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## The Influence of Statistical versus Exemplar Appeals on Indian Adults' Health Intentions: An Investigation of Direct Effects and Intervening Persuasion Processes

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## The Influence of Statistical versus Exemplar Appeals on Indian Adults' Health Intentions: An Investigation of Direct Effects and Intervening Persuasion Processes

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### ABSTRACT

In two separate investigations, we examined the persuasive effectiveness of statistical versus exemplar appeals on Indian adults' smoking cessation and mammography screening intentions. To more comprehensively address persuasion processes, we explored whether message response and perceived message effectiveness functioned as antecedents to persuasive effects. Results showed that statistical appeals led to higher levels of health intentions than exemplar appeals. In addition, findings from both studies indicated that statistical appeals stimulated more attention and were perceived as more effective than anecdotal accounts. Among male smokers, statistical appeals also generated greater cognitive processing than exemplar appeals. Subsequent mediation analyses revealed that message response and perceived message effectiveness fully carried the influence of appeal format on health intentions. Given these findings, future public health initiatives conducted among similar populations should design messages that include substantive factual information while ensuring that this content is perceived as credible and valuable.

Statistical and exemplar persuasive appeals reflect distinct approaches commonly employed to present health information. However, to the authors' knowledge, only one study (Hastall & Knobloch-Westerwick, 2013) has attempted to study the impact of evidence format on a non-U.S. population, and no study has examined effects within a non-Westernized country (for review see Allen & Preiss, 1997; de Wit, Das, & Vet, 2008; Hastall & Knobloch-Westerwick, 2013; Zillmann, 2006). Importantly, of the limited prior research addressing cross-cultural differences in evidence-format effects, findings suggest that results may vary based on country (Hastall & Knowblach-Westerwick, 2013). Prior investigators have called for research that addresses whether there is cultural variability in terms of expectations for proof in persuasive arguments that may factor into effects (Allen & Preiss, 1997). Consequently, this study explores the influence of evidence type on the mammography screening and smoking cessation intentions of Indian adults.

Central to this investigation is identifying how reaction to persuasive appeals contributes to health outcomes. While numerous studies have attempted to identify conditions upon which statistical or exemplar appeals are most effective (e.g., Braverman, 2008; Kazoleas, 1993; Kopfman, Smith, Ah Yun, & Hodges, 1998), there is a lack of sufficient investigation of the processes leading from appeal exposure to changes in one's health motivations. Identifying broader mediating factors leading to health outcomes is crucial for health communication interventions.

### Evidence Format

Two frequently utilized persuasive strategies are statistical and exemplar appeals. Statistical appeals offer evidence that takes the form of a summary record across large populations (Allen & Preiss, 1997). For example, population statistics may be used to convey the percentage of those in a particular age group afflicted with a disease and/or the likelihood that someone may contract that illness. Alternatively, exemplar evidence can utilize case studies or examples presented as personal stories and/or testimony to support the validity of the communicator's statement (Allen & Preiss, 1997). These more memorable accounts (Reinard, 1988) detail someone's history facing that problem (Greene & Brinn, 2003). Thus, a researcher may tell a story of a similar other experiencing the consequences of engaging in a risky health behavior.

Although findings indicate that both strategies influence attitude and behavior change (Baesler & Burgoon, 1994; Greene & Brinn, 2003; Limon & Kazoleas, 2004), there is substantial ambiguity concerning which is more persuasive (Allen & Preiss, 1997; Slater & Rouner, 1996). To support claims that exemplars are more persuasive, researchers have typically drawn from an exemplification theory perspective (Zillmann, 2006). Exemplification theory argues that exemplar messages offer an individual the opportunity to identify herself with similar others. When relating oneself to the exemplar described in case studies, one's assessment of personal risk and protective action can be altered (Yu, Ahern, Connolly-Ahern, & Shen, 2010). In relation to evidence format, researchers argue that exemplars lead to greater persuasive

effects than statistical information that can more easily be disregarded (de Wit et al., 2008; Hastall & Knobloch-Westerwick, 2013; Zillmann, 2006). In general, it is suggested that individuals can more easily relate to examples reflecting real-life scenarios than more “abstract” evidence (Reinard, 1988). Alternative explanations suggest that exemplars and statistical evidence should elicit distinctly different responses from audiences, with both processes influencing attitude and behavior change (Limon & Kazoleas, 2004). For example, research suggests that exemplar accounts may generate greater emotional response but little cognitive response (Kopfman et al., 1998), with the assumption that each response results in persuasive effects.

Empirical investigations comparing the effectiveness of these two approaches have yielded inconsistent results. One meta-analysis of all studies investigating evidence effects (both health related and non-health related) showed that statistical appeals were more effective than exemplars (Allen & Preiss, 1997). These findings contradicted previous reviews and investigations indicating a superior persuasive effect of exemplars (Reinard, 1988; Taylor & Thompson, 1982). More recent investigations have failed to show any significant differences in effectiveness across evidence format (e.g., Gray & Harrington, 2011; Greene & Brinn, 2003; Limon & Kazoleas, 2004; Yu, Ahern, Connolly-Ahern, & Shen, 2010). Given these inconsistencies, it is unclear what differences may emerge within the current investigation. As noted, no previous research has explored the persuasive impact of evidence format among a non-Westernized population. To address this issue, two separate investigations explore what impact evidence format has on mammography screening and smoking cessation intentions.

### **Importance of Persuasion and Health Communication Research in India**

This study explores the influence that evidence format has on the mammography screening and smoking cessation intentions of Indian participants. India is on pace to become the most populous country in the world by 2028 (United Nations, Department of Economic and Social Affairs, Population Division, 2014). Given India’s population growth, the need to identify effective communication interventions is critical for large-scale public health initiatives.

Study 1 examines the influence of evidence format on male smoking cessation intentions. Recent data show that more people worldwide smoke today than in 1980, a finding attributed to rising smoking popularity in India, China, and Russia. While smoking rates in India have dropped from 19 to 13% across this period, as of 2012, 110 million Indians smoked—an increase of 35 million from 1980 (Ng et al., 2014). In 2013, the International Tobacco Control Policy Evaluation Project released a report noting that by 2020, tobacco consumption will account for over 1.5 million deaths in India annually (The International Tobacco Control Policy Evaluation Project, 2013). This study focuses on male smokers, as prevalence rates among this group are substantially higher than that of females. Specifically, recent data show that prevalence rates among males are around 23%, compared to only 3% for

females (Ng et al., 2014). Similarly, daily smoking rates are roughly eight times higher among Indian males (21%) than females (3%; Ng et al., 2014).

