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ORIGINAL ARTICLE

Message Effects and Social Determinants of Health: Its Application to Cancer Disparities

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Recent work on message effects theories offers a fruitful way to systematically explore how features, formats, structures of messages may attract audience attention and influence the audience and is of great relevance to public health communications. Much of this work, however, has been pursued primarily at the individual level of analysis. It is our contention that message effects on health outcomes could potentially be moderated and mediated by social contextual factors in public health such as social class, social organizations and neighborhoods among others, leading to differential effects among different audience sub-groups. This essay, through a selective review of literatures in communication and social epidemiology, will explore how major message effects may moderate and mediate the role of social determinants of health on cancer control, specifically cancer-related health disparities.

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A significant challenge in public health communications is how to transcend the clutter in the information environment to reach one's intended target audience with effective messages. Practitioners and campaign planners have long focused on selecting appropriate channels and developing the "right messages" to cut through the noise to get noticed and influence the audience (Hornik, 2002). Although much of the work on "right messages" has been based on intuitive assumptions about the intended audience and the media to which they attend (e.g., television, radio, newspapers), recent work on message effects theories offers a fruitful way to systematically explore how features, formats, and structure of messages may attract audience attention and influence the audience. Even as the work in message effects has continued to contribute to our understanding of how the media influence cognitions, attitudes, and behavior, this work has been pursued primarily at the individual level of analysis. That is, the focus is usually on how individual characteristics such as personality or beliefs influence the reception and processing of messages that lead to certain outcomes. At the same time, a large body of work in public health—social epidemiology—has identified how "social determinants" such as social class, social networks,

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neighborhood conditions, and social cohesion among others could elucidate the different etiological pathways that lead to differential disease outcomes among population subgroups (Berkman & Kawachi, 2000).

It is our contention that message effects on health outcomes could potentially be moderated and mediated by such social contextual factors in public health leading to differential effects among different audience subgroups. Hence, it is critical to understand how research in message effects in health may inform and be informed by work in social epidemiology.

This article, through a selective review of literatures in communication and social epidemiology, will explore the relationship between major message effects and social determinants of health and how that may influence cancer control, specifically cancer-related health disparities. We will (a) start with a brief overview of some message effects, (b) review some of the major social determinants of health, (c) draw connections between message effects and social determinants through a selective use of examples, and (d) end with a speculation on how this research can inform cancer control, particularly cancer-related health disparities.

Message effects

The study of message effects is distinct from the study of media effects, a broader treatment of effects of media that may include message effects, but may also focus on influence of other elements, such as exposure to media content, channel use, and information flows. Message effects are a class of theories that examine how features, formats, and content of mediated messages produce effects on cognitive, attitudinal, and behavioral outcomes. Some major message formats include framing, sensation seeking, narratives, exemplars, and fear appeals. Discussion of all these message formats in the context of this essay is not feasible; thus, we have selected framing and narratives as two examples of message effects that we will explore further in the context of disparities and social determinants of health.

Framing

The term *framing* has been used in at least two different ways in the communication literature and describes the efforts of defining a health issue or problem both in strategic communication and as well as news media coverage of health. In one variant, a message is *framed* to emphasize the consequences of either adopting or failing to adopt health behaviors (Salovey, Schneider, & Apanovitch, 2002). *Gain-framed* messages emphasize the benefits from adopting a health behavior, although *loss-framed* messages focus on costs of not adopting a particular behavior (Salovey et al., 2002) (See Rothman, Bartels, Wlaschin, & Salovey, 2006). Messages are framed with the intention of manipulating cognitions and affect, and its use in promoting cancer screening and in treatment decisions has been extensively studied (Banks et al., 1995; Davey, Butow, & Armstrong, 2003; Finney & Iannotti, 2002; Salovey & Williams-Piehota, 2004; Schneider et al., 2001). A review of literature on effects of framing suggest that loss framing is more

effective than gain framing on screening behaviors, though that was not the result in case of skin cancer screening (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999). Much of the discussion on gain- versus loss-framed messages has been pursued at the individual level, how message frames influence individual health cognitions, information processing, and behaviors though there are some exceptions (e.g., see Salovey et al., 2002).

A second variant of framing is more characteristic of literature in media studies, where framing has been conceptualized as a way to "construct" and "define" a topic, a "central organizing principle that holds together a diverse array of symbols and idea elements," giving a coherent structure to one's world views (Gamson, 2001). Frames typically are a product of interaction between frame "sponsors" (e.g., social movement organizations, organized social groups including businesses, hospitals, government agencies, and civic groups) and the news media that cover these groups and agencies (Cappella & Jamieson, 1997).

