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PARADOXICAL EFFECTS OF MEDIA EXPOSURE: ROLE OF COMMUNICATION PROCESSES IN SHAPING MEDIA EFFECTS OVER TIME

THOMAS A. MORTON AND JULIE M. DUCK

Theories of media effects generally agree that exposure alone is not sufficient to produce media effects. Psychologically oriented models suggest that media effects are most likely when audiences are involved with the issues and engage in effortful processing of message content. Communication-oriented theories suggest that media effects are facilitated when people hold positive expectancies about media content and when media content stimulates secondary interpersonal communication. The aim of this research was to explore the interplay among these three variables — issue involvement, expectancies about media content, and interpersonal communication. Although all three variables were found to shape media impact, their combined effects were not straightforward. Instead, the data point to a complex, and somewhat paradoxical, interplay among psychological and communication processes. More generally, the results point to the value of integrating psychological and communication processes to provide a more complete understanding of the pathways to media effects.

Keywords: mass communication, interpersonal communication, media effects, risk perception, breast cancer

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Public health practitioners make considerable use of the mass media to disseminate messages in attempts to change individual health-related beliefs, attitudes, and behaviors (e.g., about the risks associated with smoking and alcohol consumption, or the benefits of adopting a low-fat diet and regular exercise). This reflects a level of faith in the power of the media to influence. However, evidence for such power remains equivocal. Evaluations of communication campaigns have continually shown limited direct effects on individual outcomes (Atkin & Wallack, 1990; Hornik, 1997; Snyder, 2001). At best, the media have been shown to be quite successful at increasing broad issue awareness. Changes in individual thoughts and actions are likely to be contingent on factors other than exposure to the media alone (Atkin & Wallack, 1990; Lapinski & Witte, 1998; Tyler & Cook, 1984).

To understand the apparent 'failure' of the media, both social psychological and communications theories have a clear application. Social psychological models emphasize the role of individual psychological responses to specific messages in shaping their acceptance or rejection. In contrast, more communication-oriented theories of media influence have emphasized the role of the media in individual lives, and in society more generally, and the subtle and indirect paths through which media influence may eventuate over time. In recent years, there has been some cross-fertilization of social-psychological and communication approaches. In particular, frameworks borrowed from psychology have become increasingly prominent in the media effects literature (e.g., Scheufele, 2000; Shrum, 2002). The reverse cross-fertilization, however, has proved less apparent. That is, in the domain of media effects the study of distinctly communication processes (e.g., interpersonal or societal) has tended to recede in favor of the study of more intrapersonal processes (e.g., attention and cognitive processing).

Although there have been some attempts to integrate psychological and communication accounts, particularly in the context of health (e.g., Cappella, Fishbein, Hornik, Ahern, & Sayeed 2001; Fishbein & Capella, 2006; Griffin, Dunwoody, & Neuwirth, 1999), again these have tended to privilege psychological processes and have treated distinctly communication processes as secondary in the production of media effects. As a result, the traditional divide between communication and psychological approaches (Wartella & Middlestadt, 1991) in many respects remains. This is unfortunate because the individual, psychological, effects of exposure to media content are embedded within, filtered through, and changed by additional processes of communication, most notably discussion within interpersonal networks (e.g., David, Capella, & Fishbein, 2006; Southwell & Yzer, 2007). This paper reports the results of one study from a program of research designed to integrate social psychological and communication processes through examining the interplay between media exposure and interpersonal communication in the context of health risk perception (see Morton & Duck, 2001, 2006). Before outlining the current research, the dominant psychological and communication approaches to media effects are briefly summarised.

MEDIA EFFECTS FROM A PSYCHOLOGICAL PERSPECTIVE

The dominant psychologically-oriented framework for understanding media effects is informed by theoretical models of persuasion (e.g., elaboration likelihood model, or ELM: Petty & Cacioppo, 1986; heuristic-systematic model, or HSM: Eagly & Chaiken, 1993). These argue that attitude change in response to any form of persuasive message, mass-mediated or otherwise, is contingent on the amount and type of thinking the message elicits from its audience. Both the ELM and HSM outline two possible paths via which persuasion can occur — labeled the central and peripheral routes within the ELM, and the systematic and heuristic processing in the HSM.

The central/systematic route to attitude change results from careful consideration of the arguments contained within a message. When message processing is conducted in this way, strong, well-constructed arguments should elicit favorable evaluations from the target and further thinking (i.e., elaboration) in support of the advocated position. In comparison, weak arguments should generate unfavorable evaluative responses and movement away from the advocated position.

The peripheral/heuristic route to attitude change is guided by the cues that accompany the message (e.g., the number of arguments presented or the likeability of the source: Petty, Cacioppo, & Schumann, 1983), or informed by simple decision-making rules (heuristics, e.g., 'experts always know best'), rather than specific message content. When message processing is conducted this way, favorable cues should lead to acceptance of the message and unfavorable cues to message rejection. Because peripheral processing is not associated with elaboration of message arguments, resultant attitude change is thought to be less stable, less enduring, and less predictive of behavior than change resulting from central route processing (Petty, Haugtvedt, & Smith, 1995). Conversely, central processing involves deeper consideration of the persuasive arguments and should lead to more lasting changes in individual beliefs, attitudes and behavior.

Whether message processing is conducted in an effortful (i.e., central/systematic) or effortless (i.e., peripheral/heuristic) manner depends on the individual's ability and motivation to process message content (for reviews see Johnson & Eagly, 1989; Petty, Wegener, & Fabrigar, 1997). When ability is impaired (e.g., under time pressure or when distracted: Moore, Hausknecht, & Thamodaran, 1986; Baron, Baron, & Millar, 1973), peripheral cues or judgmental heuristics are more likely to guide individual thinking than the specific contents of the message. However, even when abilities are not impaired, effortful processing still might not occur because people generally prefer to use the least possible effort to reach judgmental confidence (Chaiken, Liberman, & Eagly, 1989). Thus, for people to engage in effortful processing, a degree of motivation must also be present. Personal involvement with the issues being communicated increases the motivation to form an accurate judgment and the likelihood of engaging in effortful consideration of message

content (e.g., Axsom, Yates, & Chaiken, 1987; Johnson, 1994; Johnson & Eagly, 1989; Petty & Cacioppo, 1984; Petty et al., 1981). Of course, high involvement can be a double-edged sword if it instead heightens feelings of threat and triggers defensive processing and rejection of self-relevant messages (Liberman & Chaikem, 1992).