Study 2 explores the influence of evidence format on mammography screening intentions. In 2012, nearly 145,000 Indian women were diagnosed with breast cancer (Ferlay et al., 2015). In that same year, more than 70,000 women died of this illness. Importantly, India combined with China and the United States represents nearly one-third of the world’s breast cancer burden. When comparing these three countries, the ratio of death to new diagnoses is highest in India (Ferlay et al., 2015).

Overall, given the substantial public health concerns relating to breast cancer and smoking in India, we assess which persuasive format (statistical or exemplar) is most effective.

This leads to the following research question:

RQ1: What is the influence of evidence format (statistical vs. exemplar) on health intentions?

### **Reaction to Appeals**

Prior research involving evidence format has explored how message response and message judgments act as precursors to persuasive outcomes. For example, prior research shows that exemplars generate higher levels of emotional absorption (Braverman, 2008), perceived realism (Greene & Brinn, 2003) and affective response (Kopfman et al., 1998) than statistical messages. Alternatively, research also shows that statistical evidence leads to higher levels of message recall (Kazoleas, 1993), generates greater cognitive responses (Kopfman et al., 1998), and may be perceived as holding greater information value than exemplar accounts (Greene & Brinn, 2003). To the authors’ knowledge, there are no studies that have thoroughly investigated broader processes involving evidence format, message response/judgments, and health intentions. The following sections offer a theoretical rationale for differences in participant response and evaluation across evidence format, as well as exploring mediating processes.

### **Message Response**

How individuals process information presented in different formats may help explain persuasive effects. Researchers have argued that the greater vividness of case-study accounts enhances message recall more than do messages focusing primarily on percentages or basic statements (Nisbett & Ross, 1980). Along those lines, both narrative engagement perspectives (Green & Brock, 2000) and exemplification theory (Zillmann, 2006) suggest that exemplar formats offer greater opportunity to form a connection with similar others.

However, while researchers have argued that exemplars are more interesting and enjoyable than statistical messages (Nisbett & Ross, 1980; Slater, 2002), a more recent investigation found that statistical messages were perceived to be as interesting as, and in certain conditions, more interesting than, exemplars (Braverman, 2008). Consequently, while exemplar appeals may produce more positive emotional

response and thus are more “emotionally” interesting than statistical appeals (Kopfman et al., 1998; Taylor & Thompson, 1982), it is unclear whether this enhances overall attention levels. Furthermore, as described in the following, the format of statistical appeals can stimulate more critical processing of messages. Finally, contrary to assertions drawn from a vividness perspective, individuals have reported higher levels of message recall following exposure to statistical appeals compared to exemplar appeals (Kazoleas, 1993). This leads to the following research questions:

RQ2: Are there differences in attention levels across evidence format (statistical vs. exemplar)?

RQ3: Does attention mediate the relationship between evidence format (statistical vs. exemplar) and health intentions?

Because exemplar appeals facilitate more emotional connection to the story and character, researchers argue that this in turn reduces counterarguing and broader levels of critical processing (Csikszentmihalyi, 1990; Green & Brock, 2000; Limon & Kazoleas, 2004). Conversely, statistical appeals likely trigger more systematic (i.e., cognitive) processing of messages (Kopfman et al., 1998). In particular, research indicates that “stronger” statistically formatted messages that present factual and reliable information generate greater message elaboration than “weaker” messages referencing only one individual’s experience (Kopfman et al., 1998; Limon & Kazoleas, 2004). Importantly, cognitive processing relies heavily on the strength of message content and how the messages are presented (Chaiken, 1980; Petty & Cacioppo, 1986). Overall, given that statistical appeals rely on factual information and/or aggregate percentages, they are more likely to generate more issue-relevant thoughts than exemplar messages. Drawing from prior empirical and theoretical research, we predict the following:

H1: Statistical messages will lead to higher levels of cognitive processing than exemplar messages.

Through greater cognitive processing, people actively attempt to understand and evaluate the message’s arguments. Subsequently, attitudes are formed based on the conclusions drawn from a careful evaluation of the information (Petty & Cacioppo, 1986). Thus, cognitive processing should mediate the relationship between evidence format and health intentions. However, it is unclear how this processing mode influences health intentions. Specifically, when assessing the merits of a persuasive appeal, people are likely to consider thoughts supporting and refuting the message arguments (Kopfman et al., 1998). Thus, while individuals may be more inclined to think critically about statistical messages, this in turn can lead to greater message scrutiny. For example, previous research indicates that statistical appeals trigger both greater positive and greater negative thoughts about health issues than exemplar appeals (Kopfman et al., 1998; Limon & Kazoleas, 2004). Overall, we predict that cognitive processing will broadly intervene in the relationship between evidence

format and health intentions, with the impact of this process on intentions unclear. This leads to the following prediction:

H2: Cognitive processing will mediate the relationship between evidence format and health intentions, such that statistics will promote greater cognitive processing that in turn will influence health intentions.

### **Message Judgments**

Individual judgment regarding perceived message effectiveness has direct implications for persuasive effects (Dillard, Shen, & Vail, 2007). Various theoretical models suggest that more favorable judgment of message effectiveness is a causal antecedent to persuasive effects (Dillard & Peck, 2000; Dillard, Plotnick, Godbold, Freimuth, & Edgar, 1996). Furthermore, in a recent study involving judgments of public service announcements, researchers convincingly showed that perceived message effectiveness directly affects attitude and behavioral intentions (Dillard et al., 2007). Unfortunately, prior investigations of evidence format do not show consistent differences in judgments across statistical and exemplar appeals. For example, one study found that statistical messages were perceived to contain more informational value than exemplars, whereas exemplar messages are perceived as more realistic (Greene & Brinn, 2003). In addition, Kopfman et al. (1998) found that statistical messages were perceived to be more credible and effective than exemplar messages. However, multiple recent investigations assessing perceived message effectiveness found no differences across evidence format (Cox & Cox, 2001; Gray & Harrington, 2011; Slater, Buller, Waters, Archibeque, & LeBlanc, 2003). This leads to the following research question:

RQ4: Which evidence format (statistical vs. exemplar) is perceived as more effective?

