VIVIDNESS EFFECTS ON VALUE AND RISK FOR RADICAL INNOVATIONS

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This research investigates how consumers' perceptions of value and feelings of risk affect willingness to try a radical innovation upon first exposure to a verbal/visual description of the innovation. Based on ideas from the availability valence and risk as feelings hypotheses, we develop and test a moderated model of vividness (picture/no-picture) effects on perceived value and risk as feelings under both risky and less-risky conditions. Using the hydrogen fuel cell car as the focal product, we find that, in certain conditions, vividness has an effect on cognitive evaluation, as well as the feelings of risk related to the innovation. However, the effect of perceived value on willingness to try the innovation is strong and positive under all conditions. A second study finds that even when the pictorial stimulus is clearly detrimental to the innovation, perceived value still prevails over risk as feelings and continues to be positively and strongly related to willingness to try the innovation.

INTRODUCTION

Information about radical innovations (hydrogen fuel cell cars, for example) is often disseminated to the public by journalists who write articles which are then published in the mass media. In this connection, imagine a consumer reading an article on a hydrogen fuel cell car. Assuming that the verbal description in the article creates at least some interest in the car on the part of the consumer, would adding a picture to the description influence consumers' willingness to buy in a positive manner? Would this willingness change if the consumer saw a clearly negative picture, say of the same car burning (BBC News South Asia, 2010)? We know that the context of vividness (through pictures, etc.) in marketing communications (publicity, public relations etc.) can influence consumers' propensity to try products and services (Kisielius & Sternthal, 1986; Loewenstein et al., 2001; De Gannaro, 2010). This article explores the effect of vivid depictions of innovations and its effects on willingness to try the innovation. Such research is important for businesses in terms of understanding how consumers perceive vivid messages so that marketing and public relations managers can communicate effectively. This becomes even more important when media reports hinder the success of the innovation by stressing the negative elements of the innovation (safety concerns in an automobile, for instance).

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Currently, there are two different perspectives that could shed light on whether such vividness elements in the verbal description (in the form of pictures) of an innovation can enhance or diminish the evaluation of an innovation. According to the *availability valence hypothesis* (Tietje, 2002; Kisielius & Sternthal, 1986), vividly presented information can *increase* cognitive elaboration of the verbal message elements and, thereby, increase overall evaluations, such as perceived value, by making the verbal message elements more readily available. Thus, verbal message elements will be more available for "vividly presented" (visual) descriptions of a radical innovation than for less vivid descriptions. In contrast, the *risk as feelings hypothesis* (Loewenstein et al., 2001) suggests that, in a risky situation, negative feelings of risk, which are *directly* (without cognitive elaboration) generated by vivid message elements, will function to *decrease* favorable evaluations of value and willingness to try the innovation.

If the latter is true, then less vivid depictions, under conditions of risk, may hold an advantage over more vivid descriptions in creating favorable perceptions of value. Conversely, if the availability valence hypothesis is true, then

more vivid depictions may be more advantageous, when risk is less apparent. Thus, it may be that each of these hypotheses is true under different conditions, such as the perceived risk associated with trying the innovation. In this paper, we examine whether the availability valence hypothesis is true under less risky conditions and whether the risk as feelings hypothesis is true under more risky conditions. In a follow up study, we also investigate the extent to which differences in vividness depictions (a different type of picture) result in changes in cognitive and emotional processing leading to changes in the perceived value of the innovation as well as consumers' willingness to try the innovation.

From a practical point of view, a radical innovation presents potential consumers with both uncertainty and opportunity (Simms & Trott, 2010). On the one hand, there is risk for the consumer if the innovation has the potential for loss. On the other hand, there is the potential for gain if the innovation can benefit the consumer. Thus, it behooves marketing practitioners to know when and how perceptions of risk and value can influence consumers' willingness to try a radical innovation. Yet, there is little evidence of the independent effects of these two crucial constructs in the new product literature. Furthermore, there is little research that discusses the effect of media reports of negative vivid images detrimental to the innovation's success.

We contribute to the literature on the diffusion of innovations in several ways. First, in Study 1, we create a conceptual framework that explores the effect of vividness on risk as feelings and perceived value that in turn, affect consumers' willingness to try a radical innovation. Second, extant literature has considered perceived value and risk as feelings as separate constructs (Sweeney, Soutar & Johnson 1999; Agarwal & Teas, 2001; Sweeney & Soutar, 2001). We follow this conceptualization and contribute by considering the role of cognitive elaboration (in the form of total number of thoughts) as an antecedent of perceived value. Third, we consider the moderating role of stated risk (less risk/more risk conditions) across the conceptual framework. Stated risk is different from risk as feelings; stated risk is the risk described in the communication of the innovation while risk as feelings is the perception of risk felt by the consumer. Fourth, since consumers' willingness to try a product changes based on the type of product, we consider our model in two different scenarios (utilitarian and hedonic product settings) to understand whether the relationships between vividness and willingness to try hold for these different kinds of settings. Lastly, we have found cases where innovative products have been affected by negative media reports (including social media). Therefore, in Study 2, we examine how willingness to try an innovation is affected when consumers see a negative media report that is detrimental to the innovation. Overall, we extend past research by studying the role of vividness on the differential effects of risk as feelings and perceived value on willingness to try an innovation, under the moderating effect of higher and lower stated risk associated with a radical innovation.

LITERATURE REVIEW, CONCEPTUAL MODEL AND HYPOTHESES

Vividness

Based on Kardes et al. (2008), we define vivid stimuli as stimuli that are concrete and specific. Concrete stimuli are easy to picture, imagine and visualize. Therefore, a picture is more concrete than a written description alone and adding a picture to the verbal description of an innovation will increase the vividness of the description. We contend that, as per the risk as feelings hypothesis, vividness will have a greater effect on risk as negative feelings when a graphic pictorial representation of the risk elements in a product is included along with the verbal description of the risk than when only a verbal description of risk is presented.

According to Kardes et al. (2008), vivid stimuli can gain consumers' involuntary attention by being concrete, specific, easy to picture, imaginative and easy to visualize. Vivid stimuli are also not context dependent and are vivid regardless of the presence of other stimuli. Further, vivid stimuli are likely to be more effective for a new product because vividness effects have been shown to be weaker when subjects have a strong prior opinion of the product (Herr, Kardes & Kim, 1991). Thus,

vivid stimuli may be especially important for the marketing of new products which have a low level of prior attitudes.

Vivid stimuli (like a picture over only a written description) also have more sensory proximity (Nisbett & Ross, 1980). They are more believable since they appear to be experienced first-hand by the subject, as contrasted with second hand information (like a written description alone) which may be relayed/ written by someone else. Thus, in a description of an innovation, a picture along with a verbal description will have greater sensory proximity and generate greater arousal than the verbal description only since it is apparently experienced first-hand. Greater arousal will engender greater attention (Kahneman, 1973) to the risky elements of the innovation depicted in the picture, which in turn will generate negative feelings.

Perceived Value and Risk as Feelings as Mediators

To understand the effect of vividness on consumers' willingness to try, we need to understand the importance of two mediators: perceived value and risk as feelings. Presently, perceived value is considered to represent an amalgam of both the costs and benefits of an innovation and is comparative and personal in nature (see Moreau, Lehmann & Markman, 2001; Sanchez-Fernandez & Iniesta-Bonillo, 2007). Perceived value is considered to be a ratiocinative outcome of expected utility from an innovation derived from a consideration of the innovation's respective benefits and costs, including psychic costs. Such a conceptualization of perceived value subsumes the concept of risk as feelings under the "costs" of an innovation in the consumer's mind. Thus, in this perspective, risk as feelings is included in the notion of perceived value and is not a separate and independent concept. However, following Sweeney, Soutar and Johnson (1999), Agarwal and Teas (2001) and Sweeney and Soutar (2001), we consider perceived value to be different from risk as feelings. We derive our framework from evidence in the social psychology literature. The cognitive processes which lead to evaluations such as perceived value are not necessarily indicative of the affective consequences of a risky stimulus (such as a radical innovation, in our case).