Media frames suggest how to "look at a problem" and the "solutions" to resolve the problem, public opinion about social problems, and knowledge and learning about those topics (Entman, 1993; Gamson & Modigliani, 1989; Scheufele, 1999). In that vein, the media could be helpful in (a) creating awareness about cancer and cancer-related risks and behaviors and (b) generating public support for actions to reduce or exacerbate those risks depending on framing. For example, within the debate on mammography as a screening tool, mammography has been framed as either an effective way to save lives through early detection or one that leads to "false positives," resulting in distress and/or unnecessary treatment. This approach to framing studies has been more sensitive to the structural factors such as the relationship between institutions of media (journalists) and news sources, for example (Cappella & Jamieson, 1997).

Narratives

Another message format is narratives or stories (Green, 2006). Story telling, an age-old cultural phenomenon, is a major staple of mass media genres of news, advertising and, entertainment. In contrast to explicit attempts at persuasion, narratives or stories carry implicit meanings with a persuasive intent and could be of any length though longer stories have a better chance of addressing barriers that might lead to disparities. They may range form 30-second advertising spots or full-page ads (e.g., about how mammography saved the life of a woman through early detection) to full-length televised soap operas that may follow a character dealing with a diagnosis of breast cancer.

Incidental exposure to fictional narratives may influence viewers' cognitions such as their perceptions of social reality (Gerbner, Gross, Morgan, Signorielli, & Shanahan, 2002) or behaviors (Anderson & Bushman, 2002) or knowledge about medicine and health (Davin, 2003). Narratives, particularly personal stories, are routinely used by journalists to make their points or to embellish news reports (Hoffman-Goetz, 1999). The power of the narrative, some argue, stems from the possible reason that the audience member is absorbed by the features of the story and is "transported" to

a different world and comes back changed by the experience, accepting beliefs congruent with the story (Green & Brock, 2000). Narrative techniques have been widely adopted by communication scholars and practitioners to promote "prosocial" behaviors whether through formats such as soap operas, *telenovelas*, comic books, or even text-based narratives (Slater, 2002).

Within public health, narratives have been used to promote family planning, AIDS education, and cancer screening among others (Kreuter & McClure, 2004; Slater, 2002), with the belief that public health approaches that are culturally compatible with the intended audience are more effective though evidence of a need to construct messages separately for each individual is mixed (Institute of Medicine & Committee on Communication for Behavior Change in the 21st Century: Improving the Health of Diverse Populations, 2002).

The body of work on message effects, in general, has drawn from psychological theories and examined how individual characteristics interact with message structure to lead to outcomes in knowledge, attitudes, and behavior. Yet, this body of work does not address whether message effects are uniform across all audience subgroups and if message characteristics interact with social contextual factors such as social class, social networks, and social organizations. We will next review some major determinants of health that illustrate why a more socially focused, macrolevel approach is needed, before discussing how literatures in message effects and social determinants may inform each other for a more refined understanding of media effects in cancer control.

Health disparities and social determinants of health

There are profound disparities in health among different racial/ethnic and social groups. These disparities also extend to behaviors that are associated with increased cancer risk, such as diet, smoking (Barbeau, Krieger, & Soobader, 2004), physical inactivity, obesity (National Center for Health Statistics, 2004), and cancer screening (Institute of Medicine, 1999). Recent studies have also documented that there are disparities in what treatments are offered to cancer patients and differences across groups in treatments selected (Institute of Medicine, 2003; Schneider, Zaslavsky, & Epstein, 2002). In general, minorities and low-socioeconomic status (SES) groups are less likely to have access to preventive services, less likely to receive cancer screening services, and more likely to be in later stages when cancer is detected than other groups (Agency for Healthcare Research and Quality, 2003; National Center for Health Statistics).

Such differences in disease burden among population subgroups and the possible reasons for them led epidemiologists to focus on "social determinants" that could elucidate the different etiological pathways that lead to differential health outcomes (Berkman & Kawachi, 2000). The social epidemiological approach posits that health behaviors are a product of a complex interaction of factors across intrapersonal, interpersonal, organizational, environmental, and policy levels (Kawachi & Berkman,

2000), and that planned social change in public health should focus on interventions that cut across these multiple levels (Smedley & Syme, 2000).

Major social determinants (reviewed in Table 1) that are thought to moderate and influence health behaviors include social class or socioeconomic status (Krieger, 2001; Lynch & Kaplan, 2000; Lynch, Smith, Kaplan, & House, 2000), social networks through social capital and social cohesion (Berkman & Kawachi, 2000), social organizations such as workplace (Linnan, Emmons, & Abrams, 2002; Sorensen et al., 2003), communities and neighborhoods, and social policies (Sorensen et al.). The causal pathways that connect social determinants with health outcomes have been a subject of some controversy (Kaplan, 2004), though it is generally agreed that the influence of social determinants is through both "proximal" and "distal" factors such as access to material and intellectual resources, social support and living conditions, unequal distribution of knowledge, and exposures to environmental stressors, among others (Institute of Medicine, 1999). Differential access to knowledge between high- and low-SES groups is also offered as one mechanism linking SES with disparities. In short, disparities in health may occur concomitantly with disparities in access to information and knowledge, that is, communication inequality.

