Threat, efficacy and message framing in consumer healthcare

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Abstract

Purpose – The purpose of this paper is to empirically examine the interactive effects of message framing, perceived threat and efficacy appeals on attitudes/intentions toward consumer healthcare communications, particularly, cataract surgery.

Design/methodology/approach – This paper develops two conceptual models dealing with threat, efficacy and framing and tests them with data collected from two field experiments.

Findings – The results reveal that high efficacy messages in combination with high threat or loss-framed messages have a significant positive influence on consumer attitudes and intentions in the consumer healthcare arena.

Practical implications – The findings have managerial value and public policy implications for healthcare officials in developing effective communications material. Specifically, this paper recommends that high threat, high efficacy and loss-framed efficacy messages be used.

Originality/value – This research extends previous work by demonstrating the effectiveness of threat appeals and framing on consumer attitudes and intentions to undergo cataract surgery. It also demonstrates the use of communication models in the healthcare domain.

Keywords Healthcare, Consumer attitudes, Message framing, Efficacy, Cataract, Threat appeal

Paper type Research paper

Introduction and motivation for the research

Threat appeals and message framing (loss vs gain) have been extensively used in healthcare research (Prentice-Dunn *et al.*, 2001). Threat appeals have been effective in changing attitudes and influencing intentions in a variety of healthcare-related behaviors. For instance, Smerecnik and Ruiter (2010) investigated the effectiveness of threat appeals on HIV prevention by manipulating the levels of threat and coping appraisals of condom use (i.e. efficacy). They show that under conditions of high threat and high coping (high efficacy), consumers reported more positive intentions to use a condom. Likewise, Krishen and Bui (2015) found that consumers reported more positive intentions to engage in healthier food choices under fear frames as opposed to hope frames. Similarly, Vincent and Dubinsky (2005) find that high levels of fear lead to higher purchase intentions. Umphrey (2003), in the area of testicular self-examination showed that consumers had the most encouraging attitudes under the loss-frame and higher message processing conditions. Rothman *et al.* (1993), found that gain frames significantly influenced consumers' intentions to use sunscreen (to prevent cancer).

Fear/threat appeals have also been studied in the context of hearing protection among farmers and landscape workers (Smith *et al.*, 2008), the "Let's Move" health promotion campaign launched by US First Lady Michelle Obama (Batchelder and Matusitz, 2014) and texting while driving (Cismaru, 2014). While other kinds of appeals such as individual/social responsibility appeals (Kong and Shen, 2011), celebrity appeals (Bhutada *et al.*, 2012) and cognitive appeals (Lemanski and Villegas, 2015) have been used in healthcare, fear/threat appeals are the most common (Witte and Allen, 2000). Most fear/threat appeals have

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been used in lab settings, in "contrived, artificial settings"; research is needed in "realistic, natural settings" (Witte and Allen, 2000). The setting of our research is a real one, where we use real would-be cataract patients in two field experiments.

While threat appeals and message framing have been regularly employed in health domains in developed nations, they have largely been underutilized among Indian consumers with only a few exceptions (Fernando *et al.*, 2016). Specifically, their effectiveness is yet to be examined among Indian consumers in the utilization of cataract surgery to prevent avoidable blindness. 90 percent of those visually impaired live in developing countries. In total, 80 percent of all visual impairment can be avoided or cured (WHO, 2014). Cataract is the principal cause of preventable blindness and accounts for 51 percent of all the blindness in developing countries (WHO, 2014). The risk of developing cataract increases with age and India holds the dubious distinction of having the largest number of blind people (Frick and Foster, 2003). In India, cataract is the primary reason in every three out of four people becoming blind (Murthy *et al.*, 2005). More than half of the Indian population would be greater than 50 years of age by 2050 (United Nations, 2015). These demographic changes alone would lead to a doubling of cataract incidences (Brian and Taylor, 2001).

The cure for cataract is surgery. Hence, most efforts, have tried to address the cataract problem from a medical standpoint (Foster, 2001). The focus has been on performing surgeries as swiftly as possible for effective outcomes. The number of cataract surgeries performed every year therefore has gone up, but more people are rendered blind each year. Despite a lot of advancements in the field of ophthalmology, many people are unwilling to get their eyes tested (Tabin *et al.*, 2008). Mostly, blindness is due to the onset of cataract and consumers' failure to prevent this by undergoing a periodic eye checkup and undertaking the relatively easy-to-undergo cataract surgery (Thomas *et al.*, 2005). Venkataswamy and Brilliant (1981) brought out the major barriers to cataract surgery; these include poverty, lack of transportation and "the need not felt to undergo cataract surgery." Vaidyanathan *et al.* (1999) and Aarthi *et al.* (2015) highlight the shift in the character of these barriers. Both these studies emphasize the significant shifts in this domain: from "poverty" being the main barrier to "attitude" (e.g. need for cataract surgery not felt though it is actually present). Vaidyanathan *et al.* (1999) point out that the present-day communication material has become routine and ineffective. Cini and Reena (2008) conducted a study in near 100 percent literate Kerala (a Southern state in India) and stressed the urgent need for proper communication to address the issue. While researchers have identified the barriers to uptake of cataract surgery, there has been little structured research in actually developing effective communications material to persuade consumers to get their eyes checked regularly and have timely surgery, if required. While threat appeals have been used in a variety of health-related domains (e.g. Smerecnik and Ruiter, 2010), they are conspicuous by their absence in the cataract arena. Hence, this study is an attempt to bridge this gap by empirically assessing the usefulness of threat appeals and message framing in shaping consumer mindsets toward cataract surgery.