The risk as feelings hypothesis (Loewenstein et al., 2001) suggests that risk as feelings, or negative feelings arising from a risky stimulus, may occur directly as a result of a risky stimulus without being mediated by cognitive (cortical) processing. Consequently, perceived value and risk as feelings, although related, may have separate and unique effects on behavior. Finally, while there may be other determinants of negative feelings, the notion of risk as feelings is considered to be directly influenced by the consumer's experience of the level of vividness and immediacy of the risky stimulus.

Conceptual Model

Based on the conceptualizations of the risk as feelings hypothesis and the availability valence hypothesis, as well as our understanding of vividness, we present an overall framework in Figure 1 that explores the influence of vividness on willingness to try an innovative product. We discuss below how vividness affects risk as feelings or perceived value (via total number of thoughts) under different conditions (less risk/more risk) of stated risk leading ultimately to willingness to try an innovation:

1) The risk as feelings hypothesis (Loewenstein et al., 2001) suggests that in a risky situation, negative feelings can directly be generated based on exposure to vivid stimuli. This means that such stimuli can produce negative feelings of risk without cognitive mediation. Moreover, such negative affective reactions to risky stimuli (an innovation, in this case) may diverge from cognitive assessments and be a unique driver of behavioral intention in the form of willingness to try.
2) Vivid stimuli can indirectly (via cognitive elaboration in the form of total number of thoughts - TOT) lead to an overall evaluation of perceived value, which, in turn, may be a unique driver of willingness to try. According to the availability valence hypothesis (Kisielius & Sternthal, 1986), greater cognitive elaboration of a message

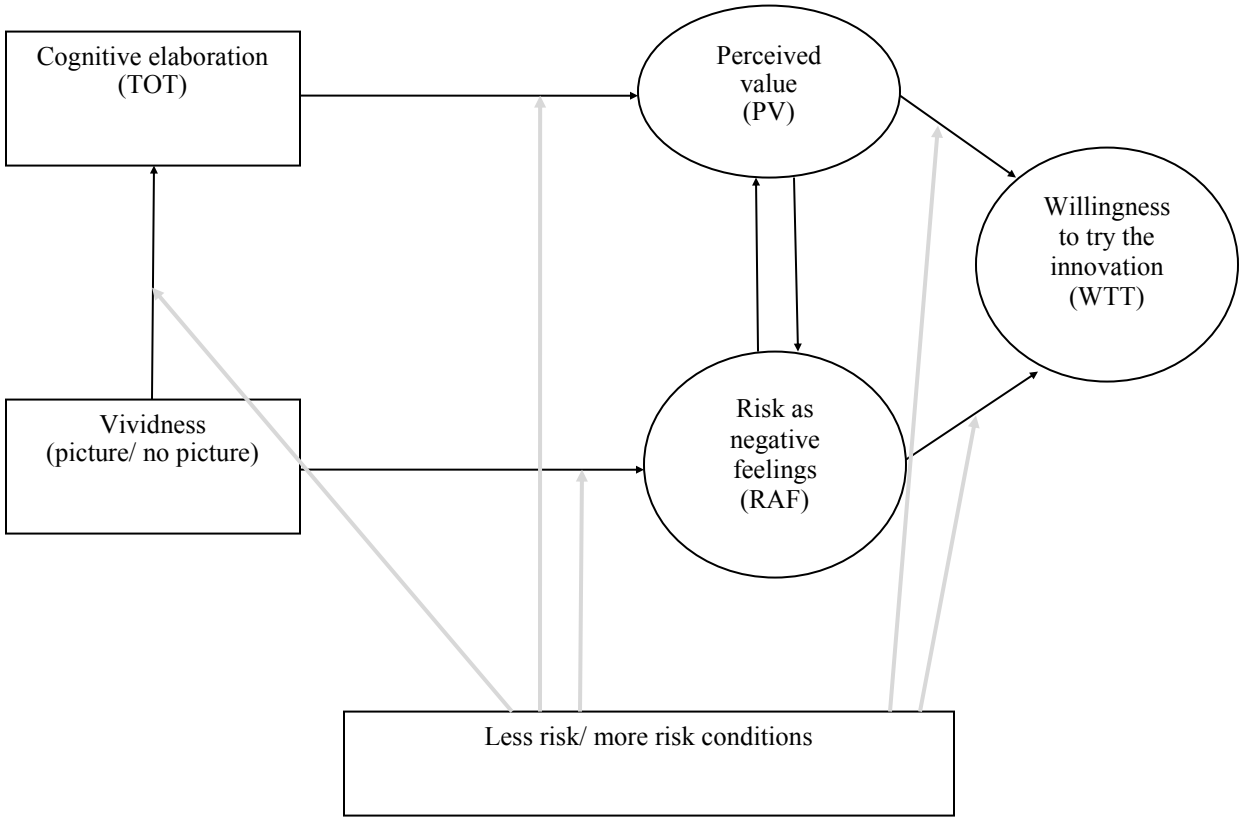
(represented, in this study, by the extent of total thoughts generated by the description of the innovation) leads to greater attitudinal judgments such as perceived value.

3) Perceived value and risk as feelings are reciprocally related to each other. The nature of these relationships is not specified since we do not know as yet how the two perspectives in our study merge together. Cognitive and emotional perspectives may be positively or negatively related depending on the context which may produce a crossfire (negative relationship) or a convergence (Swann, Griffin, Predmore, & Gaines, 1987).
4) The pathways in the model are moderated by the depiction of stated risk in the description of the innovation. For instance, as described in our hypotheses later, the path from vividness to risk as feelings is expected to be significant only under conditions of stated risk in the description of the innovation. We provide more discussion on the moderating role of stated risk via the depiction of risky attributes in the next section.

Moderating Role of Stated Risk in a Radical Innovation

We propose that stated risk in the verbal description of an innovation can increase the feelings of risk perceived by consumers with regard to the innovation. Thus, risk as feelings will be greater in the stated risk condition (more risk) than in the no-stated risk condition (less risk). Consumers will read about the risky attributes in the innovation and feel the sensation of risk (risk as feelings) as well. Additionally, the depiction of risky attributes may play a role in moderating the effects of vividness in willingness to try a radical

FIGURE 1:
A Moderated Model of Vividness Effects on Value and Risk as Feelings for an Innovation



Note: Lighter lines indicate moderating effects of risk.

innovation. It has been found that making attributes (such as the risky elements in an innovation) more vivid (by adding a picture with the risky elements, for instance) increases attention to the attribute, which increases the importance of that attribute (Mackenzie, 1986). Thus, participants who view a picture of the risky elements of an innovation, along with a verbal description of the risk, will have a tendency to pay more attention to the risky attributes and to consider these attributes to be more important. Hence, they are also more likely to experience greater negative feelings due directly to the risky attributes shown in the picture. Indeed, in a classic experiment, Schacter and Singer (1962) showed that participants labeled their feelings to be positive or negative according to the situational elements available to them in the immediate environment. Accordingly,

H_1: In the *more risky* condition, the mean of risk as feelings will be higher in the *picture* condition than in the *no-picture* condition.

According to the risk as feelings hypotheses, vividness does not lead to cognitive evaluation in the form of perceived value directly. In fact, this is one of the main tenets of the theory since this isolates the concept of risk as feelings as a separate and different construct from attitudinal judgments such as perceived value. However, according to the availability valence hypothesis (Kisielius & Sternthal, 1986), vividness leads to greater cognitive elaboration (in the form of total number of thoughts), which in turn can lead to attitudinal judgments (such as perceived value). Importantly, according to this latter perspective, both information processing by the individual and the content of the message (favorable or unfavorable) are necessary aspects of persuasion. Since the effect of vividness has been shown to deteriorate in the presence of negative information (Herr et al., 1991), we suggest that the effect of vividness on total number of thoughts will be higher in the less risky condition. Thus, total number of thoughts will be greater in the more vivid (picture) condition, but for the less risky condition only.