In sum, according to the persuasion perspective, successful influence via the media is contingent on some match between the characteristics of the audience and the features of specific media messages (see Briñol & Petty, 2006). Lasting media effects should be enhanced when high quality messages are delivered to audiences who are sufficiently motivated to engage in deeper thoughtful consideration of the message content. Thus, attempts to influence via the media succeed or fail largely at the point of message reception.

MEDIA EFFECTS FROM A COMMUNICATION PERSPECTIVE

In contrast to the psychological approaches outlined above, communication scholars have tended to take a broader perspective on the question of media effects, and have considered the subtle ways in which media messages filter through society and become influential, if only indirectly. After early demonstrations of limited direct effects of the media, communication researchers shifted the focus away from the power of the media to the power of the audience. This audience-centered perspective is evident in two of the more long-standing theoretical traditions in media scholarship: the two-step flow hypothesis and its derivatives, and research on media orientations. Each of these is briefly summarized below.

The earliest systematic studies of communication campaigns revealed that the power of the media was limited in the face of strong and often competing influences via interpersonal channels (Lazarsfeld, Berelson, & Gaudet, 1944). When making decisions, ordinary people were found to give preference to advice from interpersonal contacts rather than information gleaned from the mass media (Katz & Lazarsfeld, 1955). However, this research also revealed that media messages could provide the basis for interpersonal discussion and influence within interpersonal networks and thus become indirectly influential via a 'two-step flow' (Katz, 1957). The two-step flow is, perhaps, one of the most influential ideas within the communications literature and has become a reference point to which much subsequent theoretical development can be traced (Katz, 1987). Diffusion of innovations theory (Rogers, 1995; Rogers & Shoemaker, 1971), in particular, can be seen as a direct elaboration of these concepts (Severin & Tankard, 2001).

Diffusion theory places communication at the center of the process of innovation and change. Communication is conceived of as the process through which information is exchanged, meaning is constructed, and ambiguity is resolved (Rogers & Kincaid, 1981). According to this perspective, different communication channels make them differentially suited to satisfying individual needs for information, validation and uncertainty reduction.

In particular, the diffusion framework argues that media channels are best suited for satisfying broad informational needs, and thus predicts that media exposure should be most strongly correlated with information-based indicators of change (e.g., awareness, knowledge). In comparison, interpersonal channels are thought to be best suited to validating information and reducing uncertainty, and thus the theory predicts that exposure to interpersonal communication should be more predictive of actual behavior (Valente & Saba, 1998).

Whereas the two-step flow highlights the embedded-ness of individual audience members, research on media orientations has elaborated further on the individual differences that might lead to heightened engagement with the media. For instance, both uses and gratifications (Katz, Blumler, & Gurevitch, 1974) and media system dependency theories (Ball-Rokeach, 1985, 1998; Ball-Rokeach & DeFleur, 1976) suggest that audiences are variably active *users* of the media, rather than simply passive recipients of media messages. Both these perspectives predict that individuals will selectively expose themselves to media content, and attend more closely to such content, to the extent that they perceive the media to be a useful source of goal satisfaction (e.g., Elliot & Rosenberg, 1987; Grant, Guthrie, & Ball-Rokeach, 1991). Consequently, media effects are most likely when people hold positive expectancies about the media's capacity to satisfy individual goals (Ball-Rokeach et al., 1984; Grant et al., 1991; Morton & Duck, 2000; Tsfati, 2003), and to the extent that media content is actually successful in satisfying these goals (Skumanich & Kintsfather, 1998).

In sum, according to these communication perspectives, media effects are framed by processes that occur before and after the instant of media exposure. Specifically, media effects are most likely when individuals hold positive expectancies about the media content, and thus seek out, and attend to, media content to satisfy their goals. Moreover, individual change should be further enhanced when media exposure precipitates secondary diffusion via interpersonal channels. This perspective suggests that the success or failure of attempts at media influence rests much less in the specific moment of message reception. Instead, media influence is located within a broader communication process and is contingent on factors that precede and follow instances of media exposure.

THE CURRENT RESEARCH

Different theoretical approaches provide different accounts of media influence and identify factors that are likely to facilitate or inhibit this — they differ in the dependent variables of interest, the process used to explain attitude and behavior change in response to media messages, and the methods of investigation. However, they can also be seen to provide complementary, rather than competitive, accounts of the process of change (Slater, 1999). For example, most approaches draw attention to the importance of selectivity in guiding individual responses to media messages, although they differ in where selectivity

is located — in response to match between individual involvement with the issue of communication and specific qualities of media messages, or in the match between broad individual goals and what the media offers in relation to these. Both approaches also suggest that communications have a greater chance of success when they trigger further activity from their audience. Again, the difference lies in how activity is described — as something that occurs within the individual's head (i.e., cognitive elaboration) or as a process of exchange between people (i.e., interpersonal communication).

Past research has demonstrated some across-domain linkages between some of these concepts. For instance, both broad orientations toward the media (Morton & Duck, 2001), and specific responses to media messages (Morton & Duck, 2006) have been found to influence patterns of interpersonal communication, which, in turn, determine the nature and extent of media effects. To date, however, this research has been correlational, rendering causality a moot point. In addition, research has yet to consider how these different processes operate in combination. That is, do general positive orientations toward media content, specific involvement with the issues of communication, and post-exposure interpersonal communication all independently increase the likelihood of observing media effects? Or, is there a more complex interplay to be observed? The present research was designed to examine this possibility.