We began with a content analysis of 30 pamphlets from Sankara Nethralaya, a leading eye-care organization in India, to understand the nature of cataract-related communication. We analyzed the use of variables such as severity, susceptibility, self-efficacy and response efficacy, which persuasion research identifies as important in health communication. The coding categories for levels of severity, susceptibility, self and response efficacy were determined from extant research. Two independent judges coded the pamphlets on these categories. Cohen's κ (Cohen, 1960) was used for computing inter-coder reliability. Inter-coder reliability for all units of analysis ranged between 0.79 and 1.00, indicating excellent agreement. The findings are delineated below.

The content analysis found that the number of pamphlets containing lower severity levels ($n = 29$) were higher than the number of high severity ones ($n = 1$, χ^2 (1) = 26.13, $p < 0.01$).

The number of pamphlets containing low susceptibility levels ($n = 28$) was significantly more than the number containing high levels ($n = 2$; χ^2 (1) = 22.53, $p < 0.01$). The number of pamphlets containing low self-efficacy levels ($n = 28$) was significantly higher than those with high levels of self-efficacy ($n = 3$; χ^2 (1) = 19.20, $p < 0.01$). Finally, the pamphlets that contained low levels of response efficacy ($n = 2$, χ^2 (1) = 22.53, $p < 0.01$) were significantly higher than pamphlets with high levels of response efficacy. Our analysis showed that most of the pamphlets analyzed lacked detailed information about cataract. Not even one pamphlet contained an effective threat appeal. All the pamphlets were merely informative, announcing just the date and the timing of the upcoming eye care camps. None of the pamphlets made any attempt to persuade. Thus, in practice too, there is very little use of threat appeals in persuading consumers to undergo cataract surgeries (please see Tables I and II for detailed results).

The extended parallel process model (EPPM) combines threat (the appeal that engenders fear) with efficacy (the appeal that recommends corrective action) and has been used in areas of preventive healthcare like AIDS prevention (Witte, 1994) and cancer communication (Stephenson and Witte, 1998). Likewise, framing of messages (loss/gain) has been found to affect persuasion in mammography screening (Finney and Iannotti, 2002) and anti-smoking (Jung and Villegas, 2011). Therefore, the key research questions that we intend to answer through this research are:

RQ1. Would threat and efficacy appeals work in persuading people to undergo cataract surgeries?

RQ2. Would message framing (loss vs gain) affect persuasiveness of messages relating to cataract surgeries?

Most research in eye-care and related areas uses a medical (and not behavioral) perspective (e.g. Desapriya *et al.*, 2010). Specifically, the focus of research has been on "how does one medically improve the surgical procedure?" and not "why are people indifferent to eye-care issues?" and "What can we do to overcome this indifference?" We aim to correct this anomaly.

Conceptual framework and hypotheses

Threat appeal

Threat appeals attempt to scare people through fear and describe the negative consequences of failing to comply with the message (Witte, 1992) e.g. a doctor stating that the likelihood of death occurring if a person rides a motorcycle without a helmet. In general, by and large, threat appeals work (Ruiter *et al.*, 2014). Threat appeals are used to evoke cognitive responses rather than emotional ones (Cauberghe *et al.*, 2009). According to protection motivation theory (PMT), threat produces reactions like perceived severity and perceived vulnerability (Cauberghe *et al.*, 2009). Perceived severity refers to an individual's perception about the enormity of the threat ("cataract will lead to permanent blindness") and perceived vulnerability ("people above 50 are at a greater risk of getting cataract")

Table I. Inter-coder reliability statistics

Variables	Levels and percentages						
	Low, n	% of total	High, n	% of total	n	Cohen's κ	χ^2
Severity level	29	0.97		0	30	0.96	26.13**
Susceptibility level	30	1.00	0	0	30	1.00	22.53**
Self-efficacy level	30	1.00	0	0	30	1.00	19.20**
Response efficacy level	27	0.90	2	0.07	30	0.79	22.53**