H_2: In the *less risky* condition, the mean of total thoughts (TOT) will be higher in the *picture* condition than in the *no-picture* condition.

Perceived value is conceived as an appraisal of the costs and benefits of the innovation (see Moreau et al., 2001) and, hence, the total number of thoughts about the innovation is considered to be a determinant of perceived value. As discussed earlier, the availability valence hypothesis also suggests that greater cognitive elaboration in the form of total number of thoughts (TOT) leads to more information being made available for the formation of attitudinal judgments, such as perceived value. This hypothesis further suggests that, in addition to the extent of information (TOT) that is made accessible in memory, an attitudinal judgment (perceived value in this case) also depends on the favorableness (valence) of such information. Thus, favorable cognitive elaboration produces favorable attitudinal judgments and unfavorable cognitive elaboration produces unfavorable judgments. Accordingly, in a risky situation, total number of thoughts will comprise of a greater number of unfavorable total thoughts (e.g., about the costs of the innovation). However, in a less risky situation, total number of thoughts will comprise of a greater number of favorable total thoughts about the benefits of the innovation, leading to a greater perception of value.

H_3: In the *less risky* condition, total number of thoughts will be positively related to perceived value.

Attitudinal judgments, such as perceived value, are usually considered to lead to behavioral intentions regardless of the context or situation (Fishbein & Ajzen, 1975). Even in a risky situation, when negative feelings may arise, people will consider the value of the innovation as a factor in their future intentions towards the innovation. This is so because rational judgments are always (irrespective of the situation) a strong consideration in the choice of utilitarian products and services. Radical innovations possess a strong utilitarian component and, hence, the perception of value will lead to behavioral intent regardless of risk as feelings. In general, attitudes are hard to change and their effects are likely to be preserved (Assael, 2004).

H_4: Perceived value will be positively related to willingness to try in both less risky and more risky conditions.

According to the risk as feelings hypothesis, risk as feelings reduces behavioral intent only when stated risk is present. In the absence of stated risk, negative feelings are less likely to dominate and influence willingness to try. Emotional responses, in general, are more likely in a certain context or situation. Thus,

H_5: In the *more risky* condition, risk as feelings will be negatively related to willingness to try.

Hedonic Versus Utilitarian Product Descriptions

The above conceptual model may not be generalized across different types of product descriptions, namely, utilitarian and hedonic based on the notions of immediacy and concreteness (Pham, 1998). Hedonic product descriptions, which describe the pleasurable sensations of using a product, employ sensory cues that are concrete (e.g., "the feel of the warm summer wind on your face" for the description of a convertible car) and offer immediate gratification of pleasure. On the other hand, utilitarian product descriptions describe the functional aspects of a product that are based on abstract cues (e.g., gas mileage) since their promise can only be fulfilled on a future date (e.g., the promise of gas mileage would only be revealed upon actual trial and continued use of the product). Thus, hedonic product descriptions provide concrete cues and immediate gratification, while utilitarian product descriptions promise abstract cues and delayed gratification. Conventionally, we may think of utilitarian products as offering more concrete attributes and hedonic products as offering more abstract attributes. However, we suggest the opposite for *descriptions* of hedonic and utilitarian products based on the verbal communication properties and not the properties of a specific product. Thus, from a marketing communication perspective, it is important to study the conceptual model across utilitarian and hedonic product descriptions.

STUDY 1

Experimental Procedure

232 undergraduates (53% female) from a small university in northeastern U.S.A. participated in the study for extra credit. This study involved 2 (more risky versus less risky descriptions) X 2 (picture versus no picture) between-subjects design. Participants were randomly assigned to the experimental conditions and they first read the description of a radical innovation and answered a questionnaire containing the constructs of interest in the study. We considered it important to choose a product that would be perceived as innovative in a product category already familiar to our respondents. Thus, the radical innovation chosen for the study was the hydrogen fuel cell (HFC) car. The HFC is a radical innovation since it uses new technology and is a marked improvement in meeting consumer needs (it produces zero emissions into the environment). It also involves new patterns of behavior for consumers since new hydrogen filling stations (not gasoline) need to be used and consumers have to sacrifice some of the acceleration that they are used to. We developed separate hedonic and utilitarian versions of the verbal descriptions by changing the headline and the blurb in the description to reflect hedonic and utilitarian definitions of pleasure and functionality, respectively (Voss, Spangenberg & Grohmann 2003). Similarly, we changed the beginning and the end of each description.

Vividness manipulation. We used various sources (websites, advertisements, news reports) to compile the verbal description of the HFC car. We developed separate less risky and more risky versions of the descriptions by adding a paragraph in the more-risky version which stated that the hydrogen fuel tanks in the car could explode since hydrogen is an extremely explosive gas. The paragraph ended with a statement that the chances of such an explosion were uncertain (see Appendix A).

According to Kardes et al. (2008), a picture is more concrete than a written description and, thus, we used a picture/no picture condition for our vividness manipulation (see Appendix C for the picture used in Study 1). For the picture condition we used a color diagram of the HFC

car which showed the risky elements (hydrogen tanks) of the car along with non-risky, beneficial elements such as how the car was able to produce only water as a emission. An illustration such as this, as opposed to a photograph, was expected to generate a more moderate level of arousal and moderate levels of arousal have been found to create greater attention to stimuli (Kardes, et al., 2008). Directly below the picture we inserted a caption which read, "The car's motor runs on electricity generated by a hydrogen fuel cell located under the seats. High-pressure hydrogen tanks are located in the rear. Water is generated as a byproduct, and some of it is used for humidification." Hence, both verbal and visual information in the article conveyed the stated risk and value information clearly, yet in an even-handed manner. This was a necessary aspect of our vividness manipulation since vivid stimuli have been found to have weaker effects when a lot of negative information is also available (Herr et al., 1991). Vivid stimuli are also proximate in a sensory way (Nisbett & Ross, 1980) as discussed earlier and, hence, we included the name of a staff reporter as the presumed author of the verbal description.

To ensure that the utilitarian and hedonic stimuli were perceived as intended, we conducted a pretest with 64 undergraduate students. Participants evaluated the descriptions on five 7-point semantic-differential items measuring the utilitarian dimension (e.g., not functional/functional) and five items measuring the hedonic dimension (e.g., not fun/fun) of the products (Voss et al., 2003). Cronbach's α for the summated hedonic items was .88 and for the summated utilitarian items was .74. A paired samples t-test confirmed that there were significant differences between the hedonic (M = 21.28) and utilitarian scores [M = 24.86, t (63) = -4.76, p =.00]. An independent samples t-test also showed that participants who saw the hedonic (versus utilitarian) description rated the car higher in hedonic value [M = 22.52 vs. M = 20.12, t (62) = -1.8, p =.10]. Thus, the two versions were considered to be sufficiently different in terms of hedonic and utilitarian verbal content and were used to test if our study results were impervious to changes in the verbal description of the innovation. Appendix A shows the utilitarian version and Appendix B shows the hedonic version.

Manipulation Checks

To examine whether adding the risk dimension to the verbal description actually produced a greater amount of risk, participants stated their agreement with two statements: "The hydrogen fuel cell car could cause me physical pain" and "Overall, the hydrogen fuel cell car is risky" (1 = Strongly disagree; 7 = Strongly agree). We found significant differences across both groups for both these questions. For the first statement, a one-way ANOVA indicated a significant difference between the less risky (M = 2.30) and more risky (M = 4.32; F (1,230) = 101.56, p <.01) groups. For the second statement, a one-way ANOVA also indicated a significant difference between the less-risky (M = 4.07) and the more-risky [M = 4.55; F (1,230) = 7.26, p = .01] groups. Hence, the risk manipulation did produce more risk in one condition than in the other.