Communication inequality

Communication inequality may be defined as differences in the generation, manipulation, and distribution of information among social groups; and differences in (a) access and use, (b) attention, (c) retention, and (d) capacity to act on relevant information among individuals (Viswanath, in press). For example, attention paid to health information in different sources may vary by SES groups (Figure 1). Attention to media and messages is a robust predictor of knowledge (Romantan et al., 2005; Viswanath, Randolph et al., in press).

Recall and retention of information from diffusion of information is more likely by higher SES groups compared to lower SES groups, a phenomenon characterized as the "knowledge gap," though there are exceptions to this trend (Kwak, 1999; Viswanath & Finnegan, 1996). Audiences may vary in their capacity to act on information provided either because of lack of understanding the message or because of a lack of opportunity to act on the message. For example, limited health literacy is reported to be related to less knowledge of illness management, lower participation in shared decision making in treatment, adherence and compliance and lower self-reported health status (Nielsen-Bohlman, Panzer, & Kindig, 2004).

These issues of inequality are particularly pertinent to a discussion of message effects, and may suggest a potential causal pathway between health disparities and message effects, which will be discussed in more detail in sections that follow.

Media and message effects: A structural view

Given the influential role of the media in our society today, it is somewhat surprising that there has been very little emphasis on the role that media play in promulgating or

Table 1 Exemplars of Social Determinants and Health Outcomes

Social Determinant	Health Outcomes and Possible Reasons
Social class/socioeconimic status	Effects on life course—access to material and intellectual resources, social support, and living conditions (Krieger, 2001; Lynch & Kaplan, 2000; Lynch et al., 2000)
	Unequal distribution of prestige, power, resources (Phelan et al., 2004)
	Greater probability of living in poor neighborhoods and risk of environmental exposures (Phelan et al., 2004)
	Unequal burden in morbidity and mortality (Institute of Medicine, 1999)
Social organizations	
Workplace	Formal and Informal policies that regulate health behaviors such as smoking
Volunteer and civic groups	Job strain, occupational cultures, and social norms influence access to health services and behaviors (Linnan et al., 2002; Sorensen et al., 2003)
Social networks and social ties	Social support and social cohesion (Subramanian et al., 2002)
	Social cohesion (Berkman, 2000)
	Health media use and health information (Viswanath et al., in press)
Community Environment	Influence of community structure and complexity (Berkman & Kawachi, 2000; Viswanath et al., 1991)
	Neighborhood conditions (King et al., 2002, Subramanian et al., 2002)
Public policies	Moderation of risk behaviors (Emmons, 2000; Emmons et al., 2001; Sorensen et al., 2003)
	Indoor air policies influence smoking behavior (Gilpin et al., 2004)
	Built environment may influence physical activity (King et al., 2002)

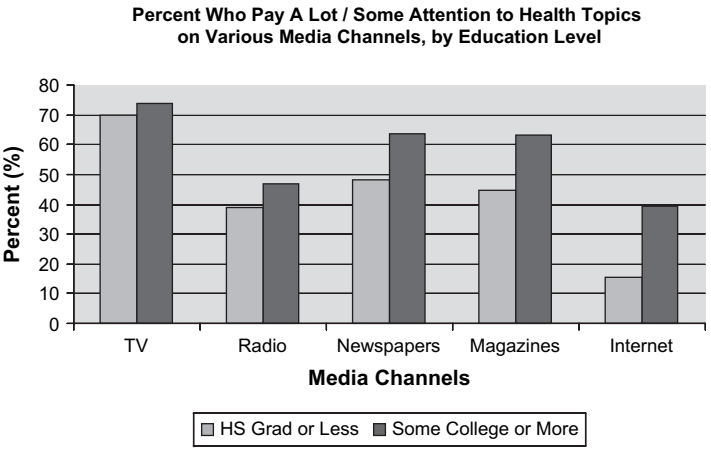

Figure 1 Attention to health in different media among different educational groups.

redressing health disparities. In media studies, with few exceptions, research on effects of media and messages, in both campaign and general media effects areas, has long focused on the individual as a unit of analysis, as mentioned earlier. The focus has been primarily on the impact of media on individual cognition, affect and behavior. This is a reflection of the field with its roots in the social psychological experimental work that developed post-World War II. This literature has made rich contributions to our understanding of the role of media in attitude reinforcement and attitude change and the conditions under which such effects may or may not occur (Bryant & Zillman, 2002). Yet, others have argued for a more structural approach, with the assumption that media messages are a product of interaction among agencies, groups, and individual actors within those agencies (Olien, Donohue, & Tichenor, 1983; Viswanath & Demers, 1999). This structural view contends that audiences attend and react to mediated content based on their structural location in the environment (Viswanath & Demers, 1999) and the social roles they play at any given time (McLeod, Kosicki, & Pan, 1991). For example, preferences for media channels, attribution of credibility and trust of information sources and reactions to media coverage depends on the social class and perceived power status of the audience groups (Finnegan, Viswanath, Kahn, & Hannan, 1993; Gaziano & McGrath, 1986; Olien et al., 1983).

