary product recall. Again, a super effort response does not even marginally seem to help a troubled organization handle a crisis more successfully than a voluntary product recall response.

The three-way interaction significance reveals the following interesting facts. Table 4 ranks the average values of NEW for all 16 treatments. Consumers are the most interested in the new model when the company is high in reputation, faced positive external effects and employed a super effort to get out of the crisis. Very close to the same point lies the case of a company high in reputation and also faced with positive external effects, but using a voluntary product recall response to get out of the crisis. At the other end, consumers are least likely to be interested in buying the new model in the case of a low reputation company which has faced negative external effects and used the denial approach during the crisis (L1−). So in general, after a crisis, consumers are more likely to buy the new model replacing the defective one, if the company rates high in reputation and faced positive external effects during its crisis handling efforts,
Table 4

<table>
<thead>
<tr>
<th>Rank</th>
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<th>NEW</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>H 4</td>
<td>3.417</td>
</tr>
<tr>
<td>2</td>
<td>H 3</td>
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<tr>
<td>3</td>
<td>H 2</td>
<td>4.000</td>
</tr>
<tr>
<td>4</td>
<td>L 3</td>
<td>4.083</td>
</tr>
<tr>
<td>5</td>
<td>H 1</td>
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</tr>
<tr>
<td>6</td>
<td>L 1</td>
<td>4.667</td>
</tr>
<tr>
<td>7</td>
<td>H 4</td>
<td>5.000</td>
</tr>
<tr>
<td>8</td>
<td>L 4</td>
<td>5.083</td>
</tr>
<tr>
<td>9</td>
<td>H 3</td>
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</tr>
<tr>
<td>10</td>
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</tr>
<tr>
<td>11</td>
<td>L 3</td>
<td>4.417</td>
</tr>
<tr>
<td>12</td>
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</tr>
<tr>
<td>13</td>
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<td>14</td>
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</tr>
<tr>
<td>16</td>
<td>L 1</td>
<td>6.250</td>
</tr>
</tbody>
</table>

which were preferably either a super effort or a voluntary product recall (H4+ or H3+). Even an involuntary product recall (H2+) is not really bad, since its NEW rating was 4.000 — the average value on the scale.

Conclusion

A new measure of organizational success in dealing with a product-harm caused crisis has been suggested and its use demonstrated for a crisis involving a defective hair dryer model. The measure accounts for changes from pre- to post-crisis consumer attitudes, and uses them as an indicator of company success in handling the crisis. Several conclusions can be drawn.

Given the same levels of a product-harm crisis extent, organizational response and various external effects, a firm will be more successful in handling the crisis if (a) it is a well-known company, and (b) the reactions by government agencies and the press are positive. In addition, it has been shown that an involuntary product recall is a more effective organizational response than a denial of the firm’s responsibility about the defective product and, in turn, that a voluntary recall is more effective than an involuntary one. However, a super effort, i.e., the company really trying hard to prove that it is socially responsible, honest and concerned with consumer welfare, was not found to be more effective than a simple voluntary product recall.
An organization has indirect control over the external effects factor, and direct control over its reputation and organizational responses. Therefore, according to the results presented in the earlier section, several managerial implications of this study can be suggested.

It is really important for any company to devote high levels of its resources to developing or improving its image. A company's favorable reputation with consumers may act as a preventive device against the negative consequences of a future crisis. It is frequently suggested that management teams play the role of the director of a company's efforts during a crisis. This paper, however, suggests that companies should pay greater attention to how consumers perceive them and should focus on polishing and enhancing their image (social responsibility, honesty, concern with consumer welfare) even before a crisis erupts. The best way for a company to achieve an improved image is to act in a socially responsible manner even before a crisis erupts. In other words, image improvement should not be the main concern of a company only during a crisis.

However, during a crisis, the troubled organization should recall the harmful product voluntarily. This involves: a decision to immediately recall the product before the CPSC orders it to do so; and communicating to consumers the danger of using the product, telling them exactly how they can identify the defective models, and how they can replace them with others or receive refunds.

Firms that are low in reputation and not well-known should handle a crisis by adopting the super effort or the voluntary recall response, so that they will enjoy improved consumer attitudes. However, employing the voluntary product recall response is more efficient, i.e., it costs less than the super effort but gives approximately the same positive results. In addition, such firms will be better able to influence their customers to buy their model to replace the defective one if they use the voluntary product recall organizational response. A condition, however, for these suggestions to work is that the company must be faced with positive external effects during the crisis. Moreover, these effects can also be seen as a result of how willing the company is to admit its responsibility for the defect, that is, by voluntarily recalling the product or by employing the super effort response.

As far as the well-known and reputable firms are concerned, the optimal way to go during a crisis is to recall the harmful product voluntarily. Their customers will be far more willing to buy the replacement if a voluntary product recall is chosen as the organizational response to a crisis.

For both high- and low-reputation companies, denial of responsibility and involuntary recall are detrimental (consumer attitudes deteriorate and consumers are not willing to buy the new product replacing the defective one).

At a more general level, one can conclude that in many cases a crisis can be seen as an opportunity to improve consumers' perceptions of and attitudes toward the company. If the company tries hard to prove its social responsibility, honesty and concern with social welfare during a crisis, it can actually improve its image (see, for example, cases L4+, L3+, H4+ and H3+). In that sense,
crises are opportunities for improving a company’s image, especially if that company is initially not well-known.

It remains to be seen whether the results of the present study will be similar in cases where the approach is applied to another product category. A replication of the study in a different product context will solve generalizability and external validity issues. The procedure employed in the study may have to be extended to incorporate more of the multiple stakeholders involved in a crisis situation, aside from consumers alone.

Researchers and managers can focus their efforts on developing a device for monitoring consumer attitudes toward the firm on an ongoing basis. Periodic attitude measurement can provide troubled organizations with meaningful information about how to deal with a crisis. The approach outlined in the study (pre-, post-, difference) provides a foundation for the development of such a measure.

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