Measures. All measured items used a seven-point scale using the end points "strongly disagree" and "strongly agree". The risk as negative feelings construct was measured using four items (The hydrogen fuel cell car makes me feel nervous/worried/anxious/tense) (Richins, 1997) (Cronbach's α = .81). To measure willingness to try, we included three items previously used in studies about innovations (Chaudhuri, Aboulnasr & Ligas, 2010) (i.e., I would be willing to spend time to know the hydrogen fuel cell car better, I would be willing to spend the effort to know the hydrogen fuel cell car better, and, I would be willing to try the hydrogen fuel cell car) (Cronbach's α = .89). To measure perceived value, we used three seven-point items (I will gain if I use the hydrogen fuel cell car, the hydrogen fuel cell car is valuable, and, the hydrogen fuel cell car's benefits are greater than its costs for me) (Cronbach's α = .80). The items were modified from Zeithaml (1988) and based on our understanding of perceived value.

We measured cognitive elaboration in the form of total number of thoughts by asking respondents to write down facts about the hydrogen fuel cell car without reading the article again. We then asked a paid graduate

TABLE 1:
Study 1: Measurement Model and Correlations and Φ2 amongst Constructs

Construct/Indicator	SL	SE	t-value	Composite reliability	AVE
Perceived value					
The hydrogen fuel cell car's benefits are greater than its costs for me	0.77 (.78)			0.80 (.83)	0.58 (.63)
I will gain if I use the hydrogen fuel cell car	0.9 (.64)	0.12 (.09)	8.32 (7.06)		
The hydrogen fuel cell car is valuable	0.58 (.93)	0.1 (.11)	5.96 (9.66)		
Risk as Feelings					
The hydrogen fuel cell car makes me nervous	0.68 (.72)			0.81 (.83)	0.54 (.55)
The hydrogen fuel cell car makes me anxious	0.47 (.58)	0.17 (.14)	4.48 (5.90)		
The hydrogen fuel cell car makes me worried	0.88 (.89)	0.18 (.15)	7.48 (8.14)		
The hydrogen fuel cell car makes me tense	0.83 (.74)	0.15 (.12)	7.39 (7.42)		
Willingness to Try					
I would be willing to try the hydrogen fuel cell car	0.85 (.61)			0.93 (.89)	0.83 (.73)
I would be willing to spend time to know the hydrogen fuel cell car better	0.94 (.94)	0.08 (.17)	13.94 (7.93)		
I would be willing to spend the effort to know the hydrogen fuel car better	0.94 (.97)	0.08 (.18)	13.9 (7.97)		

Note: SL = Standardized loading, SE = Standard error, AVE = Average variance extracted; values in parentheses represent the more risky condition

Correlations and Φ2 of constructs

Constructs	Perceived Value	Risk as Feelings	Willingness to Try
Perceived Value	.80	0.04 (0.07)	0.41 (.44)
Risk as Feelings	-0.21 (-.27)	.81	0.18 (.03)
Willingness to Try	0.64 (.66)	0.43 (.17)	.89

Note: The lower diagonal represents correlation between constructs while the upper diagonal represents Φ2; values in parentheses represent the more risky condition; values in the diagonal represent Cronbach's alpha.

student to carefully code the total number of positive, negative and neutral thoughts and facts about the hydrogen fuel cell car that each respondent had provided. The total number of these thoughts were then added together to form the total number of thoughts variable. The graduate student was blind to our hypotheses and the conditions in our study. He was properly coached in the coding procedure and his work was carefully supervised.

Results

We created a two-group model based on the two versions of the stated risk condition (less risky = 111; more risky = 121) using structural equation modeling. An overall model was run using the pooled data comprising of hedonic and utilitarian datasets. Following this, models were run separately for the hedonic and utilitarian datasets. The results of a confirmatory factor analysis using pooled

TABLE 2:
Study 1: Structural Model

	Pooled Dataset		Utilitarian Dataset		Hedonic Dataset	
	Less risky	*More risky*	*Less risky*	*More risky*	*Less risky*	*More risky*
H_1:vividàRAF	ns	.18* Support	Ns	.41* Support	ns	ns
H_2:vivid à TOT	ns	-.32***	Ns	-.40***	.30** Support	-.23*
H_3: TOT à PV	.27*** Support	ns	.31** Support	ns	ns	ns
H_4: PV à WTT (Support)	.62*** Support	.66*** Support	.73*** Support	.62*** Support	.54*** Support	.65*** Support
H_5: RAFà WTT (No support)	ns	ns	Ns	ns	ns	ns

Note : « ns » indicates a non-significant (p >.10) coefficient ; *** p < .01 ; ** p < .05 ; * p < .10
RAF = Risk as feelings ; TOT = Total number of thoughts ; PV = Perceived value ; WTT = Willingness to try

dataset showed that the measurement model for the constructs of theoretical interest was statistically significant [$\chi 2$ (92) = 144.64, p= 0.0]. However, the various indices suggested that the model fit the data well (RMSEA=.05; CFI=.96). All factor loadings were significant and loaded .50 or greater for both groups except for one item. Only the anxious item in the risk as feelings construct loaded .47 in the less-risky group. However, the item was retained since it had an acceptable loading in the more-risky group. The composite reliability values for all constructs were above .80 while the average variance extracted for all the constructs were above .50. This means that at least 50% of the variance of the constructs was explained by their items. Since all items loaded well of the respective constructs, unidimensionality and convergent validity were ensured. Next, we tested for discriminant validity by checking whether the squared correlations amongst constructs were lesser than the average variance extracted for each of the constructs. As seen in Table 1, the squared multiple correlations amongst constructs were lesser than the average variance extracted for each of the constructs, thus ensuring discriminant validity.

The structural model also showed a satisfactory fit with the data [$\chi 2$ (98) = 153.34, p= 0.0; RMSEA=.05; CFI=.96]. Table 2 provides the results of the multiple group analysis for the paths shown in Figure 1 for both risk groups. Forty two percent of the variance in willingness to try was explained by the other variables in the model for the less-risky group and 44% was explained for the more-risky group. The results support three out of five hypotheses.

H_1 is supported since the path from vividness to risk as feelings was positive and significant (p <.10) for the more risky group, but non-significant for the less risky group. This shows that the mean of risk as feelings was greater in the picture condition than in the no-picture condition for the more-risky group only. H_2 is not supported since the path from vividness to total number of thoughts was negative and significant (p <.05) for the more risky group, but non-significant for the less risky group. This shows that the mean of total number of thoughts was greater in the no-picture condition than in the picture condition for the more risky group. However, we expected that the mean of risk as feelings would be higher in the picture condition, but for the less risky group. H_3 is supported since the path from total number of thoughts to perceived value was positive and significant (p <.05) for the low risk group, but not significant for the high risk group. H_4 is supported since the path from perceived value to willingness to try was positive and

significant ($p < .05$) for both the less risky and more risky groups. H_5 is not supported since the path from risk as feelings to willingness to try was not significant for both the less-risky and more-risky groups. Additionally, in both groups, we found no significant reciprocal relationships between perceived value and risk as feelings.

We tested the utilitarian and hedonic verbal description datasets for the same model and hypotheses (see Table 1). The results of the utilitarian description data (N=118) very closely resembled the pooled data set results (see Table 1): H_1, H_3 and H_4 are supported, while H_2 and H_5 are not supported. The results for the hedonic data (N=114) are different since only H_4 and H_2 are supported.

Discussion

We find that the mean of risk as feelings is higher in the more vivid, picture condition than the less vivid, no-picture condition for the more -risky condition, but not for the less risky condition. This finding is also reproduced in the utilitarian (but not hedonic) data subset. Thus, our research revealed the moderating nature of risk on the relationship between vividness and risk as feelings. This finding is consistent with the risk as feelings hypothesis (Loewenstein et al. 2001), as well as the "affect as information" literature. The "how-do-I-feel-about-it" (HDIF) heuristic (Adaval 2001; Pham, 1996; Schwarz, 1990; Yeung & Wyer, 2004), for example, proposes that, in the formation of evaluative judgments, consumers mentally form a pictorial representation of the object to be evaluated and then use such a representation to examine their feelings towards the object. These resultant feelings are then used as information in evaluating the object. In the case of new products, however, a pictorial representation of the new product may not be mentally available to consumers during initial exposure to the innovation (e.g., while reading about it for the first time). Hence, making a picture of the innovation readily accessible to consumers should generate more feelings than when a picture is not included in the description of the innovation. This was, indeed, the case in our study in which more feelings were generated in the picture condition. As predicted, these were negative feelings arising from vividness effects and were prevalent only in the more-risky condition.