The current research involved an experimental test of the effects of a single instance of exposure to a video about breast cancer on women's beliefs about breast cancer risk over time. The specific video used in this study contained a clear message about the role of hereditary factors in determining breast cancer risk. We predicted that exposure to this message, alone, would not be sufficient to influence women's perceptions of risk for breast cancer. Consistent with theories of persuasion, media effects should at a minimum be dependent on women's personal involvement with this issue being communicated (Hypothesis 1). Given that the media message used in this study was about hereditary factors and breast cancer risk, we expected that women with a personal or family history of breast cancer (i.e., high issue involvement) would be affected by exposure more than women with no prior experience of breast cancer and no relevant family history (i.e., low issue involvement).

Communication theories also predict that media exposure alone is insufficient to produce media effects. Theories of media use suggest that media effects should be greatest among those who have developed positive expectancies about the utility of media content for goal satisfaction (Hypothesis 2). Among those who perceive less utility of media content, exposure to media content should have little effect. Theories of two-step flow and diffusion further suggest that for the effects of media exposure to extend beyond broad issue awareness, it is necessary for media messages to stimulate secondary interpersonal communication within social networks. Thus we predicted that any effects of media exposure on women's perceptions of their own personal risk for breast cancer should be

mediated through post-exposure interpersonal communication about breast cancer (Hypothesis 3).

Beyond these theory-specific predictions, we were interested in the possible across-theory interactions among individual issue involvement, broad orientations toward the media, and interpersonal communication about media content in shaping media effects over time. However, precise predictions about this interplay are difficult to derive. On the one hand, there seems to be some overlap between individual involvement with the specific issues (i.e., the topic of communication) and individual involvement with the media (i.e., media orientations). As such, the effect of one of these variables might 'drop out' once the other is taken into account. Alternatively, these variables may independently moderate the effects of media exposure, with both issue involvement, and involvement with the media increasing the probability of media effects.

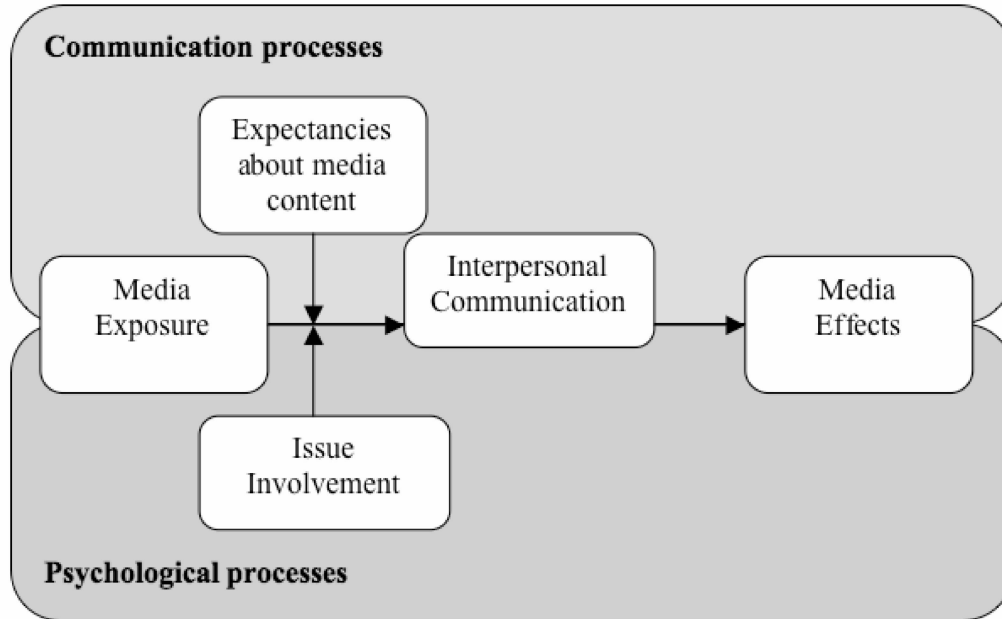
Finally, a more complex interplay is also possible. Orientations toward the media might act as peripheral cue that guides the acceptance of message content but only when issue involvement is low. When involvement is high, message content rather than orientations toward the source could be expected to be more important. Indeed, such a pattern would be consistent with psychological models of persuasion, which predict different effects of message cues under conditions of low and high involvement (Petty et al., 1997). If media orientations are, indeed, a peripheral cue, their effects should be fairly short lived (i.e., limited to the immediate context of exposure), whereas the effects of issue involvement should be more enduring and evident across time. Given the speculative nature of these predictions, this aspect of the research was treated as exploratory (Research Question 1). The basic model being investigated in this research is depicted graphically in Figure 1.

METHOD

Participants and Design

In this study, participants were surveyed at three time points across a six-week period between March and May 2002. At Time 1, participants completed a brief background questionnaire to determine their experience with the issue of breast cancer, as well as their baseline exposure to breast cancer information. Three weeks later, at Time 2, participants in an experimental group were exposed to a video stimulus before completing key dependent measures. Participants in the control condition completed the dependent measures without any exposure to media content. Three weeks later, at Time 3, all participants returned to complete a final follow-up questionnaire assessing interpersonal communication about breast cancer and the dependent measures. A summary of the research design is presented in Table 1.

Figure 1: Communication and psychological factors leading to media influence



An initial sample of 103 female undergraduate students was recruited at Time 1. Of these, two women indicated that they worked in the area of breast cancer treatment and were excluded from the sample. At Time 2, a sub-sample of 95 women returned and was randomly assigned to either a media-exposure experimental condition ($n = 53$) or a no-exposure control group ($n = 42$). All participants who were present at Time 2 returned again at Time 3. Analyses were conducted on the sub-set of women who completed measures at all three testing sessions. These women ranged in age from 17 to 59 years ($M = 22.44$ years, $SD = 7.26$). Two women identified as being of Aboriginal or Torres Strait Islander heritage and a further 28 identified as belonging to some ethnic group other than Anglo-Australian (e.g., Chinese, Greek, Muslim, Hindu). Participants received course credit in return for their involvement in the study.