Audiences bring their collective experiences as members of social groups with specific characteristics (e.g., social class, occupational structure, race and ethnicity, and gender) in reacting to and processing of media messages. These structural determinants may mediate the impact of messages through such factors as access, preferences, appeals, attention and processing and capacity to act on the information.

Drawing from both the literatures of media studies and social epidemiology, there are three broad structural determinants of health that may mediate message effects: (a) socioeconomic position, (b) social networks and social capital, and (c) social organizations including media institutions and practices (Table 2).[1]

Table 2 Social Determinants, Message Effects, and Potential Pathways Leading to Health Consequences

Structural Factors	Media Effect	Potential Pathways	Examples of Health Consequences
Socioeconomic status	Framing	Increase attention, salience Activate existing schema or develop new schema (new ways looking at a problem and a solution)	Low attention to health-related topics and low salience may result in greater "knowledge gaps" on cancer prevention, poor health behaviors, less participation in screening, lower participation in informed decision making, increase in disparities between low and high SES High attention and salience may engage the audience, greater learning on the part of low SES, potential for behavior change, more informed decision making, reduction or elimination of disparities Lower SES groups may have more difficulties sorting through complex health messages and thus may reject messages or have more difficulty reconciling conflicting messages
	Narratives/exemplars	Liking Attention Retention Absorption/transportation	Greater engagement may lead to greater knowledge, positive role models, greater identification with the messages, more positive health behaviors
Social networks and social capital	Framing	Collective identity with the issue or topic Additional source of information Development and reinforcement of social norms	Provides an interpretation of health messages within the context of a social relationship; individuals from a lower SEP background may have more exposure to individuals with less health care access and less trust of the health care system, which influences social norms regarding health

(continued)

Table 2 *continued*

Structural Factors	Media Effect	Potential Pathways	Examples of Health Consequences
	Narratives/exemplars	Modeling Reinforcement of norms	Social networks provide opportunities to see similar others address health concerns; modeling of how similar others coped with disease burden interpersonal discussions may increase salience of health topics, and a consequence may increase depth of information processing about it
Social organizations (churches, worksites, media institutions, and practices)	Framing	Worry or fear	Cultivates either excessive worry or disregard for cancer risk behaviors
		Appeal to cultural values	Media response to advocacy efforts may disproportionately increase attention to specific issues; advocacy related to disparities has been limited
		Reliance on powerful sources for news and interpretation	Consequences on how the stories on health may or may not appeal to low- versus high-SES groups Health concerns of lower SES get limited attention in the public arena Potential for limited action to ameliorate disease burden among low SES
	Narratives in TV	Repeated exposure Cultivation of TV worldviews	Higher than actual portrayal of violence on television engenders belief in a violent world; repeated exposure may serve as a cue and behavioral model Focus on TV violence may increase salience of neighborhood cues that support belief about a violent world, reduced community engagement, reduced opportunities for social exchange, knowledge, reduced physical activity, and other behavior changes

Note: SES = socioeconomic status.

Socioeconomic position

Some have argued that SES is the "fundamental cause" of health disparities possibly due to unequal distribution of prestige, power, resources, and *knowledge* translating to inequalities in access to treatment, living in poor neighborhoods and environmental exposures (Phelan, Link, Diez-Roux, Kawachi, & Levin, 2004). Unequal knowledge between low- and high-SES groups has been offered as one reason for health disparities (Link & Phelan, 1995). Research on the "knowledge gap hypothesis" suggests that information is unequally distributed in the social system, with members from higher SES groups having more and accurate information compared to people from lower SES (Tichenor, Donohue, & Olien, 1980; Viswanath & Finnegan, 1996). For example, members of higher SES, in general, learn more from information campaigns compared to people of lower SES groups (Hornik, 2002; Viswanath & Finnegan, 1996). The socioeconomic gradient has been particularly observed related to sustained information flow, such as that found in public health campaigns. Two interrelated sets of explanations at both the individual and structural level have been offered to explain the knowledge gaps: At the individual level, some have observed that relevance and utility for information, motivation, attention, level of controversy about the topic, and interpersonal discussion may be critical in explaining the knowledge gap (Ettema, Brown, & Luepker, 1983).