Interestingly, this result was found only in the utilitarian data and not in the hedonic data. In this regard, Pham (1998) found that consumers place greater reliance on their feelings as a heuristic for hedonic, consummatory situations than for utilitarian, instrumental situations. This reliance is based on consumers' perceptions that feelings are more relevant for hedonic situations. Thus, in keeping with Pham (1998), the positive finding for H_1 should have been more prevalent for hedonic descriptions than for utilitarian descriptions. However, our results suggest the opposite: in risky situations, utilitarian stimuli may not be sufficient to counteract the *negative* feelings arising from stated risk. On the other hand, hedonic stimuli may decrease negative feelings of risk, perhaps by raising positive feelings which counteract feelings of anxiety and worry. As described earlier in the paper, stated risk is the risk described in the communication of the innovation, while risk as feelings is the perception of that risk (as feelings) by the consumer. The notion of cognitive dissonance (a negative feelings, such as risk as feelings construct) is also relevant here. Cognitive dissonance arises from the inconsistency between negative and positive elements in a stimulus (Festinger 1957), such as an innovation. Thus, in our case, the consumer desires the innovation (a positive element), but this is inconsistent with the stated risk (a negative element), thereby producing cognitive dissonance. This dissonance, however, can be reduced by the positive feelings produced from a hedonic type of product description, but not by a utilitarian description, which does not contain the concrete cues that create positive feelings. H_2 was not supported in the pooled dataset or the utilitarian data. In fact, the results were exactly the reverse of our expectations. We expected that the more vivid, picture condition should have led to more thoughts in the less risky scenario. Instead, it was in the more risky scenario *and* in the less vivid condition that more thoughts were generated. Note that while this more risky/less vivid group had more thoughts, the more risky/more vivid group (from H_I above) had more feelings. This is consistent with the affect-as-information literature (Pham 1998) which suggests that

consumers rely more on pictorial representations in consulting their feelings. Thus, our results for H_1 and H_2 in the utilitarian (and pooled) dataset are more consistent with the risk as feelings hypothesis and the HDIF heuristic than with the availability valence hypothesis. For the utilitarian description, the picture may have little value in terms of aiding cognitive elaboration represented here in the form of total number of thoughts. In fact, the picture may hinder such rational information processing by distracting from the verbal content of the description.

However, for the hedonic data, more thoughts were generated in the less-risky, but more vivid condition, *consistent with H_2* and the availability valence hypothesis. Thus, H_1 is supported for the utilitarian data, while H_2 is supported for the hedonic data. As per the availability valence hypothesis, more thoughts were generated in the more vivid condition, but only when there was little risk and when the verbal description presented the innovation in pleasurable, hedonic terms. Kisielius and Sternthal (1986), in developing the availability valence hypothesis, state that the availability of information for cognitive elaboration depends on the *valence* or favorableness of the information. As stated before, hedonic verbal descriptions use more concrete cues that offer immediate gratification, while utilitarian descriptions use more abstract cues. Hence, hedonic descriptions may be perceived by consumers as more favorable information than utilitarian descriptions, which use delayed cues that do not offer immediate gratification, but instead depend on consumer experiences with the product at a later date. In this way, vividness effects may hinder and distract from the processing of words that are abstract (utilitarian description), but can help with the processing of words that are concrete (hedonic description).

Consistent with the availability valence hypothesis, H_3 is supported, i.e. cognitive elaboration (total number of thoughts) is positively related to perceived value in the less risky situation, but not in the more risky situation. The availability valence hypothesis explains attitudinal judgments in terms of a memory based operation and states that attitudinal judgments, such as perceived value, depend on the accessibility or availability of information in memory (total number of thoughts in this study). This is supported in our study, but only when the situation is not presented as risky. Presumably, in a risky scenario, negative thoughts about the risk in the innovation neutralize positive thoughts about the innovation and no relationship between cognitive elaboration (total number of thoughts) and attitudinal judgment (perceived value) was found.

H_4 is supported for the pooled data and also for both the utilitarian and hedonic subsets in the data. Perceived value was strongly and positively related to willingness to try the innovation in *both* the more risky and less risky scenarios in our study. This finding further confirms the role of value (benefits minus costs) in the literature on innovations. Even in situations of moderate risk, as in this study, consumers tend to emphasize the value in the innovation over the possibility of risk.

We do not find support for H5 in our data. While our hypothesis about the relationship of vividness and risk as feelings is supported, we do not find evidence that this, in turn, leads to willingness to try the innovation. One explanation for this may be that while emotion was engendered, consumers did not rely on these feelings to arrive at a decision about the innovation. As Pham (1998) points out, when consumers do not consider their feelings to be representative of the target object, they may not rely on such feelings to arrive at a decision. Hence, if consumers in our study did not perceive that their feelings were elicited by the innovation itself, then they may not have relied on these feelings in making their evaluation. Or, it may be that the level of risk was not strong enough to find evidence, in this study, for the risk as feelings linking willingness to try. Hence, we conducted Study 2.

STUDY 2

Study 1 discussed the effect of vividness on willingness to try when consumers are exposed to reports with or without a picture of an innovation. Now, imagine that the consumer reads and/or sees a photograph of a burning car in a media report. Would the consumer be affected by the vividness of the news and how

would he/she react in terms of willingness to try? Indeed, media reports on burning cars have occurred. For example, newspaper, television and internet based articles have recently been abound with the news of the "Nano" car, manufactured by Tata Motors in India, wrapped in flames after consumers had driven the car from the dealer's showroom (Autoexpress, 2010). How does such news affect other consumers? How does the company deal with such a public relations nightmare?

Nonverbal stimuli, such as pictures, as opposed to verbal stimuli, are non-propositional, that is, the feelings evoked *cannot* be refuted or corrected (Buck, 1988; Chaudhuri, 2006). Thus, in the context of the publicity function in public relations, it is important that marketing practitioners and academics understand the effects of different types of pictures, some of which may result in "bad press" in spite of avowedly neutral or even positive verbal information ("good press") provided by staff reporters and other journalists. While negative verbal descriptions in the popular press can be corrected by the dissemination of countervailing rational, verbal marketing information, negative pictures in the popular press create negative feelings, *independent* of the rational thoughts resulting from a verbal description (see Zajonc, 1980; Zajonc & Markus, 1982). Thus, in spite of positive verbal descriptions in the media, a strongly negative nonverbal stimulus could cause consumers to derive an overall negative impression of an innovation in spite of positive publicity and marketing and public relations efforts to the contrary. A case in point, cited above, is the burning image carried by BBC News South Asia of a small car ("Nano") manufactured by the Tata automobile company. Although touted as the "world's cheapest car", the Nano has not performed according to expectations (The Economic Times, 2011). Is it possible that the emotional impact of negative pictures in the popular press has negated the rational impact of a very favorable price for the Nano? On the other hand, the Chevrolet Volt has done well in spite of fires started from its lithium-ion batteries (Bunkley, 2011; Vlasic & Bunkley, 2011). Consequently, it is possible that the perceived value of an innovation, such as the electric car, may outweigh the perceived risk in the innovation. In study two, we investigate this possibility for the hydrogen fuel cell car, as described below.