Finally, we explore whether message evaluations mediates the impact of evidence appeals on health intentions. While judgments of message effectiveness should independently predict health intentions, it remains unclear whether this factor is central to explaining how evidence format influences health outcomes. This leads to the following question:

RQ5: Does perceived message effectiveness mediate the relationship between evidence format (statistical vs. exemplar) and health intentions?

## **Method—Study 1**

### **Design and Procedure**

Study 1 was designed to test the proposed hypotheses in the context of smoking cessation. Data were collected in Tamil Nadu, India, between January and July 2015. Participants were recruited through the Center for Entrepreneurship Development through its network of firms and organizations.



The instruments were distributed to smokers in the workplace, with participants given a week to complete the survey. Participants were instructed to either place their completed responses in a sealed envelope at the front desk (envelopes were provided by the researcher) or mail them directly to the researcher.

In total, 151 male smokers took part in the study. To be eligible for this study, participants had to be male smokers and be at least 18 years of age. Questionnaires were administered in English by trained researchers working for the Center for Entrepreneurship Development.

Roughly 73% of the participants reported being 25–30 years of age. The majority of participants had completed an undergraduate education (86%). In addition, the majority of participants (65%) reported smoking only “occasionally,” whereas another 15% reported smoking on a daily basis.

### Experimental Stimuli

Drawing from prior investigations (e.g., Cox & Cox, 2001; Gray & Harrington, 2011), the researchers developed two black-and-white text-only messages roughly equivalent in length. Eligible participants were assigned randomly to one of the two treatments. Both treatments began with a headline “Why Should You Quit Smoking?” emphasizing the benefits of quitting smoking. However, each treatment had evidence presented in exemplar or statistical format. The wording for each appeal was similar to treatments employed in the Cox and Cox (2001) research, but modified to fit the Indian context.<sup>1</sup> Participants in the exemplar condition were exposed to a message detailing the experiences of a smoker named Mohan who failed to worry about the dangers of smoking and eventually developed lung cancer. The message concludes by noting that Mohan may miss out on a long life that includes watching his son, Raj, grow up. The statistical message provided aggregate data on the risk of lung cancer among smokers, as well as the greater likelihood of suffering a heart attack. After reading their assignment message, participants completed a questionnaire containing demographic information and the central study variables.

### Measurement

#### Message Response

*Attention to message* was assessed through three semantic differential items addressing involvement, attention, and concentration. All items were measured on a 1–7 scale. A single score was created for each participant by calculating the average of his or her responses to all items in the scale ( $M = 4.47$ ,  $SD = 1.63$ ). The scale exhibited strong reliability ( $\alpha = .83$ ).

To assess *cognitive processing*, we adapted four items from a previous investigation (Stephenson & Palmgreen, 2001). The participants indicated the extent to which the advertisement made them (a) think about arguments for quitting smoking, (b) “think” rather than “feel,” (c) think about the

consequences of not quitting smoking described in the advertisement, and (d) think about how smoking might affect my life. Responses could range from *not at all* (1) to *a great deal* (7). The scale exhibited good reliability ( $\alpha = .82$ ). Participants’ scores were created by calculating the average of each participant’s responses to all items in the scale ( $M = 4.87$ ,  $SD = 1.35$ ).

#### Message Judgments

Participant assessment of perceived message effectiveness was assessed through two separate measures drawn from prior research (Cox & Cox, 2001; Dillard et al., 2007; Kopelman et al., 1998). *Perceived message credibility* was measured through four items ranging from *strongly disagree* (1) to *strongly agree* (7). An example item is “I believe the claims in the ad.” Participants’ scores were created by calculating the average of each participant’s responses to all items in the scale ( $M = 5.00$ ,  $SD = 1.35$ ). The scale exhibited acceptable reliability ( $\alpha = .77$ ).

*Perceived message value* was measured through four semantic differential scales. Participants rated the message in terms of usefulness, favorability, broader value (bad vs. good idea), and importance. Items were summed together, then averaged to create message value scale ( $M = 4.37$ ,  $SD = 1.63$ ). The scale exhibited strong reliability ( $\alpha = .86$ ).

#### Manipulation Check

Participants were asked to evaluate the degree to which they agreed or disagreed with each of two statements measured from *strongly disagree* (1) to *strongly agree* (7). Participants who read the statistical message ( $M = 5.24$ ,  $SD = 1.55$ ) reported a significantly higher mean on the statement “The ad focuses primarily on factual statistics” than participants who read the narrative message ( $M = 4.76$ ,  $SD = 1.43$ ),  $t(149) = 1.96$ ,  $p = .05$ . Similarly, participants who read the narrative message ( $M = 4.88$ ,  $SD = 1.59$ ) reported a significantly higher mean on the statement “The ad focuses primarily on a personal example or testimony” than those who read the statistical message ( $M = 4.25$ ,  $SD = 1.86$ ),  $t(149) = -2.23$ ,  $p < .05$ .

### Results—Study 1

#### Preliminary Analyses

Preliminary tests were run to assess whether any of the demographic measures (age, education, smoking frequency) correlated with intentions to quit smoking. Results showed that none of these measures was associated with intentions to quit. Thus, they were not included in any further analyses. Table 1 provides a breakdown of the intercorrelations across all central study variables (see correlations below the diagonal). These preliminary findings indicate statistically significant associations across all but one relationship.

A follow-up multiple analysis of variance (MANOVA) with evidence format (statistical vs. exemplar) as the between-subjects

<sup>1</sup>The full text of stimuli used for smoking cessation stimuli is available upon request to the corresponding author.