At the structural level, the complexity (size and diversity) of the community, level of controversy, and social conflict about an issue and relevance of topic to a social group (Rucinski, 2004) may explain the knowledge gaps. That is, for example, high levels of social conflict in the community increases media coverage, raises salience, and attracts citizens' attention to the controversy, thereby equalizing information among both high- and low-SES groups. This dichotomy between individual- and structural-level determinants of knowledge gaps has been difficult to explain deterring any efforts to bridge the gaps.

The work in message effects offers a fruitful way to bridge the explanation for knowledge gaps at individual and structural levels by identifying ways to increase message salience and attract audience attention, potentially equalizing media effects across SES groups. We will elaborate this point discussing two message effects, "framing" and "narratives," drawing examples from current problems in public health.

Framing, in theory, may work in a number of ways to equalize knowledge levels across different SES groups. One, media frames influence the way audiences perceive issues, given that frames suggest a way to look at a problem and the solutions to resolve the problem (Entman, 1993; Pan & Kosicki, 2001). For example, the recent attention to the "epidemic of obesity" serves as an excellent example of how media framing may play a role in bridging gaps. The federal government and global health agencies have declared obesity as a crisis warranting preventive action.[2] There are active efforts to stem obesity and recently several federal agencies increased research funding for obesity prevention and treatment. In line with these developments, media attention to obesity has been steadily increasing. For example, the number

of news stories on obesity in major television networks alone increased by more than 1000% in 5 years: from 5 in 2000, to 12 in 2001, 24 in 2002, 40 in 2003, and 56 in 2004.[3] Reports about community actions, such as eliminating vending machines from schools to promotion of physical activity among youth and adults, are beginning to accumulate. One might hypothesize that the framing of obesity as an "epidemic" played a significant role in this social change. This scenario is not dissimilar to how cardiovascular disease emerged as a major health problem in the media in the 1970s and 1980s (Viswanath & Finnegan, 2002).

These actions at the level of agencies and the consequent media attention may also influence individual processing of information. Attention and framing in the media may increase salience among individuals, thus leading to greater engagement with the issue. Also, media frames offer a new way of looking at issues or activating existing schema in the audiences' minds, allowing for processing of information and formation of opinions (Price, Tewksbury, & Powers, 1997) leading to greater learning across different SES groups.

Several other topics of relevance to cancer control are influenced by how sponsors and mass media frame the messages: smoking (smokers' rights vs. secondhand smoke effects), screening behaviors, and cancer treatment (being in a clinical trial vs. being a guinea pig à la Tuskegee study).[4] All these topics have been a source of sustained media coverage at one time or other in the past few years, although the impact of use of different frames has not been systematically explored. Framing effects are a product of how media portray an issue and prior schema activated by the frames within the minds of the audience. For example, in the case of Whites, clinical trial frame may activate a schema focused on scientific advances, whereas in African Americans it may activate a schema of racism and denial of treatment. It remains to be seen how media frames will generate attention and activate prior schema and how these could affect disparities in health knowledge and behaviors.

On another message format, *narratives*, most of the limited available evidence suggests that when stories are used to present cultural themes in interventions as a context and background to provide health information and in constructing the messages, they may be more effective (Kreuter & McClure, 2004). For example, Kreuter et al. (2004) conducted a study with African American women to examine whether tailoring on four sociocultural constructs, religiosity, collectivism, racial pride, and time orientation, could enhance the impact of cancer communications. The communications were delivered in the context of a tailored women's health magazine, and culturally tailored magazines received more attention, were liked better, yielded better retention of information, and were shared with others (Kreuter et al., 2004). Within media studies, culture serves as a resource from which media producers draw their stories and exemplars, and the audience processes information through the filters of culture.

As a message format, narratives should be intuitively appealing and effective in processing information, given that they may engender high salience and arousal

when properly constructed. Although most studies have used narratives on specific audience segments (e.g., African Americans), what is not clear is the extent to which narratives may interact with social structural variables, such as social class and ethnicity, in reducing communication inequalities in health. More theoretical and comparative work remains to be done in this area.

Social networks and social capital

The role of social networks and social ties in health promotion has begun to accumulate in such areas as family planning and tobacco use (Valente, Hoffman, Ritt-Olson, Lichtman, & Johnson, 2003). Much attention on health and social ties focuses on social capital—solidary ties and norms of reciprocity that result from social interaction and that supposedly foster collaboration (Putnam, 2000). Social capital is considered a critical moderator between sociodemographic characteristics (e.g. social class) and health outcomes (Hawe & Shiell, 2000; Holtgrave & Crosby, 2003; Kawachi, Kennedy, & Glass, 1999; Lochner, Kawachi, Brennan, & Buka, 2003; Putnam; Subramanian, Kim, & Kawachi, 2002). Of note, however, is that the causal nature of the relationship as well as its precise role remains a subject of debate (Baum, 1999; Macinko & Starfield, 2001; Mackenbach, 2002; Pearce & Davey Smith, 2003).