The purpose of this second study is twofold: first, to understand whether the non-significant relationship between risk as feelings and willingness to try in Study 1 become significant if the pictorial stimulus in Study 2 is clearly and strongly negative (detrimental to the innovation)? Second, since the influence of perceived value on willingness to try was so pervasive in Study 1, what consumer-related variables create perceived value in an innovation other than the processing of thoughts about the innovation? For instance, do individual differences among subjects on certain values lead to a greater perception of overall perceived value in the innovation? Lusch and Vargo (2012) state that consumers are co-creators of value in the value chain of the firm. We submit that consumers' own personal values, along with marketing stimuli (pictures, copy writing techniques, etc.), may be a crucial determinant of consumer perceptions of value regarding an innovation. Thus, in Study 2 we include a measure of concern for the environment to examine its effects on consumers' responses to environmentally-friendly innovations, such as the hydrogen fuel car, which has been used as a stimulus in our study. Figure 2 reproduces the model used in Study 2, which replicates and extends the model in Study 1.

In this study, we replicated Study 1 with a different stimulus, which was clearly detrimental to the innovation's success. Instead of a diagram depicting the various elements in the HFC car, we substituted a picture of a burning car (see Appendix D), which, although detrimental to the innovation's success, was in line with the potential for an explosion in the HFC car. In Study 2, we used the utilitarian description from Study 1 (Appendix A), since the results from this version were most in line with the overall results in Study 1.

In order to answer the second question, we included two additional questions in the questionnaire to measure the concept of "concern for the environment," an individual difference variable which should be related to the perceived value of the HFC car. The

TABLE 3:
Study 2: Measurement Model

Construct/Indicator	SL	SE	t-value	Composite reliability	AVE
Perceived value					
The hydrogen fuel cell car's benefits are greater than its costs for me	0.64			0.76	0.51
I will gain if I use the hydrogen fuel cell car	0.69	0.18	5.34		
The hydrogen fuel cell car is valuable	0.81	0.19	5.81		
Risk as Feelings					
The hydrogen fuel cell car makes me nervous	0.81			0.86	0.61
The hydrogen fuel cell car makes me anxious	0.64	0.13	6.47		
The hydrogen fuel cell car makes me worried	0.87	0.13	9.07		
The hydrogen fuel cell car makes me tense	0.79	0.14	8.30		
Willingness to Try					
I would be willing to try the hydrogen fuel cell car	0.75			0.90	0.75
I would be willing to spend time to know the hydrogen fuel cell car better	0.90	0.11	9.29		
I would be willing to spend the effort to know the hydrogen fuel car better	0.94	0.11	9.54		
Concern for Environment					
In general, I am concerned about the environment	0.94			0.91	0.69
I think our society can do more to reduce air pollution	0.70	0.12	5.35		

Note: SL = Standardized loading, SE = Standard error, AVE = Average variance extracted

Correlations and Φ2 of constructs

Constructs	Perceived Value	Risk as Feelings	Willingness to Try	Concern for Env.
Perceived Value	.74	0.08	0.23	0.00
Risk as Feelings	-0.28	.86	0.03	0.03
Willingness to Try	0.48	0.17	.85	0.19
Concern for Environment	0.23	0.18	0.44	.67

Notes: The lower diagonal represents correlation between constructs while the upper diagonal represents Φ2.

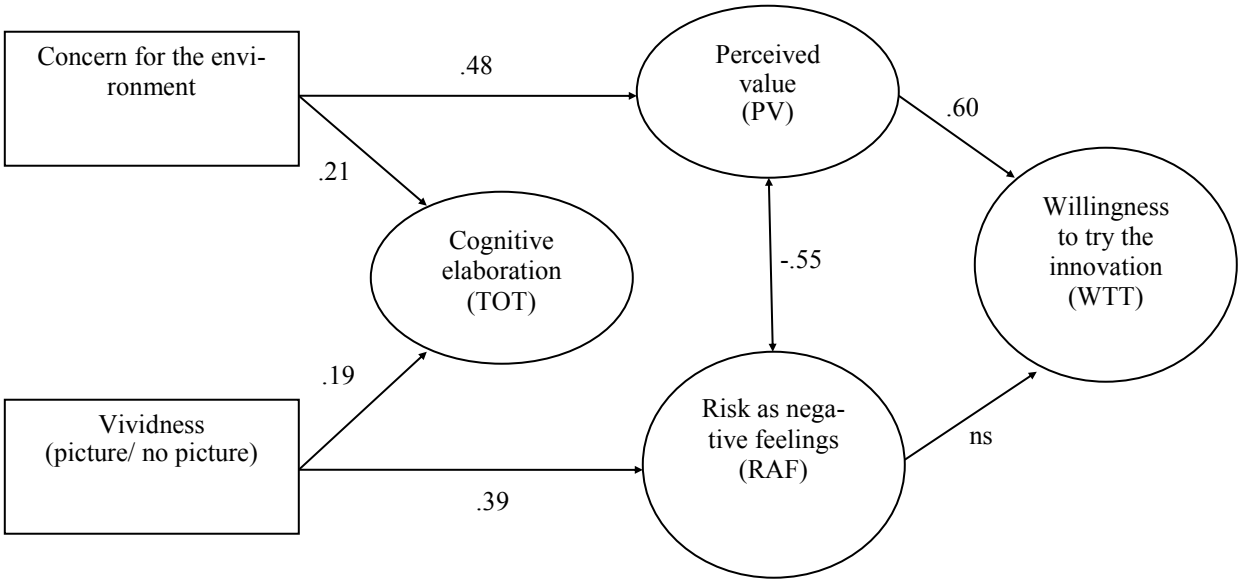
questions were (1) "In general, I am concerned about the environment" and (2) "I think our society can do more to reduce air pollution" Cronbach's α = .67.

99 undergraduate students (64.6 % females) from a university in northeastern U.S.A. participated in a 2 (picture vs. no picture) X 2 (more risky vs. less risky information) between-subjects design. Participants in the study had been driving a car from a minimum of three years to a maximum of eight years and the average driving experience was 5.1 years. We used the same procedure and measures in Study 2 as in Study 1, but with the two differences mentioned above: the nature of the pictorial stimuli and the two additional questions measuring people's concern for the environment**.**

Results

Multi-group analysis of the data in Study 2 showed that the data did not fit the two group

FIGURE 2:
Study 2: Replication with Extension



ns = non-significant at $p > .10$

model adequately: $\chi 2$ (140) = 242.6 (p= 0.0) and (RMSEA=.085; CFI=.847). The strongly negative aspect of the picture of the burning car may have reduced the differences between the less-risky and more-risky groups. Hence, we created a single group model using Amos 19.0. The results of a single group confirmatory factor analysis showed that the measurement model for the constructs of theoretical interest was statistically significant [$\chi 2$ (64) = 103.64, p= 0.0]. However, the various indices suggested that the model fit the data adequately (RMSEA=.079; CFI=.936). All factor loadings were significant and .50 or greater. As in Study 1, we checked for convergent and discriminant validities. All composite reliabilities values were above .76 for all constructs and the average variance extracted values for all constructs were above .50. The model showed discriminant validity since the squared correlations amongst the constructs were lesser than the average variance extracted values for each of the constructs (please see Table 3). The structural model (Figure 2) also showed a satisfactory fit with the data: $\chi 2$ (69) = 108. 9 (p = 0.0) and (RMSEA=.06; CFI=.94). Thirty five percent of the variance in willingness to try was explained by the other variables in the model.

The path from vividness to risk as feelings was positive and significant (Beta =.39; p <.01). This shows that the mean of risk as feelings was greater in the picture condition than in the no-picture condition, which is consistent with the risk as feelings hypothesis. The path from vividness to total number of thoughts was positive and significant (Beta = .19; p <.10). This shows that the mean of total number of thoughts was greater in the picture condition than in the no-picture condition. The path from total number of thoughts to perceived value was not significant (p > .10). The path from perceived value to willingness to try was positive and significant (Beta = .60; p <.01). The path from risk as feelings to willingness to try was not significant (p >.10). Finally, the path from concern for the environment to perceived value was strongly positive and significant (Beta =.48; p <.01) and the path from concern for the environment to total number of thoughts was also positive and significant (Beta =.21; p <.10). This suggests that perceived value is, directly, a function of personal, ethical values such as an individual's concern for the environment and also, indirectly through TOT, of communication stimuli such as vividness. Hence, perceived value is

stimulated by communication and also directly generated by personal values.