**Table 1.** Intercorrelations between central study variables—Study 1 and Study 2.

Variable	1	2	3	4	5	6
1. Evidence type (statistical)	x	.22**	.14*	.02	.20**	.19**
2. Intentions	.18*	x	.30**	.33**	.31**	.31
3. Attention	.16 <sup>†</sup>	.35**	x	.38**	.18**	.59**
4. Cognitive processing	.25**	.51**	.30**	x	.27**	.41**
5. PMC	.33**	.42**	.17*	.49**	x	.18**
6. PMV	.18*	.37**	.49**	.42**	.34**	x

Note. The numbers reflect Pearson's *r* coefficients. Coefficients below the diagonal (x) reflect correlations for Study 1—smoking cessation measures. Coefficients above the diagonal (x) reflect correlations for Study 2—mammography-screening measures. PMC = perceived message credibility; PMV = perceived message value. Evidence type was coded as 1 = exemplar, 2 = statistical.

<sup>†</sup>*p* < .10, \**p* < .05, \*\**p* < .01.

factor was run to address participants' general responses to the various dependent variables. Results revealed a significant main effect of evidence format Wilks's  $\Lambda = .88$ ,  $F(5, 145) = 4.02$ ,  $p < .01$ , partial  $\eta^2 = .12$ . Subsequent independent-sample *t*-tests were run to explore differences in ad responses and intentions across conditions. The results of those tests are described in the following.

### Health Intentions Across Evidence Format

Research question 1 explored whether differences existed in smoking cessation intentions across evidence format. Results showed that those exposed to statistical appeals reported significantly higher levels of smoking cessation intentions ( $M = 4.45$ ,  $SD = 1.88$ ) than participants in the exemplar condition ( $M = 3.81$ ,  $SD = 1.72$ ),  $t(149) = 2.21$ ,  $p < .05$ ; partial  $\eta^2 = .03$ .

### Message Responses Across Evidence Format

Research question 2 and hypothesis 1 addressed how evidence format influenced participant response. Research question 2 explored the influence of evidence format on overall attention to the message. Results showed that the effect of evidence format on attention to message approached conventional levels of significance,  $t(149) = 1.92$ ,  $p = .057$ ; partial  $\eta^2 = .02$ . Average attention levels were higher in the statistical condition ( $M = 4.72$ ,  $SD = 1.64$ ) than the exemplar condition ( $M = 4.22$ ,  $SD = 1.60$ ).

Hypothesis 1 predicted that statistical appeals would lead to greater cognitive processing than exemplar appeals. Results showed that processing levels were significantly higher in the statistical appeal condition ( $M = 5.20$ ,  $SD = 1.27$ ) than the exemplar appeal condition ( $M = 4.54$ ,  $SD = 1.36$ ),  $t(149) = 3.09$ ,  $p < .01$ ; partial  $\eta^2 = .06$ . Thus, hypothesis 1 was supported.

### Message Judgments Across Evidence Format

Research question 4 examined whether evidence format influenced participant judgments toward the message. Two separate analyses were conducted involving either perceived message credibility or perceived message value as the outcome variable. Results from the first analysis showed that statistical appeals ( $M = 5.43$ ,  $SD = 1.35$ ) were perceived as significantly more credible than exemplar appeals ( $M = 4.56$ ,  $SD = 1.21$ ),  $t(149) = 4.19$ ,  $p < .001$ ;

partial  $\eta^2 = .11$ . Results from the second analysis showed that statistical appeals ( $M = 4.65$ ,  $SD = 1.80$ ) were perceived as having significantly more value than exemplar appeals ( $M = 4.07$ ,  $SD = 1.40$ ),  $t(149) = 2.21$ ,  $p < .05$ ; partial  $\eta^2 = .03$ .

### Mediation Analyses

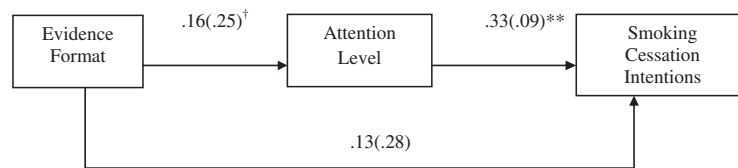
Hypothesis 2 and research questions 3 and 5 explored how message response and message judgments mediated the relationship between evidence format and smoking cessation intentions. Preliminary correlation analyses were run to explore links between proposed mediators and intentions. Results showed that attention ( $r = .35$ ,  $p < .01$ ) cognitive processing ( $r = .51$ ,  $p < .01$ ), perceived message credibility ( $r = .42$ ,  $p < .01$ ), and perceived message value ( $r = .37$ ,  $p < .01$ ) were all significantly associated with smoking cessation intentions. Follow-up bootstrapping analysis tested through the PROCESS analysis (Hayes, 2012) was performed.<sup>2</sup> These analyses are used to formally assess whether an indirect effect (i.e., perceived message credibility mediates the relationship between evidence format and smoking cessation intentions) is statistically significant.

The first test assessed attention as a mediator between evidence format and intentions (research question 3). Although the results already described indicated that the relationship between evidence format and attention only approached conventional levels of significance, given the slight nonsignificance ( $p = .057$ ) we determined that subsequent mediation tests were appropriate. Results of bootstrapping analysis showed that the indirect relationship between evidence format and smoking cessation intentions through attention to message ( $\beta = .05$ ; 95% confidence interval: .002 to .13;  $R^2_{\text{med}} = .02$ ) was statistically significant. Follow-up multiple regression analysis confirmed that the relationship between evidence format and intentions was reduced to nonsignificance ( $\beta = .13$ ,  $p > .05$ ) when attention was included in the mediation model (see Figure 1).

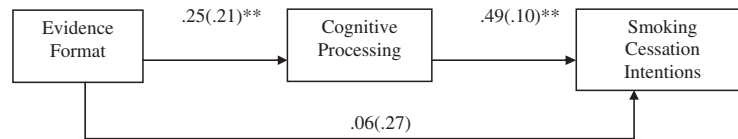
Hypothesis 2 predicted that cognitive processing would mediate the relationship between evidence format and intentions. Results of bootstrapping analysis showed that the indirect relationship between evidence format and smoking cessation intentions through cognitive processing ( $\beta = .12$ ; 95% confidence interval: .04–.22;  $R^2_{\text{med}} = .03$ ) was statistically significant. Subsequent multiple regression analysis showed that the relationship between evidence format and intentions was reduced to nonsignificance ( $\beta = .06$ ,  $p > .05$ ) when cognitive processing was included in the mediation model (see Figure 2). This indicates that cognitive processing fully mediated the relationship between evidence format and smoking cessation intentions. Thus, hypothesis 2 was supported.