Notes: Total number of pamphlets = 30. *$p < 0.05$; **$p < 0.01$

Information about cataract	*n*	% of total	Cohen's κ
Severity			
Presence of the word "cataract"	30	100	1.00
Symptoms of cataract	7	23	0.96
How cataract is contracted	0	0	1.00
Prevalence	0	100	1.00
Risks			
Cataract causes vision deterioration	0	0	1.00
Cataract causes blindness	0	0	1.00
Susceptibility			
Are age/age range given to indicate susceptibility?	2	7	0.96
Are gender-specific information on cataract susceptibility	0	0	1.00
Efficacy			
Information on self-efficacy	3	10	1.00
Information on response efficacy	2	7	0.79
Presence of the word "cataract surgery"	30	100	1.00
Surgery efficacy mentioned?	0	0	1.00
Info on recovery time of surgery	0	0	1.00
Mention of IOL?	30	100	1.00
Benefits of IOL	0	0	1.00
Cost of surgery	30	100	1.00
Tone of message			
Positive	30	100	1.00
Negative	0	0	
WHO's Vision 2020			
Vision 2020 mentioned	0	0	1.00
Information about Vision 2020?	0	0	1.00
Source attribute			
Eye care organization	30	100	1.00
NGOs	25	83	0.79
Political persons/government	17	57	0.96

Note: Total number of pamphlets = 30

Table II.
Unit of analyses

refers to an individual's perception of the likelihood of actually experiencing the threat. Higher intensity of threat will lead to greater fear arousal and will have a positive impact on perceived severity and vulnerability (Fernando *et al.*, 2016). Therefore:

H1a. High threat messages will lead to more favorable consumer attitudes toward undergoing cataract surgery, compared to low threat messages.

H1b. High threat messages will lead to greater consumer intentions to undergo a cataract surgery, compared to low threat messages.

Efficacy appeal

Self-efficacy is the personal judgment of one's capabilities to organize and execute courses of action to attain the chosen goals (Bandura, 1977) (e.g. a consumer believes that she can go to a gym regularly). The role of self-efficacy in motivating changes in consumers' attitudes and intentions has been empirically studied in health-related campaigns like alcoholism (Ilgen *et al.*, 2006) and HIV prevention (Smerecnik and Ruiter, 2010). Apart from self-efficacy, other research studies (e.g. Lewis *et al.*, 2010) has documented the effectiveness of response

efficacy, which is "a person's belief that a recommended course of action would actually help avoid the threat." For instance, a consumer who believes that a vaccine would prevent measles would act on communication regarding the vaccine. In general, the EPPM states that response efficacy and self-efficacy combine to form the construct efficacy (Witte, 1992). Therefore:

H1c. High efficacy messages will lead to more favorable consumer attitudes toward undergoing cataract surgery, compared to low efficacy messages.

H1d. High efficacy messages will lead to greater consumer intentions to undergo a cataract surgery, compared to low efficacy messages.

Interaction effects of threat and efficacy

The EPPM posits that to motivate consumer behavior, health communications must include two constructs: threat and efficacy. Level of severity (e.g. cataract is a dangerous condition) and susceptibility to the problem (e.g. I will definitely get cataract) in the message describe the degree of threat. If the message initiates perceptions of threat that reach a certain threshold level, then individuals next appraise the efficacy of the suggested remedy. The level of efficacy perceived from a recommended response shapes how the individual can react to the threat (Stephenson and Witte, 1998). Self-efficacy (e.g. "I can do it") and response efficacy (the feeling of "this treatment really works") are the variables that would relate to the individual's reaction to the threat. The evaluation of a threat appeal initiates two appraisals of the message, which result in one of the three outcomes (Stephenson and Witte, 1998). First, individuals appraise the threat of an issue from a message. The more individuals believe they are susceptible to a serious threat, the more motivated they are to begin the second appraisal, which is an evaluation of the efficacy of the recommended response. If the threat is perceived as irrelevant or insignificant (i.e. low), then there is no motivation to process the message further. In contrast, when a threat is portrayed to be serious and relevant (e.g. "I'm susceptible to contracting a threatening disease"), individuals become scared. Their danger motivates them to take some sort of an action that will reduce their fear. Perceived efficacy (comprising self-efficacy and response efficacy) determines whether people get motivated to control the danger of the threat or control their fear about the threat. When people believe they are able to perform an effective recommended response against the threat (i.e. high perceived self-efficacy and response efficacy), they are motivated to control the danger and think about ways to remove or reduce the threat. Usually, people think carefully about the recommended responses advocated in the message and adopt those as a means to reduce or avert the danger. Hence:

H2a. The positive effect of threat appeals on consumer attitudes toward undergoing cataract surgery would be stronger for high (vs low) efficacy appeals.

H2b. The positive effect of threat appeals on consumer intentions to undergo cataract surgery would be stronger for high (vs low) efficacy appeals.