Measures and Procedure

At Time 1, all participants completed a questionnaire designed to assess experience with and knowledge about breast cancer, perceptions of media utility as a source of health information, and baseline perceptions of risk for breast cancer. At Time 2, participants in the experimental condition were exposed to and evaluated an issue-relevant video. All

Table 1. *Summary of research design and measures.*

Time 1	⇒	Time 2	⇒	Time 3
Demographics				
Baseline knowledge		Desire for more information		
Baseline media exposure				
Baseline interpersonal communication		Media exposure V. Control		Post-exposure interpersonal communication
Breast cancer experience (Low, High)				
Perceived media utility				
Perceived personal risk		Perceived personal risk		Perceived personal risk

participants then completed a questionnaire that assessed their perceptions of risk for breast cancer and perceived knowledge about breast cancer. At Time 3, participants completed a follow-up questionnaire that again measured the key dependent variable of perceived risk as well as interpersonal communication about breast cancer. A summary of the measured independent and dependent variables is summarized in Table 2.

Background measures. After reporting their age and ethnicity, participants indicated (yes/ no) whether they personally had any experience with breast cancer (e.g., been diagnosed with breast cancer, detected a lump on their breast, or had a breast cancer “scare”) and whether anyone in their immediate family (including siblings, mother, and grandmothers) had been diagnosed with breast cancer. Only nine women indicated any personal experiences with breast cancer, although 28 women reported that someone in their immediate family had experienced breast cancer. These items were used to classify respondents according to their direct experience with breast cancer. Those women who reported neither personal experience nor experience via their immediate family were

Table 2. *Summary of key measured independent and dependent variables.*

Variable	Items	Reliability
Direct experience	1. Have you had any personal experiences with breast cancer (e.g., been diagnosed with breast cancer, detected a lump on your breast, or had a breast cancer 'scare')? <i>No/ Yes</i>	Dichotomous: 0 = No experience 1 = Direct or family experience
	2. Has anyone in your immediate family (e.g., siblings, parents, grandparents, been diagnosed with breast cancer or had a breast cancer scare? <i>No/ Yes</i>	
Perceived media utility	How helpful do you think news and current affairs media are for: 1. Keeping up with important health issues 2. Understanding issues important to your own health 3. Observing how others cope with health issues that are relevant to you 4. Deciding where to go for services related to your own health 5. Deciding what health precautions to take 6. Getting ideas about how to approach others about important health issues 7. Staying on top of developments in health and medical science 8. Thinking about how to maintain your own health and well being <i>1 = Not at all helpful to 5 = Very helpful</i>	$\alpha = .85$
Perceived personal risk	1. How important an issue is breast cancer to you personally? <i>1 = Not at all important, 7 = Very important</i>	T1: $\alpha = .85$
	2. How worried are you about being affected by breast cancer sometime in the future? <i>1 = Not at all worried; 7 = Very worried</i>	T2: $\alpha = .85$ T3: $\alpha = .88$
	3. How likely is it that you personally will be affected by breast cancer sometime in the future? <i>1 = Very unlikely; 7 = Very likely</i>	
	4. How much risk do you personally feel from breast cancer? <i>1 = None at all; 7 = A great deal</i>	
Desire for more information	1. How interested would you be in learning more about breast cancer (e.g., causes, treatments, and prevention)? <i>1 = Not at all; 7 = Very much</i>	Single item
Interpersonal communication	1. In the weeks since the last session you attended, have you discussed the issue of breast cancer with anyone (e.g., friends, family, colleagues, health professionals)? <i>1 = No, not at all; 7 = A great deal</i>	Single item

classified as being low in direct experience ($n = 62$). The remainder, who reported either personal or family experience with breast cancer, were classified as high in direct experience ($n = 33$). This measure of direct experience served as our proxy for issue involvement.

On two 7-point items, participants indicated how informed they felt about breast cancer and how certain they were of the accuracy of their knowledge. Responses to these two items were subsequently combined and averaged to form a single composite measure of self-reported knowledge about breast cancer ($\alpha = .80$). Higher scores indicated greater self-perceived knowledge.

Participants then indicated how helpful (1 Not at all helpful, 5 Very helpful) they found news and current affairs media for satisfying a variety of health-related goals (see also Morton & Duck, 2000, 2001). Responses to these eight items were combined and averaged to form a composite index of perceived media utility ($\alpha = .85$). Higher scores reflected a stronger belief that the media were a useful source of health information.

To ensure that experimental and control groups did not differ in their baseline levels of exposure to breast cancer information, a series of items checked for exposure to breast cancer information via mass and interpersonal channels in the previous month. On a single 7-point scale, participants were asked to indicate whether breast cancer was an issue they had seen, read, or heard about in the media in the previous month. As an additional check, respondents who answered "yes" to this item were asked to describe what it was they had seen, read, or heard. Also on a 7-point item, participants were asked to indicate whether breast cancer was an issue they had discussed with anyone in the previous month. Again, if participants responded in the affirmative to this item, they were asked to describe who the conversation was with and what had been discussed.

Finally, on four 7-point scales adapted from past research (Morton & Duck, 2001, 2006) participants gave baseline estimates of their own personal risk for breast cancer. These items were combined and averaged to form a composite measure of personal risk ($\alpha = .85$) with higher scores indicating more risk.

Video stimulus. At Time 2, participants in the experimental condition were exposed to, and evaluated, an issue-relevant video stimulus. Participants in the no-exposure control group immediately completed the dependent measures. The video stimulus was a segment from a recent televised current affairs program that emphasized the high, and increasing, rate of breast cancer among Australian women, the possible genetic causes for breast cancer and the future availability of a genetic test for breast cancer (Breast Cancer Test, 1998). The video was approximately ten minutes in length and included interviews with experts, as well as ordinary women affected by breast cancer and their families. Pre-testing with a sample of women drawn from the same population ($N = 32$) revealed that this video was generally perceived to be effective ($M = 5.97$), good ($M = 5.24$), and credible ($M = 5.88$; all variables

measure on 7-point semantic-differential scales, all means differ significantly from the scale mid-point, $t_s > 4.22$, $p_s < .001$). Following exposure to the video, women were asked to indicate how relevant they thought the video content was to them personally (1 Not at all relevant, 7 Very relevant).