In study two, unlike study one, there is evidence of a negative and significant path from risk as feelings to perceived value (Beta = -.55; $p < .01$). We surmise that the presence of the strongly negative stimulus of a burning car functioned to increase negative feelings in study two, leading to a stronger negative relationship with perceived value. For reasons cited earlier, we did not postulate a theoretical relationship between risk as feelings and perceived value in this paper. However, our findings in study 2 indicate that, under certain conditions, this may be a potentially rich area of inquiry for future research.

Discussion

The results from Study 2 largely corroborate the overall results from Study 1, with additional findings due to the inclusion of the concern for the environment variable. In both studies, we find that adding a picture (vividness effect) to a verbal description of a radical innovation increases consumers' feelings of risk. Further, as expected and consistent with the availability valence hypothesis, adding a picture that is clearly negative (burning car) increases consumers' cognitive elaboration (total number of thoughts). Perhaps the burning car picture increased participants' attention to the description, which helped them better recall the information.

Most importantly, we find in both studies that perceived value is always strongly and positively related to willingness to try the innovation, even when the vividness stimulus is strongly detrimental to the success of the innovation. Despite the fact that feelings of risk were evoked in both studies by the vividness stimuli, perceived value always overwhelmed the effect of risk as feelings on willingness to try.

Finally, the effect of cognitive elaboration (total number of thoughts) on perceived value was not significant in Study 2. Thus, although thoughts about the innovation were generated as a result of vividness effects in both studies, in Study 2 such thoughts did not lead to greater perceived value. Presumably, the strongly negative vividness stimuli in Study 2 created unfavorable thoughts and such unfavorable thoughts neutralized other favorable thoughts from the verbal description of the innovation, effectively negating any influence of cognitive elaboration on a positive evaluation (value) of the innovation. However, an individual level variable, concern for the environment, proved to be a strong and positive antecedent of perceived value in Study 2. Interestingly, although this variable was also positively related to cognitive elaboration, its effect on perceived value was direct and not mediated by cognitive elaboration.

GENERAL DISCUSSION

Our research brings together multiple theoretical perspectives (i.e., risk as feelings and availability valence hypotheses) to hypothesize the effects of vividness and risk associated with a radical innovation on consumers' willingness to try the innovation. The two theories provide contrasting perspectives. On one hand, according to the availability valence hypothesis, presenting a vivid, visual depiction of the innovation along with a verbal description of it makes the verbal message more readily available in consumers' minds (due to higher cognitive elaboration), which results in more positive evaluations of the innovation. On the other hand, the risk as feelings hypothesis suggests that including a picture next to the verbal description of an innovation results in more negative evaluations of the product (due to the uncertainty associated with trying a radical innovation).

We found in two studies that, consistent with the risk as feelings hypothesis, a picture generated more negative feelings, but only in certain conditions. Indeed, including a picture of an innovation increased negative feelings, but only when the verbal description accompanying the picture was utilitarian, not hedonic, and only when the verbal description itself included some elements of risk. If the verbal description was hedonic, presenting a picture did not result in more negative feelings, regardless of the level of risk presented in the description. Perhaps the positive feelings raised by the hedonic stimuli counteracted the negative feelings of anxiety and worry. These results were replicated in Study 2, which

examined the effects for the utilitarian description only, across the risk conditions.

Further, we found in Study 1 that a picture did not generate greater thoughts (TOT) than no picture in the less risky condition, although greater thoughts were related to greater perceived value in the same condition. However, in Study 2, when a picture (vs. no picture) was used more thoughts were, indeed, generated. We attribute this to the type of picture used as stimulus in Study 2. The clearly negative and detrimental picture of the burning car in Study 2 may have increased consumers' attention to the message, resulting in higher cognitive elaboration of the message, but not greater perceived value. Interestingly, despite this, perceived value overwhelmed the effect of risk as feelings on willingness to try in both studies.

MANAGERIAL IMPLICATIONS

The implications of these findings for managers are encouraging. First, consumers will ignore emotional risks in forming willingness to try, if perceived value is strong. The results of our studies show that although negative feelings of risk were present on learning about the innovation, these perceptions may have been outweighed by perceived value in arriving at willingness to try. Hence, marketers can fulfill their marketing responsibilities to divulge the risk in the product without fear that this may result in a lowering of perceived value and willingness to try the innovation. Also, marketers can deal with negative reports of their products in news media by understanding consumers' perceived value of the product versus the negative feelings of risk. In today's environment, social media plays a very important role in quick dissemination of information. Therefore, managers need to be especially careful in addressing issues arising out of conversations in this medium. However, the implications for public policy are discouraging. When perceived value is high, consumers may suppress emotional risk perceptions and take worse decisions than if they took these emotions and perceptions into account.

Further, in this era of rapid technological advancement, it is critical for companies to reach out to its consumers who are more prone to adopting an innovation. Our findings reveal that the individual level variable, concern for the environment, is a strong and positive antecedent of perceived value. Specifically, despite any media reports of negative product information, advertisers of the hydrogen fuel cell car can continue to advertise in such magazines as E: The Environmental Magazine (which covers environmental issues) to discuss the innovation to help enhance consumer's perceived value for the product. Furthermore, highlighting the environment-related benefits (e.g., no harmful pollutants) should lead to higher preferences than touting the car-related benefits (e.g., performance).

LIMITATIONS AND FUTURE RESEARCH

Kisielius and Sternthal (1986) review vividness effects and summarize that vividness effects may be true only under certain conditions. Utilitarian and hedonic verbal descriptions in our study seem to ratify this since we find that these types of descriptions may provide boundary conditions that serve to limit our generalizations about vividness effects in more-risky and less-risky scenarios. As Kisielius and Sternthal (1986) state, vividness can be a "persuasive liability" (p. 419) since it can help or hinder information processing under certain conditions and, accordingly, future research needs to pay close attention to the effects of these and other boundary conditions that may qualify the effects of vividness.

With regard to the visual element, we used a different picture in Study 2 than in Study 1 and found some differences between the results. In Study 1, we used a color diagram with more concrete details, showing the risky elements (hydrogen tanks) of the car along with other non-risky elements. In Study 2, we used a clearly detrimental picture of a burning car to investigate whether the risk generated by the negative picture influences consumers' willingness to try. Perhaps the differences observed were due to the level of emotions/ rational processing engendered by the two pictures. Thus, several alternative operationalizations examining the intensity of emotions arisen from exposure to different pictures remain to be tested for a better

understanding of the effects of vividness and risk on consumers' responses to innovations.

In this paper, we have tried to gauge the effect of cognitive elaboration on perceived value by using total number of thoughts. However, it is unknown whether it is the total number of thoughts or the impact of such thoughts on consumer attitudes and decisions that affect their willingness to try a radical innovation. Therefore, future research should involve teasing apart these nuances for better understanding of their influences in the diffusion of innovation.

Finally, in this work, we focused on a high involvement innovation. We speculate that our findings should hold for an array of high involvement products; nonetheless, an interesting and important extension would be to examine the vividness effects of visual and verbal elements for low-involvement products, which require different processing than high-involvement products. Past research has shown that, when customers are not highly involved (either with the product or the message), the effects of affective responses on brand attitudes are strong (Batra & Stephens, 1994). Thus, it would be interesting to examine the effect of negative emotions on consumers' responses to innovations in low-involvement contexts as well. It may be that, for low involvement products, the effect of risk as feelings is stronger on willingness to try than the effect of perceived value. For instance, the environmental risk of breakage and spillage in using the new mercury-filled compact florescent light bulbs (CFLs) may outweigh the perceived value of these longer lasting bulbs.