The effect of framing

Framing effects occur when transparently and objectively identical situations generate dramatically different decisions depending on whether the situations are presented or perceived as potential losses or gains (Kahneman and Tversky, 1981). Guided by prospect theory, framing has played a significant role in designing health communication material.

Health communication messages therefore can either highlight the benefits that would result by following the recommended behavior (gain-frame) or underline the consequences of failing to involve in the recommended behavior (loss-frame). For instance, a gain-framed message could emphasize the benefits by adopting a recommended behavior "taking a

cholesterol test allows assessment of one's heart disease"; while a loss-framed message will emphasize the loss of the same benefits if the recommended behavior is not followed "not taking a cholesterol test does not allow the assessment of one's risk of heart disease" (Maheswaran and Meyers-Levy, 1990). Loss-frame messages have performed well in a number of studies that adopted goal framing (e.g. Block and Keller, 1995). When messages are negatively framed, they are thought to constitute higher risk when compared to positively framed messages (Meyers-Levy and Maheswaran, 2004). Negative frames invoke more cognitive processing when compared to positive frames (O'Keefe and Jensen, 2009). Therefore:

H3a. Loss-framed messages will lead to more favorable consumer attitudes toward undergoing cataract surgery, compared to gain-framed messages.

H3b. Loss-framed messages will lead to greater consumer intentions to undergo cataract surgery, compared to gain-framed messages.

Loss-frames and efficacy

There are many empirical studies that have examined the relationship of efficacy with framing in developing persuasive health-related messages (e.g. Block and Keller, 1995). Abhyankar *et al.* (2008) highlight how response efficacy when combined with loss framed messages enhanced behavioral intentions to undergo vaccination. Response efficacy has been known to be a key persuasive component in increasing acceptance (Lewis *et al.*, 2010) and loss frames invoke more cognitive processing than gain frames (O'Keefe and Jensen, 2009). Therefore:

H4a. The positive effect of efficacy appeals on consumer attitudes toward cataract surgery would be stronger for a loss- (vs gain-) framed message.

H4b. The positive effect of efficacy appeals on consumer intentions to undergo cataract surgery would be stronger for a loss- (vs gain-) framed message.

Methodology

Experiment 1

This study uses a 2 (high vs low threat) × 2 (High vs Low efficacy) factorial, between-subjects field experiment ($n = 295$).

Procedure and design. The subjects were between the ages 40 and 61 from rural areas near Jabalpur, Madhya Pradesh and Mahabalipuram, Tamil Nadu (in Northern and Southern India, respectively). We deliberately chose rural parts of India since the prevalence of preventable blindness due to the onset of cataract is greater in rural *vis-à-vis* urban India (Murthy *et al.*, 2005). We chose Tamil Nadu and Madhya Pradesh since both have rural populations but they differ in their overall development, with Tamil Nadu being more developed than Madhya Pradesh. The vernacular languages of Tamil Nadu and Madhya Pradesh are Tamil and Hindi, respectively.

The sample's mean age is 46.81 years (male = 53 percent), which is in line with most studies related to cataract research (Murthy *et al.*, 2012). Over seven days, we intercepted subjects in four community health hospitals, two each in Tamil Nadu and Madhya Pradesh; subjects were intercepted and randomly assigned to the four conditions. The respondents were first exposed to the stimuli (print posters) and immediately afterward asked to fill in the questionnaire.

Stimuli. The stimuli for the study consisted of four print posters that gave information on cataract and how to deal with it. We created the posters in English and using back-translation, translated the original to Tamil and Hindi. To increase the credibility of the message, on the top right corner of the poster, a logo of the State's Ophthalmic Association was displayed and

the words "issued in public interest" were written above the logo. Threat and efficacy were manipulated as follows: The high threat condition stressed on the risks of cataract to the individual and family, and the certainty of going blind permanently if left untreated. The low threat condition focused on how age brings about the onset of cataract and if left untreated for a prolonged period could gradually lead to deterioration of vision. The high efficacy condition stressed on the technological advancements in the field of ophthalmology and the short duration it takes to undergo a painless surgery. The low efficacy condition spoke about how it was difficult to predict the outcome of a surgery in terms of quality of vision restored. All scales were adapted from existing literature (Witte, 1996). All scales exhibited excellent psychometric properties; please see Table AI for details on scales.

Manipulation checks. Results showed that the manipulations were successful. Participants reported higher level of threat in the high-threat condition ($M = 3.95$, SD = 0.88) *vis-à-vis* the low threat condition ($M = 3.48$, SD = 0.56); $F(1, 293) = 29.27$, $p < 0.01$). Likewise, participants rated efficacy level as low in the low-efficacy condition ($M = 3.89$, SD = 0.58) as compared to the high efficacy condition ($M = 4.47$, SD = 0.42); $F(1, 293) = 95.31$, $p < 0.01$). We found statistically significant mean differences in fear evoked by the high threat message ($M = 4.06$, SD = 0.84) *vis-à-vis* the low threat message ($M = 3.39$, SD = 0.64) $F(1, 293) = 48.92$, $p < 0.01$).