Dependent measures. At Time 2, participants again completed measures of personal risk ($\alpha = .85$) identical to those used at Time 1. Finally participants completed measures of perceived knowledge about breast cancer ($\alpha = .86$) and, on a single item, indicated the extent to which they would be interested in learning more about breast cancer.

Follow-up measures. Three weeks later, participants returned to complete a brief follow-up questionnaire that included measures of perceived personal risk ($\alpha = .88$) and self-perceived knowledge ($\alpha = .82$). In addition, participants were asked to report on any interpersonal communication about breast cancer that had occurred in the intervening weeks. Specifically, on a single item participants were asked whether, and how much, they had discussed the issue of breast cancer since the last experimental session (1 No, not at all, 7 Yes, a great deal).

RESULTS

Preliminary Checks

Prior to the main analysis, we checked whether the control and experimental conditions were roughly equivalent on all relevant variables. *T*-tests revealed no significant differences between experimental conditions on the basis of age, self-reported knowledge, or perceived media utility, all $t_s(93) < 1.68$. Minority participants were equally divided across the two conditions ($n_s = 14$ & 16 in the control and experimental conditions respectively). There were no differences between conditions in terms of baseline exposure to breast cancer information via interpersonal channels, or via the media, and no differences in initial perceptions of personal breast cancer risk all $t_s(93) < .90$, ns. There was also no association between condition (experimental versus control) and experience with breast cancer (high versus low), $\chi^2(1, N = 95) = 2.19$, ns. Finally, within the experimental condition, women high in direct experience ($M = 5.13$, $SD = 1.36$) perceived the video content to be more relevant to them personally than did women low in experience ($M = 4.08$, $SD = 1.18$), $t(52) = -2.83$, $p = .007$. This provides some support for our assumption that direct experience would be an appropriate indicator of issue involvement.

Table 3. Summary of regression analyses.

Step	Variable	T2 Personal risk		T2 Desire for Information		T3 Personal risk		T3 Interpersonal comm.	
		ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
1.	T1 control	.51***	.72***	.001	.02	.44***	.66***	.12***	.35***
2.	Condition	.02	.09	.01	.06	.00	.003	.09*	.25**
	Experience		.11		.07		-.03		.19*
	Media utility		.08		.04		.05		.09
3.	Cond X Exp	.01	.04	.01	.11	.03	.15	.03	.12
	Cond X Utility		-.01		.04		-.08		-.20
	Utility X Exp		-.10		-.10		-.13		-.06
4.	Cond X Exp X Utility	.00	-.06	.04+	-.32+	.02*	-.27*	.07***	-.45***
	R^2	.54***		.23		.49***		.55***	

Note: + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .005$

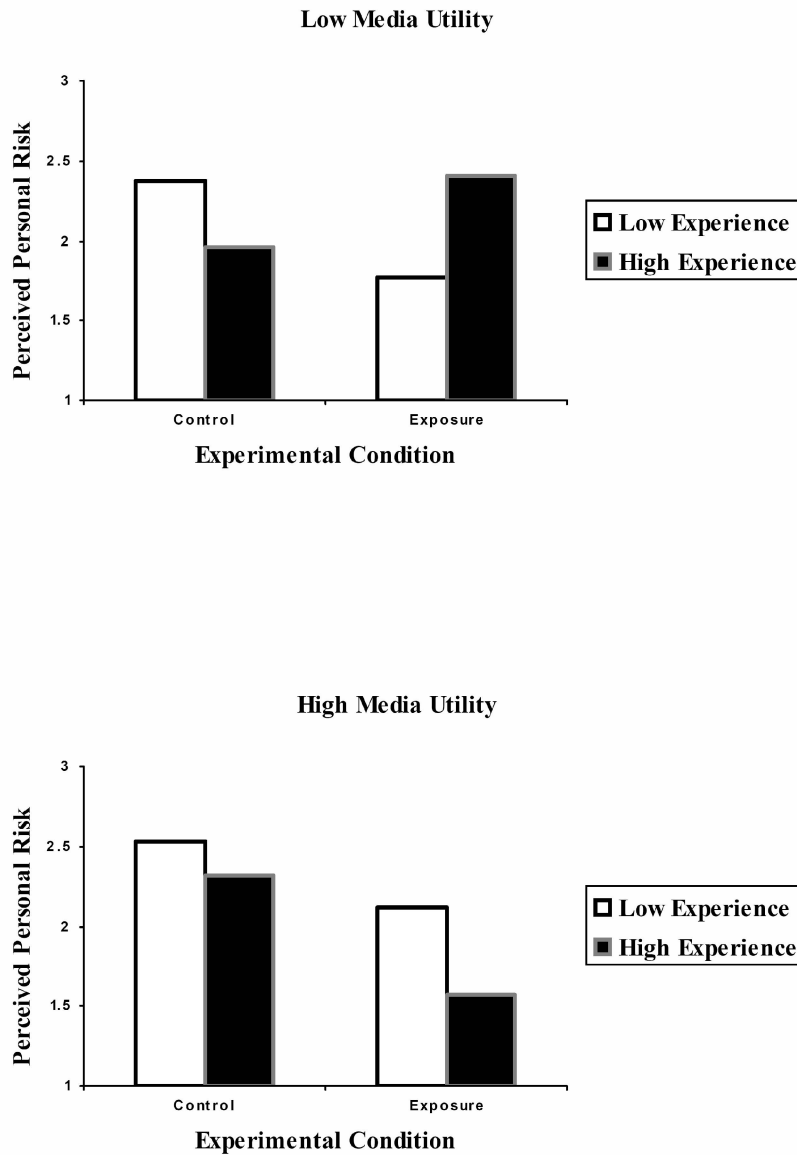
Primary Analyses

To examine the effects of media exposure, direct experience with breast cancer, and expectancies about media content (perceived media utility) in shaping media effects over time, a series of moderated hierarchical regression analyses were conducted to predict perceptions of personal risk (Times 2 and 3) and interpersonal communication (Time 3). In each of these analyses, Time 1 measures were controlled for at the first step. At Step 2, experimental condition (0 = control, 1 = exposure), direct experience (0 = low, 1 = high), and perceptions of media utility were entered as predictors. At Step 3, all possible two-way interactions among these predictors were entered, and at Step 4 the single three-way interaction was entered. In accordance with Aiken and West (1991) the continuous measure of media utility was centered prior to analysis, and significant interactions were graphed and explored using simple slope analysis. The regression output for these analyses is summarized in Table 3.