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APPENDIX A:
Utilitarian Description (Study 1 and Study 2)

Hydrogen Fuel Cell Car Makes Sense to Drive

By HOWARD W. FRENCH

PASADENA, June.19 –

Imagine that for the last two months, you have been driving a car powered by hydrogen fuel cells. You use the car to commute to work, and your spouse uses it to ferry your daughters to school, soccer and ballet.

The car you have been driving is a hydrogen fuel cell car which does not use gasoline for fuel. Instead, thanks to hydrogen fuel cell technology, it uses only water and emits only water vapor as emissions.

Hydrogen power may be in the distant future for America, but it's making the wheels of Jon Spallino's car zip down California's freeways right now.

Spallino says that the hydrogen fuel cell car has a practical side yet it presents no sacrifice in utility, efficiency or convenience. However, the hydrogen fuel cell car cruises only up to 80 miles per hour, when traffic permits.

Another potential drawback of these cars is that they carry tanks in which hydrogen has been compressed to around 10,000 psi. It is not well known what happens when a high-pressure tank erupts in an accident and sprays explosive hydrogen.

The passenger cabin looks like any other, except for the large gauge on the dashboard that counts down the miles Spallino can travel until he has to refuel. That's important because while hydrogen is abundant, hydrogen filling stations are not.

When Spallino runs low on fuel, he typically fills up at a hydrogen filling station in Torrance, Calif. It's one of only about two-dozen hydrogen stations around the country.

Building that network is just one of the challenges facing hydrogen fuel-cell cars. Stephen Ellis, a company spokesperson, says the company producing these cars also has to find ways to make the cars travel more than 190 miles between fill-ups, to extend the life of the fuel cells, and to bring the sticker price down -- way down. The custom-built car is worth about $1 million, but Spallino leases it for $500 per month. In exchange for the discount, the automaker gets Spallino's feedback on the vehicle.

The car has a practical side and it presents no sacrifice in utility, efficiency, or convenience.

But, that’s a small price to pay when there is so much useful stuff in the car. Most of all, perhaps, is the knowledge that you are driving a car that is environmentally responsible.

APPENDIX B:
Hedonic Description (Study 2)

Hydrogen Fuel Cell Car is Fun to Drive

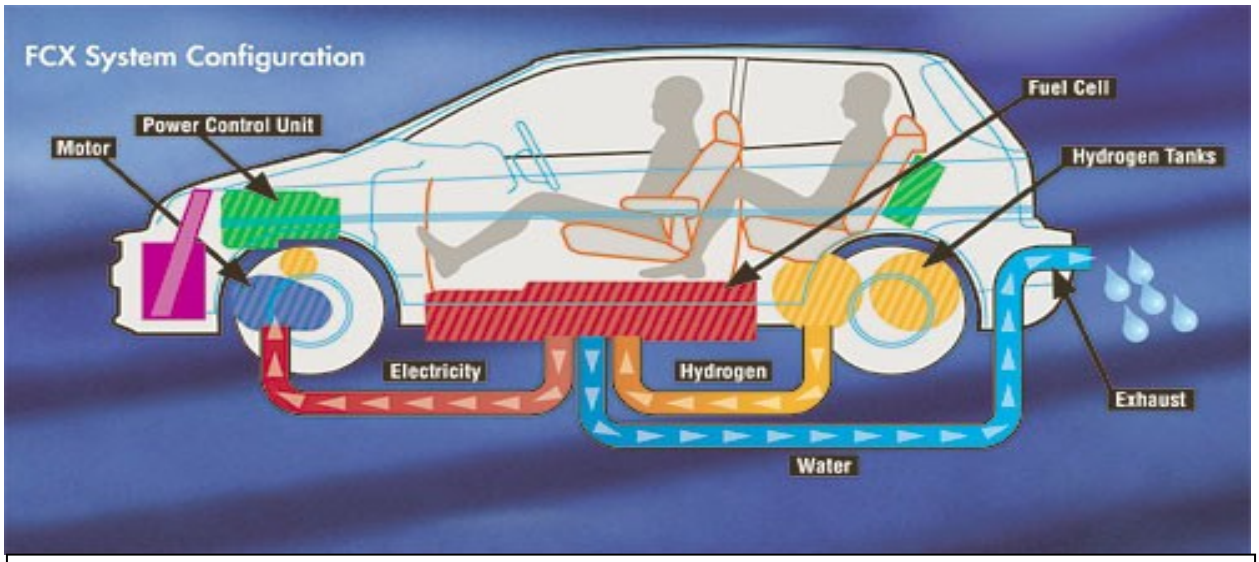
By HOWARD W. FRENCH

PASADENA, June.19 –
Imagine yourself cruising down the highway with the top down, feeling the breeze on your face, without the slightest smell of gasoline in the air.
That's because the car you are driving is a hydrogen fuel cell car which does not use gasoline for fuel. Instead, thanks to hydrogen fuel cell technology, it uses only water and emits only water vapor as emissions.
Hydrogen power may be in the distant future for America, but it's making the wheels of Jon Spallino's car zip down California's freeways now.
Spallino says that the hydrogen fuel cell car is thrilling and fun because it presents no sacrifice in handling, acceleration, pleasure or comfort. However, the hydrogen fuel cell car cruises only up to 80 miles per hour, when traffic permits.
Another potential drawback of these cars is that they carry tanks in which hydrogen has been compressed to around 10,000 psi. It is not well known what happens when a high-pressure tank erupts in an accident and sprays explosive hydrogen.
The passenger cabin looks like any other, except for the large gauge on the dashboard that counts down the miles Spallino can travel until he has to refuel. That's important because while hydrogen is abundant, hydrogen filling stations are not.
When Spallino runs low on fuel, he typically fills up at a hydrogen filling station in Torrance, Calif. It's one of only about two-dozen hydrogen stations around the country.
Building that network is just one of the challenges facing hydrogen fuel-cell cars. Stephen Ellis, a company spokesperson, says the company producing these cars also has to find ways to make the cars travel more than 190 miles between fill-ups, to extend the life of the fuel cells, and to bring the sticker price down – way down. The custom-built car is worth about $1 million, but Spallino leases it for $500 per month. In exchange for the discount, the automaker gets Spallino's feedback on the vehicle.

The car is thrilling and fun because there's no sacrifice in handling, acceleration, pleasure or comfort.

But, that's a small price to pay when there is so much more to enjoy and love about the car.
Most of all, perhaps, is the pleasure that comes from driving a car that is environmentally responsible. The company that makes the car gives all its employees a green cap that symbolizes two messages - the fun that their employees have through working at the company and how that fun is embedded in every automobile, motorcycle and power product that the company makes. "Our cars let you feel good about saving the world" says one smiling green- capped employee.

APPENDIX C:
Picture Used in Study 1



The car's motor runs on electricity generated by a hydrogen fuel cell located under the seats. High-pressure hydrogen tanks are located in the rear. Water is generated as a byproduct, and some of it is used for humidification.

APPENDIX D:
Picture Used in Study 2

The car's motor runs on electricity generated by a hydrogen fuel cell located under the seats. High-pressure hydrogen tanks, located in the rear, are a possible fire hazard. Water is generated as a byproduct, and some of it is used for humidification.

APPENDIX E:
Example of Media Reports on Burning Cars

Tata Nano bursts into flames

Another Nano spontaneously combusts as safety concerns grow for world's cheapest car. An insurance broker in Mumbai has become the latest in a growing string of Tata Nano customers to see his new car frying at the roadside. Just 45 minutes after purchasing his shiny silver Nano Satish Sawant watched it transform into carbon black as flames engulfed the car. As Sawant cannot drive he was being chauffeured home in the passenger seat when a passing motorcyclist caught his attention.

“I have no idea what happened. A motorcycle rider overtook me and told me that the vehicle was on fire,” said Mr Sawant. “The engine was behind me and I did not realise that the car was on fire.”

Tata’s Nano has been a hot topic for all the wrong reasons since its launch last July with three cases of spontaneous fires breaking out reported last year. Tata has put the problem down to a short circuit in an indicator stalk yet refused to recall the car. The Indian firm is yet to comment on this latest incident.