In addition to the generation of social capital, social networks may also provide information on health or supplement information on health that is available in the secular environment (Viswanath, Randolph, & Finnegan, in press). Health behaviors occur in the context of social norms, acceptable beliefs, and behaviors, and social networks influence what norms are held and acceptable within a group (Valente et al., 2003). It is quite likely that networks could potentially mediate message effects either by providing exemplars or by framing and interpreting health messages in the environment. Interpersonal discussions among network members may increase salience for a health topic, increase the chance of evaluating the information and enhance learning about health and knowledge about the topic (Valente & Saba, 2001). Audience may engage in "reflective integration," when they deliberate on information that they have attended to and talk to other people about (Kosicki & McLeod, 1990).

This is of particular relevance to cancer given the complexity of information processing that people must engage in at different points in the cancer control continuum (Hiatt & Rimer, 1999). Research on how social ties may moderate message effects in different stages of the continuum, from prevention, detection, diagnosis, and treatment, to end of life or survivorship, could be of immense value to both theory building and application. For example, patients are typically under a great deal of stress while they are weighing the pros and cons of different treatment options, and the choices they make may be influenced by experiences of others (Rimer, Briss, Zeller, Chan, & Woolf, 2004). Here, the literature on narratives can make a contribution in interpreting the messages and in helping in decision making. For example, a story by a woman on how she coped with hair loss during

chemotherapy may serve as a model and example to other women about to undergo chemotherapy. The prospect of prostate cancer surgery, because of serious side effects such as impotence and incontinence, poses a serious dilemma for many men. Narratives relating the experience of other patients who have gone through the decision-making process may help people make decisions on the surgery. In fact, testimonials and stories have often been used to provide information to patients; theory-based interventions using exemplars or narratives could contribute to more informed decision making (see Rimer et al., 2004, for a discussion on IDM). It is, however, critical to examine the extent to which narratives are representative of audience's class and cultural backgrounds in addition to individual situations.

Social organizations, media institutions, and practices

The role of social organizations (e.g., worksites, churches, schools, and health care systems) in health promotion is well documented (Emmons, 2000). Health promotion efforts through organizations provide the opportunity to intervene with large populations of individuals directly as well as indirectly through change in the policies, norms, and cultures of the organization. Such approaches have been successful in a variety of behavioral risk factor areas, including smoking (Jeffery et al., 1994; Sorensen et al., 1996), nutrition (Byers et al., 1995; Sorensen et al., 1999), physical activity (Sorensen et al., 2005), alcohol (Roman & Blum, 2002), HIV (Wilson, Holman, & Hammock, 1996), and cancer screening (Tilley et al., 1999). Here, we offer a brief summary of several different institutional channels that can impact on health outcomes (e.g., health care, churches, worksites, schools), with a particular emphasis on media institutions and their relevance to message effects.

Interventions in the health care system can take advantage of the natural focus on health and utilize the relationship a patient has with his or her provider to stimulate preventive health care behaviors. Several studies have shown the health care system to be an effective channel for delivery of health promotion interventions (Curry, Ludman, et al., 2003; Emmons et al., 2005; Kristal, Curry, Shattuck, Feng, & Li, 2000). The national effort in increasing health care providers' counseling of patients about smoking cessation is an excellent example of what could be accomplished in this setting through a systems-oriented approach (Rigotti et al., 2002; Taylor & Curry, 2004), though provider-delivered interventions may also exacerbate health disparities as some groups do not have access to health services (Institute of Medicine, 2003) or because of patient–provider communication patterns (Cooper & Roter, 2003).

Churches have increasingly been used as a channel to reach some groups, given the centrality of the institution in the African American and Hispanic communities. Many of these interventions have been successful in bringing about behavior change in a range of risk behaviors and diseases including smoking, nutrition, obesity, colon cancer prevention, and mammography (Campbell et al., 2004; Darling, Nelson, & Fife, 2004; Derose, Duan, & Fox, 2002; Giarratano, Bustamante-Forest, & Carter,

2005; Peterson, Atwood, & Yates, 2002; Resnicow et al., 2004). Church-based interventions that place health in the context of spirituality and religion are effective in bringing about change (Yanek, Becker, Moy, Gittelsohn, & Koffman, 2001). Much of this work draws on a framing perspective, presenting messages about the importance of health behavior change in the context of spiritual rather than health-related benefits. For example, Wellness for African Americans Through Churches Project focused on improving nutrition, physical activity, and colorectal cancer screening among rural African Americans using tailored approach compared to a lay health advisor and control groups. Tailored, personalized messages included scriptural passages and religious content that supported behaviors targeted in the study. Subjects in the group that received the tailored approach showed significant increases in fruit and vegetable consumption, physical activity, and fecal occult blood testing compared to the lay health group. In addition, the tailored group participants showed greater exposure and recall of intervention messages (Campbell et al., 2004). Similarly, one study reported that "culturally appropriate educational programs to Hispanics have resulted in percentage of Latina women getting mammograms" (Darling et al., 2004).