The equation predicting *Time 2 perceptions of personal risk* was significant, $R^2 = .54$, $F(8,86) = 12.69$, $p < .001$, however this was due solely to a significant main effect for Time 1 perceptions at the first step, $\Delta R^2 = .51$, $F_{ch}(1,93) = 97.89$, $p < .001$. There were no further significant main or interactive effects at subsequent steps.

When this model was used to predict *perceptions of personal risk at Time 3*, in addition to a significant main effect for Time 1 perceptions at the first step, $\Delta R^2 = .44$, $F_{ch}(1,93) = 72.07$, $p < .001$, the three-way interaction among experimental condition, direct experience, and perceptions of media utility emerged as significant at the fourth step,

Figure 2. The interaction between media exposure and direct experience on Time 3 perceptions of personal risk at low and high levels of perceived media utility.



$\Delta R^2 = .02$, $F_{ch}(1,86) = 4.11$, $p < .05$. This interaction is depicted graphically in Figure 2. Simple slope analysis revealed a significant positive association between experimental

condition and personal risk, but only for those women who were high in experience and *low* in perceived media utility, $\beta = .40$, $t = 2.11$, $p < .05$. For this group, media exposure significantly increased perceptions of personal risk. All other slopes were non-significant (all $ps > .07$).

A parallel regression equation was used to predict *interpersonal communication* about breast cancer at Time 3. Inclusion of the Time 1 measure of interpersonal communication at the first step explained significant variance, $\Delta R^2 = .12$, $F_{ch}(1,93) = 12.96$, $p < .001$, as did inclusion of the main effect terms at the Step 2, $\Delta R^2 = .09$, $F_{ch}(3,90) = 3.34$, $p < .05$. Inspection of the regression coefficients at this step revealed significant main effects for experimental condition, $\beta = .25$, $t = 2.66$, $p < .01$, and direct experience, $\beta = .19$, $t = 1.97$, $p < .05$. Participants in the experimental condition were more likely to report having discussed the issue of breast cancer since Time 2, as were those who had some prior experience with the issue. Although inclusion of the two-way interaction terms at Step 3 produced no further increment in variance explained, the three-way interaction term entered at Step 4 was significant, $\Delta R^2 = .07$, $F_{ch}(1,86) = 8.16$, $p < .005$. This interaction is presented graphically in Figure 3.

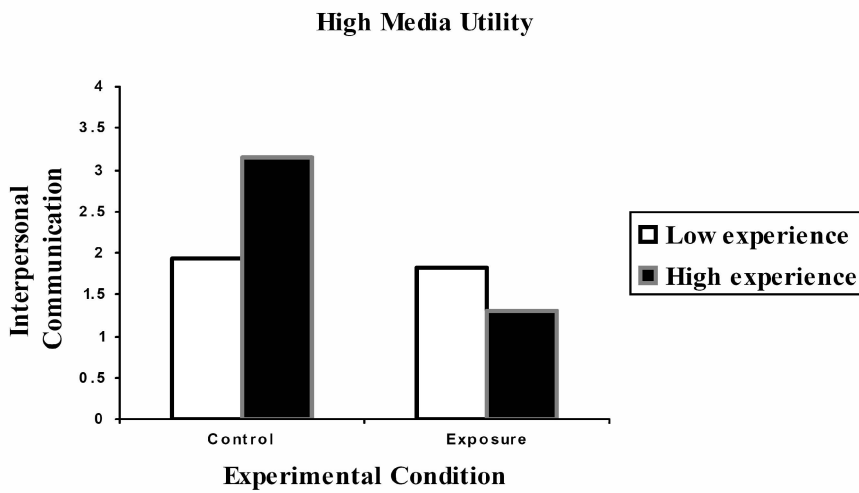
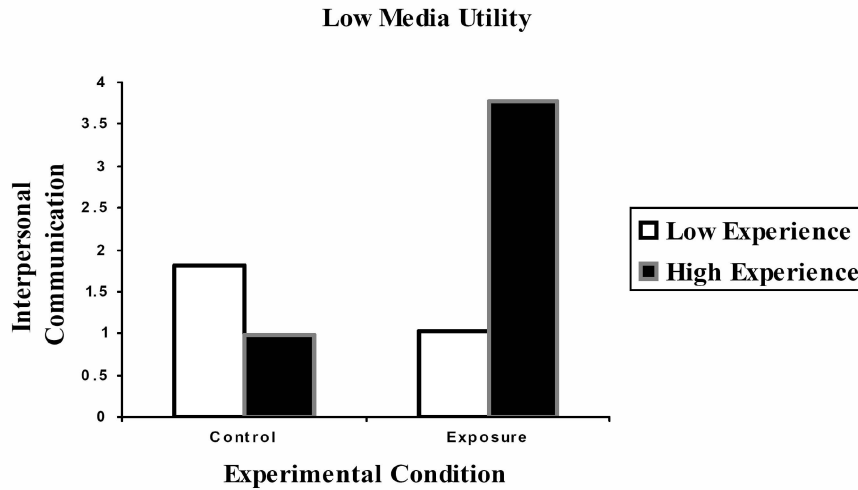
Simple slope analysis revealed that the significant three-way interaction was again due to a strong positive association between experimental condition and interpersonal communication for women who were high in experience but low in perceived media utility, $\beta = .71$, $t = 3.28$, $p < .01$. Among this group of women, media exposure at Time 2 increased interpersonal communication about breast cancer at Time 3. All other associations between experimental condition and interpersonal communication were non-significant (all $ps > .24$).