Finally, research question 5 examined how message judgments mediated the relationship between evidence format and smoking cessation intentions. Both perceived message credibility ( $\beta = .13$ ; 95% confidence interval: .06–.22;  $R^2_{\text{med}} = .03$ ) and perceived message value ( $\beta = .06$ ; 95% confidence interval: .01–.14;  $R^2_{\text{med}} = .02$ ) significantly carried the indirect effect of evidence format on smoking cessation intentions. In follow-up multiple regression analyses, results showed that the

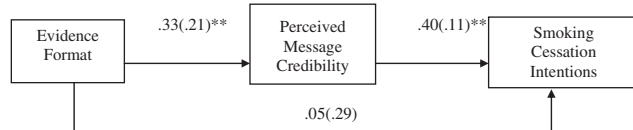
<sup>2</sup>To eliminate potential shared variance/multicollinearity issues among message response and message judgment variables, simple mediation analyses were performed.



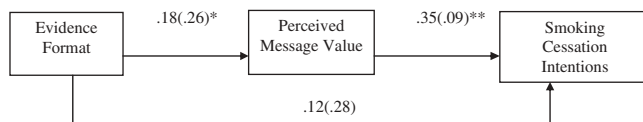
**Figure 1.** Attention level as mediator between evidence format and smoking cessation intentions. Evidence format was coded as 1 = exemplar appeal, 2 = statistical appeal. The numbers reflect standardized regression coefficients obtained through simple and subsequent multiple regression analysis. For the final model,  $R^2 = .14$ . Numbers in parentheses denote standard errors. Significance:  $†p < .06$ ;  $**p < .01$ .



**Figure 2.** Cognitive processing as mediator between evidence format and smoking cessation intentions. Evidence format was coded as 1 = exemplar appeal, 2 = statistical appeal. The numbers reflect standardized regression coefficients obtained through simple and subsequent multiple regression analysis. For the final model,  $R^2 = .26$ . Numbers in parentheses denote standard errors. Significance:  $**p < .01$ .



**Figure 3.** Perceived message credibility as mediator between evidence format and smoking cessation intentions. Evidence format was coded as 1 = exemplar appeal, 2 = statistical appeal. The numbers reflect standardized regression coefficients obtained through simple and subsequent multiple regression analysis. For the final model,  $R^2 = .18$ . Numbers in parentheses denote standard errors. Significance:  $**p < .01$ .



**Figure 4.** Perceived message value as mediator between evidence format and smoking cessation intentions. Evidence format was coded as 1 = exemplar appeal, 2 = statistical appeal. The numbers reflect standardized regression coefficients obtained through simple and subsequent multiple regression analysis. For the final model,  $R^2 = .15$ . Numbers in parentheses denote standard errors. Significance:  $*p < .05$ ;  $**p < .01$ .

relationship between evidence format and intentions was reduced to non-significance in models that included either perceived message value ( $\beta = .05$ ,  $p > .05$ ) or perceived message value ( $\beta = .12$ ,  $p > .05$ ; see Figures 3 and 4). Thus, both message judgment variables fully mediated the relationship between evidence format and smoking cessation intentions.

## Methods—Study 2

### Design and Procedure

Study 2 examined the impact of exemplar versus statistical appeals within the context of mammography screening. In total, 205 women were recruited from various universities,

health care facilities, and women's organizations throughout the Madurai, Tirupati, and Udaipur regions of India. Consistent with prior research (e.g., Banks et al., 1995; Gallagher, Updegraff, Rothman, & Sims, 2011), the women were at least 40 years old and had never been diagnosed with breast cancer. In addition, the sample reflects the recommendation offered by the American College of Obstetricians and Gynecologists (ACOG) that women aged 40 years and older start having a mammogram annually. Three field researchers were recruited from Madurai, Tirupathi, and Udaipur to facilitate coordination of the survey work.

An English-language questionnaire containing all study measures and experimental stimuli was translated into Hindi language by a bilingual expert and was back-translated in English to ensure accuracy. Participants were allowed to choose whether the survey was administered in English or Hindi. Participants were compensated Rupees 50 for participating in the study. Questionnaires containing all study measures as well as experimental stimuli were mailed to participants in a sealed envelope. Subjects were instructed to hand the completed questionnaires and consent forms to the field researcher or to mail them back to the researcher in the stamped, addressed envelope provided.

Forty-eight percent of the participants reported being 40–44 years of age, with an additional 31% reporting being 45–49 years old. Roughly 21% of participants reported being 50 years or older. The majority of participants had completed an undergraduate education (89%). In addition, the majority of participants (60%) had never had a mammogram, and 80% indicated they had no family history of breast cancer.

### Experimental Stimuli

Similar to Study 1, each treatment contained the identical basic information about encouraging mammography screening and a headline “Why Should You Get a Mammogram?” with evidence presented in either exemplar or statistical form.



The treatments were adapted from previous research (Cox & Cox, 2001) to fit the Indian context.<sup>3</sup> The exemplar treatment briefly described a woman named Poonam with no family history of breast cancer whom does not follow guidelines for getting annual mammography screenings at age 40. Therefore, doctors are unable to detect her cancer at an earlier stage. The statistical treatment centered on aggregate data of breast cancer incidences in India. This message concluded by noting higher mortality rates for women in their 40s and 50s who fail to get annual screenings when they turn forty.

## Measurement

With the exception of mammography screening intentions (described in the following), all measures used were identical to those employed in study 1. Reliabilities for cognitive processing ( $M = 5.16$ ,  $SD = 1.34$ ,  $\alpha = .84$ ), attention ( $M = 4.85$ ,  $SD = 1.51$ ,  $\alpha = .88$ ), perceived message credibility ( $M = 5.03$ ,  $SD = 1.19$ ;  $\alpha = .75$ ), and perceived message value ( $M = 4.80$ ,  $SD = 1.66$ ;  $\alpha = .88$ ) met acceptable standards.