Results

We used SEM using AMOS 22.0, since (in both experiments) we had multi-item measures, multiple constructs and inter-relationships between them for both models. We first assessed the measurement model before testing the structural one (Anderson and Gerbing, 1988).

Measurement model

The measurement model shows a good fit ($\chi^2 = 276.69$, df = 153; CFI = 0.96; TLI = 0.94; IFI = 0.95; GFI = 0.91; AGFI = 0.88; SRMR = 0.06 RMSEA = 0.05). The measures included in the analysis were reliable, with construct reliability (CR) estimates ranging from 0.75 to 0.92. All measures exhibited good convergent and discriminant validities. Table III shows related statistics.

Common method variance (CMV)

This study uses the predictor and criterion variables from the same source in a single survey; hence, we tested for CMV using the "single common method factor" approach (Podsakoff *et al.*, 2003). The model with the CMV factor showed a poor fit; therefore, CMV does not present a problem.

				Experiment 1				
Variables	Cronbach's α	CR	AVE	MaxR (H)	Attitude	Threat	Efficacy	Intention
Attitude	0.92	0.91	0.62	0.91	**0.79**			
Threat	0.77	0.76	0.51	0.94	*−0.09*	**0.71**		
Efficacy	0.79	0.75	0.35	0.95	*0.89***	*0.10***	**0.59**	
Intention	0.82	0.82	0.61	0.96	*−0.05*	*0.62***	*0.09***	**0.78**

Notes: The values along the diagonals, appearing in bold, are the square roots of average variance extracted (AVE), which is used to calculate discriminant validity. The values in italics are the correlations among the constructs. The values under CR are composite reliability. MaxR (H) is maximal reliability. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table III.
Reliability and validity statistics

Structural model

Results indicated a good fit for the structural model ($\chi^2 = 309.230$, df = 170; CFI = 0.95; TLI = 0.93; IFI = 0.95; GFI = 0.91; AGFI = 0.88; SRMR = 0.06 RMSEA = 0.05) with all the indices better than the recommended threshold values (Hu and Bentler, 1999). The analysis revealed support for *H1b*, *H1c*, *H2a*, and *H2b*. The summary of the findings is given in Table IV.

The results indicated that threat had a significant positive effect on consumer intentions to uptake of cataract surgery ($\beta = 0.61$, $p < 0.01$) supporting *H1b*; however, threat had a significant negative effect ($\beta = -0.21$, $p < 0.01$) on consumer attitudes, thus *H1a* was not supported. The main effect of efficacy on consumer attitudes was positive and statistically significant ($\beta = 0.91$, $p < 0.01$), supporting *H1c*. However, we find no effect of efficacy on consumer intentions; hence *H1d* was not supported. Efficacy significantly and positively moderated the relationship of threat on consumer attitudes to uptake of cataract surgery ($\beta = 0.14$, $p < 0.01$), lending support to *H2a*. Also, efficacy significantly and positively moderated the relationship of threat on consumer intentions to undergo cataract surgery ($\beta = 0.18$, $p < 0.01$), thus supporting *H2b*. Figure 1 presents the model with the path coefficients.

Experiment 2

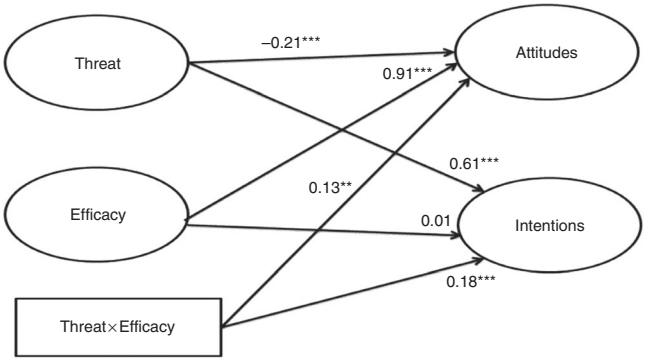
Procedure and design

We conducted a field experiment similar to the first one ($n = 228$; males = 57 percent) The procedure and locations were identical to those in experiment 1.

Hypotheses		Experiment 1 Estimate	C.R.	*p*-value	Result
H1a	Threat → attitude	−0.21	−3.70	0.01***	Not supported
H1b	Threat → intention	0.61	5.89	0.01***	Supported
H1c	Efficacy → attitude	0.91	7.62	0.01***	Supported
H1d	Efficacy → intentions	0.01	0.19	ns	Not supported
H2a	Threat × efficacy → attitude	0.14	2.90	0.01**	Supported
H2b	Threat × efficacy → intentions	0.18	3.30	0.01***	Supported

Notes: ns, not significant. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table IV. Hypotheses and results summary



Notes: **$p < 0.01$; ***$p < 0.001$

Figure 1. SEM test of research model

Stimuli

The design was a 2 (gain- vs loss-frames)× 2 (high vs low efficacy) factorial design. The gains used in the frame highlighted the benefits that would accrue if a person took up the surgery while the loss frame highlighted the losses (s)he would suffer if (s)he did not undergo the surgery. The high and low levels of efficacy were retained from the stimuli used in Experiment 1.