Mediation Analysis

Given the similar three-way interactions that emerged in the prediction of both Time 3 perceptions of personal risk and Time 3 reports of interpersonal communication, it was possible that the effects on perceptions of risk were mediated through interpersonal communication (i.e., Hypothesis 3). In order to test for this possibility, the three criteria for mediation outlined by Baron and Kenny (1986) were examined. These are: a) that a significant relationship between the predictor and criterion variables must exist, b) that a significant relationship between the predictor and proposed mediator must exist, and, c) that the relationship between the predictor and criterion must be substantially reduced upon introduction of the mediator into the equation.

The significant three-way interaction observed on both interpersonal communication (the proposed mediator) and perceptions of personal risk (the dependent measure) demonstrates support for the first two criteria. To satisfy the final criteria for mediation, an additional hierarchical regression analysis was conducted. At Step 1 of this equation, experimental condition, direct experience, and perceptions of media utility were entered. All

Figure 3. The interaction between media exposure and direct experience on Time 3 reports of interpersonal communication at low and high levels of perceived media utility.



two-way interactions were entered at the Step 2, and the three-way interaction was entered at Step 3. At Step 4, interpersonal communication was included as a predictor. This model accounted for a significant amount of variance in personal risk, $R^2 = .20$, $F(8,86) = 2.64$, $p < .05$. Although inclusion of the three main effect terms at Step 1, and the three possible two-way interactions at Step 2, did not contribute significantly to prediction, inclusion of the three-way interaction term at Step 3, $\Delta R^2 = .07$, $F_{ch}(1,87) = 6.99$, $p < .05$, and interpersonal communication at Step 4, $\Delta R^2 = .04$, $F_{ch}(1,86) = 4.17$, $p < .05$, produced significant increments in variance explained. More important, inclusion of interpersonal communication reduced the significance of the beta weight for the three-way interaction (from, $\beta = -.44$, $t = -2.64$, $p < .05$, at Step 3 to, $\beta = -.32$, $t = -1.83$, $p = .07$, at Step 4). This suggests that the effect of the three-way interaction on perceptions of personal risk may have been mediated through interpersonal communication. A Sobel test on the change in significance was, however, only marginally significant, $z = -1.75$, $p < .08$, suggesting only partial mediation.¹

Additional Analyses

The above results showed evidence that direct experience, perceptions of media utility, and interpersonal communication all play a role in shaping media effects over time. Specifically, regression analyses indicated that media exposure increased perceptions of personal risk three weeks later, but only among those women for whom breast cancer was already an important issue due to their family history. In addition, there was some evidence that this effect was mediated through interpersonal communication. Somewhat surprisingly, this pattern of media effects emerged only among women who *did not* perceive the media to be a useful source of health information. To explore this unexpected pattern, and to provide some clues about the motivations underlying interpersonal communication, women's desire for further information about breast cancer at Time 2 was examined following the same regression procedure as outlined above.

At Step 1 of the analysis of Time 2 informational desires, self-reported knowledge at Time 1 was entered as a control variable. This did not contribute to explanation, $\Delta R^2 = .00$, $F_{ch} < 1$. At Step 2, experimental condition, experience, and perceptions of media utility were entered as main effects. There were no significant main effects at this step, $\Delta R^2 = .01$, $F_{ch} < 1$, nor were there any significant two-way interactions when these were tested at Step 3, $\Delta R^2 = .01$, $F_{ch} < 1$. Entry of the three-way interaction at the final step did, however, explain a marginally significant increase in variance, $\Delta R^2 = .04$, $F_{ch}(1,86) = 3.19$, $p = .077$.

Given the consist pattern, this marginal interaction was explored further via simple slope analysis. This revealed that the three-way interaction was due to a marginal Condition x Experience interaction at low, $\beta = -.54$, $t = -1.71$, $p < .10$, but not high levels of perceived media utility, $\beta = .28$, $t = .85$, $p > .10$. Among women who did not perceive the media to be

a useful source of health information, there was a weak positive relationship between media exposure and informational desires, but only when experience was also high, $\beta = .38$, $t = 1.50$, $p > .10$. When experience was low, there was a weak negative relationship between media exposure and informational desires, $\beta = -.16$, $t = -.86$, $p > .10$. Although neither of these slopes is significantly different from zero, the significant interaction term indicates that they are significantly different from each other (i.e., media exposure has opposing effects on informational desires at low and high levels of experience).

DISCUSSION

The aim of this study was to explore the effects of issue involvement, perceptions of media utility, and interpersonal communication in shaping the effects of a single instance of media exposure over time. Each of these variables has been identified as important within different theoretical traditions, and consistent with this each was expected to increase the impact of exposure to media content about breast cancer on women's perceptions of their own breast cancer risk. Of more interest to the present research, however, was the possible interplay among these variables.

Consistent with expectations (Hypothesis 1), there was some evidence that issue involvement (in terms of past experience with breast cancer) moderated the impact of media exposure. Exposure to a single video about breast cancer increased perception of personal risk for that disease, but only among women with prior experience of the issue via their immediate family. Contrary to predictions based on theories of media use (Hypothesis 2), media effects were not more pronounced among women who also had positive expectations about media utility. More interesting, there was evidence of a three-way interaction among all the variables (Research Question 1) that was significant on perceptions of personal risk and interpersonal communication about breast cancer assessed three weeks post-exposure (Time 3), as well as marginally significant on informational desires immediately following exposure (Time 2).

In accordance with theories of media use (e.g., Ball-Rokeach, 1985, 1998; Ball-Rokeach & DeFleur, 1976), it could have been expected that the significant effect of exposure to the breast cancer video among women with experience of breast cancer (i.e., high in issue involvement) would be further enhanced to the extent that these women also perceived the media to be a useful source of health information (see also Morton & Duck, 2000, 2001). Alternatively, based on theories of persuasion, it could have been expected that effects of positive expectancies about the media (not dissimilar to source credibility; Petty & Cacioppo, 1984) might have been observed only at low levels of experience — that is, expectancies might have acted as a peripheral cue guiding persuasion in the absence of any other motivation to engage with the content of the media stimulus. However, neither of these

patterns emerged. Instead, the moderating role of direct experience emerged among women who *did not* perceive the media to be a useful source of health information.