## Mammography Screening Intentions

Mammography screening intentions were measured through the following items: "I intend to get my screening mammogram within the next 6 months" and "I intend to get my screening mammogram within next year." Responses could range from *strongly disagree* (1) to *strongly agree* (7). These items were adapted from previous research (Cox & Cox, 2001). Although the reliability for this scale was not ideal ( $\alpha = .66$ ), subsequent tests revealed no meaningful differences when comparing one combined measure versus treating these items as separate outcome variables. Consequently, the two items were summed together, then averaged to create an intention scale ( $M = 4.83$ ,  $SD = 1.72$ ).

## Manipulation Check

Identical to study 1, participants were asked to evaluate the degree to which they agreed or disagreed with each of two statements, measured from *strongly disagree* (1) to *strongly agree* (7). Participants who read the statistical message ( $M = 5.55$ ,  $SD = 1.57$ ) reported a significantly higher mean on the statement "The ad focuses primarily on factual statistics" than participants who read the narrative message ( $M = 4.45$ ,  $SD = 1.84$ ),  $t(202) = 4.58$ ,  $p < .001$ . Similarly, participants who read the narrative message ( $M = 4.27$ ,  $SD = 1.86$ ) reported a significantly higher mean on the statement "The ad focuses primarily on a personal example or testimony" than those who read the statistical message ( $M = 3.18$ ,  $SD = 1.72$ ),  $t(203) = -4.36$ ,  $p < .001$ .

## Results—Study 2

### Preliminary Analyses

Preliminary tests were run to assess whether any of the demographic measures (age, education, prior mammography

screening, and family history) correlated with mammography intentions. Results showed that none of these measures was associated with mammography intentions. Thus, they were not included in any further analyses. Table 1 provides a breakdown of the intercorrelations across all central study variables (see correlations above the diagonal). These preliminary findings indicate statistically significant associations across all but two relationships.

A follow-up multiple analysis of variance (MANOVA) with evidence format (statistical vs. exemplar) as the between-subjects factor was run to address participants' general responses to the various dependent variables. Results revealed a significant main effect of evidence format Wilks's  $\Lambda = .89$ ,  $F(5, 198) = 4.70$ ,  $p < .01$ , partial  $\eta^2 = .11$ . Follow-up independent-sample  $t$ -tests were run to explore differences in message responses/judgments and intentions across conditions. The results of those tests are described in the following.

### Health Intentions Across Evidence Format

Research question 1 explored whether differences existed in mammography screening intentions across evidence format. Results showed that those exposed to statistical appeals reported significantly higher levels of mammography screening intentions ( $M = 5.22$ ,  $SD = 1.71$ ) than participants in the exemplar condition ( $M = 4.45$ ,  $SD = 1.65$ ),  $t(203) = 3.26$ ,  $p < .01$ , partial  $\eta^2 = .05$ .

### Message Responses Across Evidence Format

Research question 2 and hypothesis 1 addressed how evidence format influenced participant response. Research question 2 explored the influence of evidence format on overall attention to the message. Results showed that the effect of evidence format on message attention was statistically significant,  $t(203) = 2.06$ ,  $p < .05$ , partial  $\eta^2 = .02$ . Average message attention levels were higher in the statistical condition ( $M = 5.07$ ,  $SD = 1.47$ ) than in the exemplar condition ( $M = 4.64$ ,  $SD = 1.53$ ).

Hypothesis 1 predicted that statistical appeals would lead to greater cognitive processing than exemplar appeals. Results showed that mean cognitive processing levels were not significantly higher in the statistical appeal condition ( $M = 5.18$ ,  $SD = 1.37$ ) than in the exemplar appeal condition ( $M = 5.13$ ,  $SD = 1.31$ ),  $t(203) = .26$ ,  $p > .05$ . Thus, hypothesis 2 was not supported.

### Message Judgments Across Evidence Format

Research question 4 examined whether evidence format influenced participant judgments toward the message. Two separate analyses were conducted involving either perceived message credibility or perceived message value as the outcome variable. Results from the first analysis showed that statistical appeals ( $M = 5.27$ ,  $SD = 1.07$ ) were perceived as significantly more credible than exemplar appeals ( $M = 4.79$ ,  $SD = 1.26$ ),  $t(203) = 2.94$ ,  $p < .01$ , partial  $\eta^2 = .04$ . Results from the second

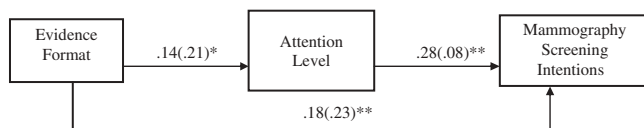
<sup>3</sup>The full text of stimuli used for mammography screening stimuli is available upon request to the corresponding author.

analysis showed that statistical appeals ( $M = 5.12$ ,  $SD = 1.64$ ) were perceived as having more value than exemplar appeals ( $M = 4.49$ ,  $SD = 1.63$ ),  $t(202) = 2.76$ ,  $p < .01$ , partial  $\eta^2 = .04$ .

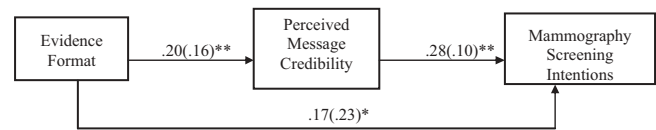
### Mediation Analyses

The researchers utilized identical procedures as study 1 to test mediation effects. The lack of significant differences in cognitive processing across evidence format indicates that cognitive processing did not mediate the effect of appeal format on intentions. Thus, hypothesis 2 was not supported. Preliminary correlation analyses were run to explore links between other proposed mediators and intentions. Results showed that message attention ( $r = .30$ ,  $p < .01$ ), perceived message credibility ( $r = .31$ ,  $p < .01$ ), and perceived message value ( $r = .31$ ,  $p < .01$ ) were all significantly associated with mammography screening intentions. The first test examined message attention as a mediator between evidence format and intentions (research question 3). Results of bootstrapping analysis showed that the indirect relationship between evidence format and mammography screening intentions through message attention ( $\beta = .04$ ; 95% confidence interval: .004–.09;  $R^2_{\text{med}} = .02$ ) was statistically significant. However, subsequent multiple regression analysis indicated that the relationship between evidence format and intentions remained significant ( $\beta = .18$ ,  $p < .01$ ) when attention was included in the model (see Figure 5). This reflects only a partial mediation effect.