Manipulation checks

In line with our manipulations, greater gain ($M = 4.57$) and lower loss ($M = 2.24$) were perceived in the gain condition as compared to the loss condition ($M_{gain} = 1.69$; $M_{loss} = 4.13$; $F = 361$; $p < 0.01$). Further, efficacy was significantly higher in the high ($M = 4.50$) as opposed to the low ($M = 4.08$; $F = 43.92$; $p < 0.01$) efficacy condition. Thus, our manipulations were successful.

Results

Measurement model

Our measurement model showed a good fit ($\chi^2 = 414.04$, df = 258; CFI = 0.95; TLI = 0.94; IFI = 0.95; GFI = 0.88; AGFI = 0.85; SRMR = 0.04 RMSEA = 0.05). The measures included in the analysis were reliable, with CR estimates that ranged from 0.70 to 0.96. All measures exhibited convergent and discriminant validities. Table V shows related statistics. Like in Experiment 1, we tested for CMV and found it was not a problem.

Structural model

The structural model shows a good fit ($\chi^2 = 207.64$, df = 112; CFI = 0.95; TLI = 0.94; IFI = 0.95; GFI = 0.88; AGFI = 0.83; SRMR = 0.06; RMSEA = 0.05) with all the fit indices better than the recommended threshold values (Hu and Bentler, 1999). The analysis revealed support for *H4a*, *H4b*; however, *H3a* and *H3b* were not supported. The summary of the findings is given in Table VI.

The results indicate that loss-frames when combined with high efficacy had a significant positive effect on consumer attitudes to uptake of cataract surgery ($\beta = 0.16$, $p < 0.01$), thus supporting *H4a*. Again, under the same conditions we also found that it had a significant positive effect on consumers' intentions to uptake of cataract surgery ($\beta = 0.17$, $p < 0.01$), thus supporting *H4b*. We did not find any main effect of loss-frames on either consumer attitude or consumer intentions, therefore not supporting *H3a* ($\beta = 0.02$, $p > 0.05$) and *H3b* ($\beta = -0.01$, $p > 0.05$). In gain frames, both the main effect and its interaction with efficacy were found to be insignificant. Figure 2 shows the final structural model with the path coefficients.

Experiment 2

Variables	Cronbach's α	CR	AVE	MaxR (H)	Attitude	Loss frames	Gain frames	Efficacy	Intention
Attitude	0.92	0.88	0.54	0.91	**0.73**				
Loss frames	0.96	0.96	0.92	0.91	*−0.41***	**0.96**			
Gain frames	0.93	0.95	0.89	0.94	*0.45***	*−0.95***	**0.94**		
Efficacy	0.78	0.79	0.38	0.95	*0.79***	*−0.31*	*0.35*	**0.62**	
Intention	0.84	0.86	0.62	0.98	*0.39*	*−0.23***	*0.25***	*0.63***	**0.79**

Table V.
Psychometric properties of constructs

Notes: The values along the diagonals, appearing in bold, are the square roots of average variance extracted (AVE), which is used to calculate discriminant validity. The values in italics are the correlations among the constructs. CR is composite reliability. MaxR (H) is maximal reliability. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Discussion and implications

Theoretical implications

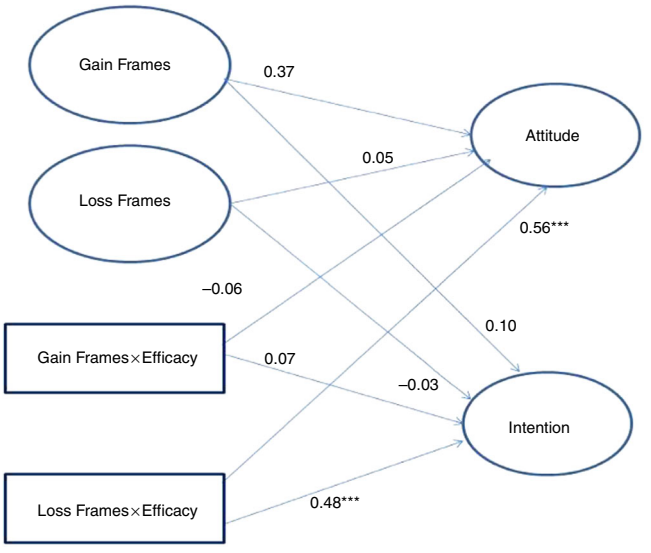
We found support for many of our hypotheses. While *H1b* (threat on intentions) was supported, *H1a* (threat on attitudes) was not. The plausible reason could be that attitudes may take some time to get formed, while intentions may be immediate particularly in the instance of cataract surgery (since eye care camps are organized frequently in villages such as the ones we collected data from). Likewise, *H3a* and *H3b* were not supported (these dealt with the main effects of loss- frames on attitudes and intentions, respectively. This could be because while some research has shown that loss-frames are better since they evoke more cognitive processing (Meyers-Levy and Maheswaran, 2004), it could be that our subjects did not indulge in such elaborate message processing, without which loss-frames would not be as effective. Further research is needed to throw more light on this issue.