Given the consistency of this interaction across three dependent measures, assessed at two points in time separated by three weeks, it is unlikely that the result is spurious. Indeed, further analyses revealed a process of communication that gave meaning to this seemingly paradoxical effect. First, interpersonal communication mediated the effects on perceptions of personal risk — indicating that interpersonal communication was the process through which media effects were carried over time; consistent with the two-step flow hypothesis and diffusion of innovations theory (Hypothesis 3). Further, analysis of informational needs at Time 2 revealed that women with direct experience of breast cancer (i.e., high in issue involvement), but who did not perceive the media to be a useful source of health information, expressed a greater desire to obtain further information about breast cancer following exposure to the video. This suggests that the interpersonal communication at Time 3 might have been motivated by information needs aroused, but unsatisfied by, media exposure at Time 2. Consistent with this notion, informational desires and interpersonal communication were significantly correlated.² Together, this suggests that exposure to negatively-perceived media content about an issue of high personal relevance stimulated informational needs that were then satisfied through discussion with others, apparently amplifying media effects over time (see also Tsfati & Capella, 2003).

It would be difficult to explain the above patterns solely in terms of intra-psychic processes (e.g., information processing, cognitive elaboration). Instead, the pattern observed underlines the value of considering media effects as part of a process of communication that is itself motivated by individual informational needs — that is, the connection between individual psychological states and communication activity between people. According to diffusion of innovations theory (Rogers, 1995), the principal effect of media coverage is to put issues on the public agenda. Interpersonal communication is, however, an important forum in which both the social validation of information and actual persuasion occur, and discussion can supplement the more abstract effects of media messages. Building on this analysis, the present study elaborates on some of the conditions under which this kind of supplementary interpersonal communication is likely to take place.

Limitations and Directions for Future Research

Locating media effects within a broader process of communication helps to explain the presence of media effects among women who did not perceive the media to be a useful source of information. However, it does not explain the absence of media effects among those women who did have positive expectancies about media content. Past research suggests that perceptions of media utility should facilitate the effects of media exposure (Ball-Rokeach et al., 1984; Grant et al., 1991; Morton & Duck, 2000, 2001; Skumanich &

Kintsfather, 1998). To explain this, at least three possibilities exist. First, it is possible that the more complex role of media orientations, as observed in this study, only emerges when other variables are taken into account. Second, it may be that women high in perceived media utility had already extracted information from the media to satisfy their needs, and thus were not influenced by the single additional message presented to them in this experiment. Although the study presented here was an experiment, it is impossible to fully control for the total media environment within which participants were embedded — and this environment inevitably shapes the effects that can be observed, even within an experimental setting. Finally, it is possible that the precise role of media orientations depends on whether people are seeking out, or responding to, media messages.

At present, evidence that positive expectancies about media content facilitate media effects comes almost exclusively from correlational research. In such field settings, it is likely that individuals who perceive media positively are not only more influenced by it, but that they also seek out exposure to media messages to satisfy their needs. Indeed, positive expectancies about media content and actual exposure to media content should be correlated (Ball-Rokeach 1985; Grant et al., 1991). Individuals with less positive expectancies about the media would normally neither seek media exposure nor be particularly influenced by it. In experimental contexts, however, where individuals are confronted with media content, negative orientations may be more important in triggering an active and critical response within such individuals.

Experimental studies are still the exception within this research tradition. Given this, and given the novel effects observed in this study, it is important that future research further establishes the robustness of these patterns across different issues and populations of interest. Indeed, although the patterns of effect described in this study were statistically significant (or marginally significant in the case of Time 2 informational desires), the effect sizes were small. Thus, for example, the reported effects on perceived personal risk are best thought of as changes in the relative degree of risk perceived, rather than an absolute change from perceiving no risk to perceiving high risk (i.e., all responses fell below the scale mean, indicating that perceptions of risk were low irrespective of any of the effects of the independent variables). Notwithstanding this limitation, the effects are important in so far as they demonstrate the important role of spontaneous interpersonal communication in supplementing, transforming, and sustaining media effects over time — a role that is often overlooked by researchers of media effects, and by those who seek to harness the power of the media to affect social change (Southwell & Yzer, 2007).

Conclusions

The findings of this research point to the value of integrating insights from communication-based and psychologically-based perspectives to fully understand the impact

of media exposure on individual thinking. Consistent with this, our research suggests that that mass communication is part of a dynamic process that unfolds over time — and that media effects are contingent on factors that precede, interact with, and follow specific instances of media exposure. More interesting, the results observed here suggest that this process may not always unfold straightforwardly. Rather, the relationships between mass and interpersonal communication, and the ultimate outcomes of this process, are driven by individual informational needs, and the perceived capacities of the media to satisfy these.

Paradoxically, in this study, this process led to the appearance of heightened media effects among those who perceived the media least positively. This paradox makes sense once one considers the broader process of communication within which our participant were engaged: Participants in this study *used* interpersonal communication to supplement media messages, or perhaps to compensate for their inadequacy. More broadly, these findings contribute to a picture of the mass audience as being more than simply reactive processors of media messages. Rather that they are actively engaged in a process of communicators that unfolds, and changes over time. Understanding that process is central to understanding how and why attempts to influence via the media might succeed or fail.

ENDNOTES

1. We also tested the reverse possibility — that is, that the effects of the three-way interaction on interpersonal communication were mediated through perceptions of personal risk. With interpersonal communication as the criterion, the three-way interaction term was significant at Step3, $\Delta R^2 = .10$, $F_{ch(1,87)} = 11.83$, $p < .001$, as was the effect of personal risk at Step 4, $\Delta R^2 = .04$, $F_{ch(1,86)} = 4.17$, $p < .05$. However, three-way interaction at Step 3, $\beta = -.55$, $t = -3.44$, $p = .001$, remained significant with the inclusion of personal risk at Step 4, $\beta = -.45$, $t = -2.81$, $p = .006$. This suggests that personal risk did not mediate the effects on interpersonal communication, an interpretation consistent with the non-significant Sobel test, $z = 1.61$, $p > .10$.

2. The correlation between desire for more information (measured at Time 2) and interpersonal communication (measured at Time 3) was $r = .23$, $p < .05$.

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