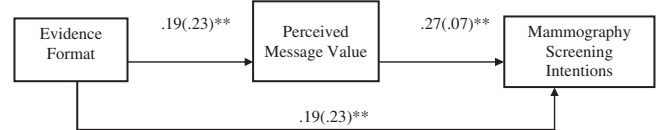
The second test of research question 5 examined how message judgments mediated the relationship between evidence format and mammography screening intentions. Results showed that perceived message credibility ( $\beta = .06$ ; 95% confidence interval: .02–.12;  $R^2_{\text{med}} = .02$ ) and perceived message value ( $\beta = .05$ ; 95% confidence interval: .01–.11;  $R^2_{\text{med}} = .02$ ) significantly carried the indirect effect of evidence format on intentions. Consistent with the described results, follow-up multiple regression analyses showed that the relationship between evidence format and intentions remained significant when either perceived message credibility ( $\beta = .17$ ,  $p < .05$ ) or perceived message value ( $\beta = .19$ ,  $p < .01$ ) was included in the model (see Figures 6 and 7). This indicates that message judgments partially mediated the relationship between evidence format and mammography screening intentions.



**Figure 5.** Attention level as mediator between evidence format and mammography screening intentions. Evidence format was coded as 1 = exemplar appeal, 2 = statistical appeal. The numbers reflect standardized regression coefficients obtained through simple and subsequent multiple regression analysis. For the final model,  $R^2 = .13$ . Numbers in parentheses denote standard errors. Significance: \* $p < .05$ ; \*\* $p < .01$ .



**Figure 6.** Perceived message credibility as mediator between evidence format and mammography screening intentions. Evidence format was coded as 1 = exemplar appeal, 2 = statistical appeal. The numbers reflect standardized regression coefficients obtained through simple and subsequent multiple regression analysis. For the final model,  $R^2 = .12$ . Numbers in parentheses denote standard errors. Significance: \* $p < .05$ ; \*\* $p < .01$ .



**Figure 7.** Perceived message value as mediator between evidence format and mammography screening intentions. Evidence format was coded as 1 = exemplar appeal, 2 = statistical appeal. The numbers reflect standardized regression coefficients obtained through simple and subsequent multiple regression analysis. For the final model,  $R^2 = .13$ . Numbers in parentheses denote standard errors. Significance: \*\* $p < .01$ .

### Post Hoc Analysis

Unlike study 1, results from study 2 showed that evidence format remained a significant predictor of intentions in all mediation tests. Based on these results, a final multiple regression analysis was performed to assess whether evidence format significantly predicted intentions after controlling for all message response and message judgment variables. Results from this final model showed that evidence format ( $\beta = .16$ ,  $p < .05$ ) remained a significant predictor of mammography screening intentions. Of note, cognitive processing ( $\beta = .18$ ,  $p < .05$ ) and perceived message credibility ( $\beta = .17$ ,  $p < .05$ ) were the only other variables to contribute significant unique variance to the model,  $R^2 = .22$ ,  $F(5, 198) = 10.83$ ,  $p < .01$ .

### Discussion

The goal of this study was to identify whether statistical or exemplar appeals have a greater positive effect on the health intentions of Indian participants. Within this investigation, we addressed how evidence format elicits different message responses and perceptions of message effectiveness. Results drawn from two investigations testing the impact of high-risk arguments indicated statistical appeals led to higher levels of mammography screening intentions and smoking cessation intentions than exemplar appeals (see Table 2 for summary of findings). In addition, statistical appeals consistently produced higher levels of attention and were perceived as more effective than exemplar appeals. Statistical appeals addressing smoking risk also generated higher levels of cognitive processing than exemplar appeals. In both studies, mediation results showed that message response and message judgment acted as precursors to changes in health intentions. This was most

**Table 2.** Summary of mean differences in health intentions across evidence type conditions—Study 1 and Study 2.

Variable	Statistical	Exemplar	t Value
Intentions			
Smoking cessation	4.45	3.81	2.21*
Mammography screening	5.22	4.22	3.26**
Attention			
Smoking cessation	4.72	4.22	1.92 <sup>†</sup>
Mammography screening	5.07	4.64	2.06*
Cognitive processing			
Smoking cessation	5.20	4.54	3.09**
Mammography screening	5.18	5.13	.26
PMC			
Smoking cessation	5.43	4.56	4.19**
Mammography screening	5.27	4.79	2.94**
PMV			
Smoking cessation	4.65	4.07	2.21*
Mammography screening	5.12	4.49	2.76**

Note. PMC = perceived message credibility; PMV = perceived message value.

<sup>†</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ .

pronounced in the smoking cessation investigation, where results showed that all message response and message judgments variables fully mediated the relationship between appeal format and intentions to quit.

## Implications

### Theoretical Perspectives

Although prior findings do not indicate any consistent superiority of one evidence type over the other, the current investigation suggests that among Indian populations, statistical appeals may be more persuasive than exemplar appeals. These differences may partially be explained by participant reaction to differently formatted messages. In both studies, participants reported higher levels of attention to statistical appeals, and perceived these messages as more credible and of greater value than exemplar appeals. Greater attention toward statistical appeals suggests that while exemplar appeals facilitate greater identification and emotional interest than statistical appeals, this may not equate to broader interest and concentration towards the persuasive argument. Furthermore, statistical appeals related to smoking cessation generated significantly higher levels of critical message processing than exemplar appeals. While, theoretically, critical message processing can lead to greater message scrutiny, when comparing the persuasive effectiveness of evidence format it appears that any negative thoughts smokers had toward the statistical message were outweighed by positive outcomes.

Importantly, the messages stressed negative consequences of failing to adhere to the recommended action, with the manipulation centering on evidence format. Given the greater affective response associated with exposure to exemplar appeals (Kopfman et al., 1998), it is likely that exposure to anecdotal accounts of people experiencing negative outcomes may result in greater negative emotion. This could possibly result in greater defensiveness/resistance than exposure to statistical appeals. For example, one previous study comparing positively versus negatively framed health messages found that positively framed appeals elicited lower levels of psychological reactance than negatively framed appeals (Reinhart, Marshall, Feeley, & Tutzauer, 2007). However, prior research has also found that exemplar appeals highlighting negative

outcomes generate greater perceived risk than exemplar appeals centering on positive outcomes (Yu, Ahern, Connolly-Ahern, & Shen, 2010). Consequently, exemplar appeals may be even less effective than statistical appeals when framed positively than negatively.