This study takes a crucial step toward understanding and reducing the barriers to uptake of cataract surgery among people living in rural areas of India. Although there have been many studies on understanding the prevalence of visual impairment/cataract (e.g. Murthy *et al.*, 2005), there is little effort in tackling them from a communications strategy perspective. To the best of our knowledge, there is little structured research in tackling eye care issues in India from a psychological and attitudinal standpoint. We believe that this paper is the first research effort in addressing these important problems in a

Hypotheses		Experiment 2 Estimate	C.R	*p*-value	Result
H3a	Loss frames → attitude	0.02	0.23	ns	Not supported
H3b	Loss frames → intentions	−0.01	−0.12	ns	Not supported
H4a	Loss frames × efficacy → attitudes	0.16	7.21	0.01***	Supported
H4b	Loss frames × efficacy → Intentions	0.17	5.55	0.01***	Supported

Notes: ns, not significant. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table VI. Summary of hypotheses and estimates



Note: ***$p<0.001$

Figure 2. Structural model with path coefficients

structured manner and thus, we answer the question "what can we do to overcome the indifference among consumers regarding eye care?" We demonstrate the effectiveness of EPPM/PMT in an actual field setting. While EPPM and PMT-based models have been used to tackle other health issues like cancer prevention (Witte, 1992), we are the first to test its efficacy in eye care management. This is in line with other studies in related fields. For instance, Fernando *et al.* (2016) extend the PMT to green marketing even while they do not contribute to the PMT/EPPM by extending it fundamentally. In a similar vein, we extend the PMT and EPPM to cataract surgery.

In Study 1, as predicted, high efficacy messages positively moderated the relationship between threat and attitude. The use of high threat along with high efficacy messages yielded favorable attitudes toward uptake of cataract surgery, which is consistent with other EPPM studies (e.g. Stephenson and Witte, 1998). Furthermore, the use of high threat and high efficacy messages resulted in positive intentions toward uptake of cataract surgery. Our findings from Study 2 indicated that loss-frames, compared to gain-frames led to more positive attitudes and intentions toward uptake of cataract surgery, when efficacy is high, rather than low, similar to other studies (e.g. Abhyankar *et al.*, 2008).Therefore, our research contributes to extant literature by extending these theory-based models to a domain where it has never been tested before and in a setting that is culturally varied. This study makes an important contribution to consumer healthcare research in developing economies.

Public policy implications

With the World Health Organization's "Vision 2020: The Right to Sight" only a few years away, the findings from this study are useful in addressing eye care management in India. Our research findings have significant policy implications. Simply put, India accounts for one fourth of the blind population in the world, and hence is the largest blind country. Two-thirds of those blind in India is because of cataract. India can take pride in the fact that it was the first country to set up a national program for control of blindness. Further, prominent eye care organizations like Sankara Nethralaya and Aravind Eye Care have revolutionized the service delivery and the quality of service delivery to the affected. However, there remains a huge backlog. This backlog is essentially due to attitudinal issues among the affected and can only be addressed through effective communications strategies.

The first step to a holistic and inclusive eye care public policy is for policy makers, private NGOs and social marketers to join hands to develop effective communication platforms. From a practical and managerial viewpoint, our studies will significantly benefit eye care organizations to help develop effective communication campaigns and spend their money efficiently. Thus far, efforts have been unidirectional with the concerned organizations having to push their services to the affected. Examining the findings from our two field experiments side by side, it becomes clear that it is imperative that all health communications campaigns should include high efficacy messages regarding the recommended behavioral intervention. In the case of cataract, it should highlight the ease of getting operated upon, the time it takes to perform the surgery and the quick post-operation recovery. For instance, instead of bland announcements that a cataract camp is going to organized, pamphlets with threat appeals (e.g. highlighting the threat of cataract in rendering eyes blind) and high efficacy appeals (e.g. highlighting how cataract surgery can help avoid blindness) may be used. Additionally, loss-frames highlighting the loss of eyesight may be used in conjunction with high efficacy messages. Loss-frame alone did not seem to do the trick, while loss-frame combined with high efficacy was successful. Our research calls for a complete overhaul of message design from the current bland information dissemination (of cataract surgery camps) to the use of threat and efficacy appeals; and loss-framing with high efficacy messages. These pamphlets may be distributed to the village councilor and (s)he in turn can widely distribute them to every household in the village. Also, blown-up posters of such appeals can

be displayed in cinema theaters, village fairs, temples and public places in villages. While our research was conducted in rural India, displaying such posters can also be done in urban India. Such steps would go some distance in eradicating curable blindness. For each US dollar spent on eye care and on the prevention of vision loss, there is a five-dollar return to the community (Taylor, 2007). In addition, it is estimated that Vision 2020, if successful, will provide a global saving of US $223 billion over 20 years (Frick and Foster, 2003). Moreover, the government would also be able to spend their communication and marketing money efficiently and effectively.