The body of work on interventions using organizations such as worksites, health care systems, churches, and schools as channels for intervention delivery to defined populations (e.g., workers, school personnel, students) is promising. What is not clear is the interaction between message formats and the channels. Several questions remain to be addressed in this realm:

- What factors at the organizational level are critical to understand the nature of message formats to be chosen for interventions? For example, how does heterogeneity/homogeneity of the occupational distribution within an organization help or hinder message dissemination and processing?
- What role do peers, colleagues, and fellow members play in the interpretation of messages about health, and what impact does that have on health outcomes?
- Do the experiences of fellow members and peers serve as exemplars in mediating messages about health?

Media organizations, media messages, and relevance for health

Although the role of organizations, their characteristics, culture, and policies have been extensively explored in health promotion in cancer control, the role of media organizations has been less extensively studied, even though their importance has been recognized in public health. Specifically, we know less about how the organizational structure of mass media and the occupational practices of media personnel lead to the production of certain message formats and how they may potentially influence health behaviors.

Second, the occupational practices of media personnel, journalists, for example, may potentially widen health disparities rather than narrow them as they rely on

official sources, scientists, and medical practitioners to report news. Such reliance may influence not only what they report on but also is likely that they report from the perspective of such powerful sources.

Third, the language and literacy level of news reports, particularly in the print-based media, may impede low-literacy group from learning from news media. We will elaborate these points next.

Within media studies, two bodies of work connecting message production with message effects offer some interesting and useful pointers for future work on message effects in health communication. Our premise is that understanding message effects in public health, especially in a nonintervention context, requires connecting message effects with the message production process (Finnegan & Viswanath, 2002; Shoemaker & Reese, 1996). One body of work stems from the cultivation analysis that examines the impact of television on perceptions of reality, and another examines media sociology and media effects, primarily in public affairs.

Work in the area of cultivation analysis, despite the controversy it engendered, offers a useful model for relating media production with message effects. The argument behind the cultivation hypothesis is that heavy exposure to television content, images, ideas, themes, and stories is likely to influence the audience in a number of ways, including its effect on their cognitions and behaviors (Gerbner, Gross, Morgan, & Signorielli, 1980). The hypothesis is that heavy TV exposure often leads individuals to accept the TV-portrayed world as "real," cultivating a stilted view of the world, especially a "mean-world syndrome" given that so much of televised content, drama, news, and movies, contain violence (Shanahan & Morgan, 1999; Signorielli, 1990). This finding now is well documented, even though the degree of association is attenuated when controlling for other factors (Gerbner et al., 1980; Gunter & Wobner, 1983; Hawkins & Pingree, 1990; Hirsch, 1980; Shanahan & Jones, 1999).

Cultivation analysis encourages not only the study of media and message effects but also an analysis of the organizational logic of TV that results in production of specific kinds of messages, as well as a content analysis of television programs to document the amount of violence depicted in the programs. Studies of content analysis of television programs have repeatedly shown that prime time television dramas portray significantly higher levels of violence and crime than is the case in the real world (Gerbner et al., 2002). Television, just as other mass media, thus performs a social control function, defining what is acceptable and normative and what is unacceptable and deviant, in essence defining that violence is normatively acceptable (Shanahan & Morgan, 1999).

The consequences of this are not trivial. For example, some recent work has shown a relationship between TV viewing and obesity. One plausible mechanism linking TV with obesity is portrayal of violence on TV as prime time television dramas portray significantly higher levels of violence and crime than is the case in the real world (Gerbner et al., 2002). The consequence is that people who spend more time watching television are more likely to overestimate crime and violence in

the real world compared to people who spend less time with TV (Morgan & Shanahan, 1991; Signorielli & Morgan, 1990). The "fear of crime" engendered by heavy TV viewing could deter the viewer from engaging in any physical activity outside the home, thus potentially leading to more TV viewing and a sedentary life. Studies testing the "theories of neighborhood disorder" suggest that a heightened fear of crime in the neighborhood could influence physical activity (King, Stokols, Talen, Brassington, & Killingsworth, 2002; Newman, 1973; Perkins, Wandersman, Rich, & Taylor, 1993; Taylor, 1988). Thus, heightened TV viewing, particularly violent content and perceived disorder in neighborhoods, may lead to lower physical activity. Both obesity and TV viewing are more prevalent among low-SES groups, thus likely be one significant contributor to existing health disparities. Other studies have also documented how media narratives portraying smoking in movies (Dalton et al., 2003) or advertising of junk food on TV (Borzekowski & Robinson, 2001; Jeffrey, McLellarn, & Fox, 1982) could potentially influence health behaviors or viewers.