While prior investigations have identified conditions by which evidence format appeals are more or less effective (e.g., Braverman, 2008; Cox & Cox, 2001; Gray & Harrington, 2011) few studies (Slater & Rouner, 1996) have explored processes leading from appeal exposure to persuasive effects. The results from the current investigations strongly suggest that when exploring the impact of evidence format on health intentions, judgments of perceived message effectiveness act as a central precursor to persuasive effects. This extends previous research (Dillard et al., 2007) to the investigation of evidence format appeals. In addition, by examining the results within an Indian population, we provide more generalized support for the value of perceived message effectiveness. In both studies, statistical appeals were perceived as more effective than exemplar appeals, and through these more favorable message judgments, evidence format indirectly influenced health intentions.

### Practical Perspectives

Extending research on evidence format to a non-Westernized nation such as India is vital, given the continued growth coinciding with increased public health concerns. Because statistical appeals seem to facilitate greater persuasive effects than exemplar messages, public health campaigns in India should concentrate on integrating factual evidence and percentages to highlight risk factors and treatment effects. In addition, given that message responses play a critical role in ultimate persuasive effects, the public health community must continue to explore message design strategies that enhance both message engagement and critical message processing.

Finally, results of these two investigations support broader arguments concerning the critical need for health communication interventions to establish that public service announcements are sufficiently effective (Fishbein, Hall-Jamieson, Zimmer, von Haeften, & Nabi, 2002). Ensuring that persuasive appeals are perceived as credible, important, and useful is central to subsequent behavior change. Working with members of target populations to design effective health messages should contribute to enhancing the power of these appeals.

### Limitations and Future Research

A key limitation of this study was the strict focus on negative consequences resulting from failure to adhere to a recommended health action. In an attempt to isolate the main effect of evidence format and make clearer comparisons across two studies, we chose not to include messages highlighting the positive outcomes of engaging in healthy behaviors (i.e., gain-framed appeals). While this prevents the confounding influence of message framing, it also weakens the ability to make broader assertions about the impact of evidence format across various message formats. Prior research indicates significant interactions between evidence format and message framing (e.g., Cox & Cox, 2001; Yu, Ahern, Connolly-Ahern, & Shen,

2010). Consequently, future researchers examining the impact of evidence format among similar populations should consider exposing participants to a greater variety of messages.

In addition, the content within the statistical appeal condition highlighted the words “death/die” multiple times, whereas the exemplar message simply mentioned “missing out” on future experiences. To remain consistent with previous evidence type research, we applied stimuli obtained from a previous mammography-screening investigation (Cox & Cox, 2001). In that previous study, no significant differences were found across evidence type condition. However, this does not rule out the possibility that the content contained within the statistical message may generate greater fear and/or mortality salience than the exemplar content, subsequently leading to stronger persuasive effects. Subsequent investigations should perform extensive pilot testing to address this potential confounding issue.

Third, this study did not explore any emotional responses to messages. Prior research indicates that affective response may play an influential role in explaining the persuasive impact of exemplar appeals (Kopelman et al., 1998). Consequently, future investigations should explore how affective response mediates the relationship between evidence format and health intentions.

Fourth, participants completed the study outside of a controlled laboratory. This approach limits the ability to control for any extraneous factors that could bias participants' responses. While this approach is less “artificial” than a controlled laboratory experiment, we cannot rule out additional variables that may have influenced these results.

Fifth, similar to prior investigations, the researchers prompted participants to read content. This does not reflect typical voluntary or accidental exposure to persuasive messages. Although the majority of research testing evidence type manipulations has employed prompting and/or forced exposure, one recent cross-cultural analysis assessing selective exposure to magazines found that participants read more exemplar messages than statistical messages (Hastall & Knobloch-Westerwick, 2013). The researchers in that study note that this less obtrusive observation of participants health information exposure is not reliant on factors such as self-report (utilized in this study), and therefore, participants are less prone to social desirability bias. Furthermore, while manipulation check items were necessary for determining whether participants perceived differences in evidence formats, asking individuals to consciously think about the format of messages may have encouraged thinking about the quality of the arguments presented. This could have led to greater persuasive effects in the statistical versus exemplar condition. Overall, to make more generalizable claims regarding the efficacy of these different types of evidence format, future studies must examine participants' natural exposure to persuasive appeals.

Sixth, participants were asked to read material presented strictly in print format. Prior researchers have argued that audio exemplars are more vivid than exemplars presented in print, thus impacting persuasive effects (Brosius & Bathelt, 1994). In support of these arguments, a recent investigation (Braverman, 2008) showed that informational appeals were

more influential than testimonials when presented in print format, while testimonials were more persuasive than informational appeals when presented via audio. Other research has found no differences in persuasive effects after exposure to videotaped messages (Limon & Kazoleas, 2004). Clearly, future researchers should attempt to replicate the findings of the current investigation across other modalities (e.g., audio, audiovisual).

Finally, the uniqueness of this sample makes it difficult to generalize findings to other populations. In particular, smoking cessation intentions were assessed strictly among Indian men. Although smoking rates are substantially lower among Indian women, recent reports show that rates among this population is rising (Ng et al., 2014). Similarly, the majority of participants reported obtaining at least an undergraduate degree. Based on greater knowledge and/or resources, individuals with higher levels of education may be influenced more strongly by messages providing statistical and other factual information than by messages referencing case-study accounts. Follow-up investigations should examine the influence of evidence type across a more diverse range of demographic populations.

## Conclusion

In two separate investigations, we examined the persuasive effectiveness of statistical and exemplar appeals on Indian adults' mammography screening and smoking cessation intentions. Results showed that statistical appeals led to higher levels of health intentions than exemplar appeals. In addition, in both studies statistical appeals stimulated more attention, and were perceived as more effective than anecdotal accounts. Among male smokers, statistical appeals also generated greater cognitive processing than exemplar appeals. Subsequent mediation analyses revealed that message response and perceived message effectiveness fully carried the influence of evidence format on health intentions. Given these conclusive results, future public health initiatives conducted among similar populations should design messages that include substantive factual information while ensuring that this content is perceived as credible.

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