Limitations and future research

Our study has a few limitations that future research may address. First, we used pictures to enhance the effect of threat appeal; however, we did not measure the degree of effectiveness or non-effectiveness of using visual content. Moreover, we used some text (copy) to provide a context to the pictures that accompanied the messages. We kept the same text in all our stimuli so that it does not confound the effect of the pictures but it does not help us separately assess the effects of the text and the pictures. Future research can therefore include different versions of the stimuli, one with only pictures that depict varying levels of vividness (Block and Keller, 1995), another with only text and one with a combination of pictures and text, to test the individual impact of the pictures and the text. Other formats such as videos may also be studied apart from print. This would help understand message-processing abilities among the rural population, whose literacy rate is comparatively lower than her urban one.

Future studies can also manipulate variables such as source credibility and message involvement to test the use of threat appeals in rural India to address not only cataract-related issues but extend it to other major healthcare problems, such as diabetes, obesity and cancer. In India, companies like Cadbury's and Coke have benefited by using celebrities when confronted with dealing with crises and these appeals have worked for them. It could be possible that celebrity appeals could work in this issue as well. We also collected data only from India. Studies can be conducted on the same lines in Africa, other parts of South Asia and Latin America. While we used threat appeals following prior research, in future, researchers can consider the use of the other appeals like celebrity appeals (Bhutada *et al.*, 2012), shame and guilt (Brennan and Binney, 2010) in cataract and related healthcare domains.

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Appendix

Scale	Items	Loadings
Fear	The message made me feel comfortable (-)	0.53
(Witte, 1996)	The message made me feel anxious	0.72
	The message scared me	0.78
	I felt skeptical after viewing the message (-)	0.62
	I felt nervous viewing the message	0.73
	Viewing the message I felt tensed	0.73
Severity	Cataract is a dangerous condition	0.67
(Witte, 1996)	Cataract will cause permanent blindness	0.94
	I am likely to get cataract sometime soon	0.54
Susceptibility	I will definitely get cataract	0.82
(Witte, 1996)	I will not get cataract (-)	0.72
Response Efficacy	Regular eye checkup is the easiest and best way to delay cataract	0.70
(Witte, 1996)	Regular checkup improves chances of early detection	0.66
	Early detection of cataract increases chances restoring the eyesight	0.74
	Regular eye checkups will not drastically improve my chances of detection (-)	0.72
	Cataract surgery will successfully restore the vision	0.72
	Cataract surgery is painless	0.8
	Cataract surgery is easy to undergo and quick	0.51
	Cataract surgery will not restore my eyesight (-)	0.47
Self-efficacy	I can take an appointment with the eye clinic	0.67
(Witte, 1996)	Regular visits to the eye clinic is possible for me	0.94
	I cannot visit the clinic regularly (-)	0.53
Attitude	1. Regular eye checkup after age 45 is:	
(Witte, 1996)	Important □ □ □ □ □ not important	0.68
	Good □ □ □ □ □ bad	0.61
	Sensible □ □ □ □ □ foolish	0.72
	Useful □ □ □ □ □ Useless	0.74
	2. Undergoing cataract surgery is	0.77
	Easy □ □ □ □ □ not easy	0.75
	Good □ □ □ □ □ bad	0.77
	Safe □ □ □ □ □ unsafe	0.84
	Useful □ □ □ □ □ useless	0.82
	Harmless □ □ □ □ □ harmful	0.75
Intention	I plan to get my eyes tested in the next 6 months	0.74
(Witte, 1996)	I want to consult the eye doctor to discuss options regarding cataract surgery	0.84
	I am motivated to know more about cataract	0.74
	I will undergo surgery to restore my vision	0.74
	I will not check my eyes regularly (-)	0.71
	I will not undergo cataract surgery (-)	0.65
Gain Frames (De Dreu	The message given in the poster is positive	0.95
and McCusker, 1997)	The poster message highlights the benefits of cataract surgery	0.92
Loss Frames (De Dreu	The message given in the poster is negative	0.93
and McCusker, 1997)	The poster message highlights dangers of not undergoing the cataract surgery	0.92

Note: (-) Reverse-worded items

Table AI.
Scale summary