Unfortunately, study of the media production process that leads to such message genres and formats has been limited. A systematic exploration of this area of message effects and production could make a significant contribution to public health communication and suggest ways of intervening at organizational and policy levels. The impact of TV messages on public health including perceptions of violence and rising obesity particularly on individuals living in lower income neighborhoods warrants more systematic work. The effects of exposure to TV genres combined with other daily hassles faced by low-SES groups such as those living in unsafe neighborhoods, lack of access to green space/playgrounds, and lack of choices in the local grocery stores may have multiplicative effect leading to greater burden of obesity among low-SES compared to high-SES groups.

News media organizations and message framing

Earlier, we discussed the importance of framing and its effects on health behaviors. It is also important to consider how media frames are generated within news organizations and the implications for public health. Media sociology and the impact of media framing on public cognitions, cynicism, and behavior has been one area that has been thoroughly and systematically examined in media studies (Cappella & Jamieson, 1997; Reese, Gandy, & Grant, 2001). Two broad groups of studies explain how the interaction and interrelationship between sources and journalists and the occupational practices of journalists lead to framing effects in news.

First, community and advocacy groups have often used media coverage to draw public attention to major health problems and effectuate policy changes in such cases as AIDS, vaccination, binge drinking, drunk driving, and tobacco use. Community activism may attract the attention of journalists for several reasons. In the case of activism, confrontation, the role of drama, the subject of conflict, and a sense of moral injustice could influence reporters to pay attention and provide ideas for story angles

(Gamson & Modigliani, 1987; Hilgartner & Bosk, 1988; Olien et al., 1983; Tichenor et al., 1980). Reporters are attracted to stories of outrage and deviance with greater moral clarity, that is, where the definitions of good and evil are clear and unambiguous. Cancer health disparities with their unjustified and disproportionate burden on the lower SES, working poor, racial, and minority ethnic groups provide the necessary moral outrage and, in theory, should be an appealing frame for journalists.

Second, in order to make sense of events and structure their occupational routines, journalists rely on certain sources for a steady supply of information or "information subsidies," which are reported as news (Fishman, 1980; Gandy, 1982). These routines include the beat system, an arrangement where reporters routinely go to certain geographical or positional locations, such as the mayor's office or the city council, for gathering information. Although beats are common in print media, they are somewhat less so in television and radio where "general assignment" reporters cover a variety of stories.

Third, either alone or in combination with the beat system, news or campaign events and news releases are another vital source of information. Reporters rely on news/press releases to be alerted about news and may interview sources as a follow-up or rewrite the news release into a regular story (Stryker, 2002). These occupational practices could sometimes lead to coverage that focuses more on superficial causes of social problems instead of structural determinants, overreliance on powerful sources, and "episodic" approach to coverage rather than consistent follow-up (Cappella & Jamieson, 1997; Iyengar, 1991).

This rich tradition has a lot to offer to examine the impact of media framing on public health practices and behaviors (Stryker, 2003; Wallack & Dorfman, 1996; Yanovitzky, 2002). For example, a study of framing analysis focused on activists agitating for funding breast cancer documented the evolution of this issue from a problem of individual women, into one that is viewed as a major public health problem, with considerable resources devoted to it (Kolker, 2004). Media coverage has been reported to be associated with mammography screening, though it is not clear whether it is the sheer amount of attention or the framing of the issue that was influential (Yanovitzky, 2002). The tobacco control movement has been extraordinarily successful in furthering an anti–tobacco use agenda through successful organization and media advocacy (Wolfson, 2001). Recently, the Breast Cancer Coalition has used shareholder activism to attract attention to Avon Products Ltd.'s use of estrogenic chemical preservatives in its products (Fintor, 2003).

This brief discussion raises certain questions about the role of framing at the structural level and how intense coverage by media in defining an issue could potentially influence audiences:

- How do media framing and social construction of cancer control problems influence audience knowledge, attitudes, and behavior about cancer?
- Are the effects of framing likely to vary by socioeconomic position of the audience as well as their race and ethnic background? To what extent does the

selection of frames from mainstream culture apply to and resonate with those groups that may not see themselves as a part of that culture?

- How do the media frame cancer risks, and to what extent are these risks influenced by the structural conditions of the community (Dunwoody & Griffin, 1999)? For example, is it likely that cancer morbidity and mortality of certain racial and ethnic groups will receive differential attention and framing in the media based on proportion of minorities in the community in which those media are published (Gandy, 1999)?
- Last, will SES- and race- and ethnicity-based communication inequalities in effects be influenced by the way issues are framed in the media?

Conclusions: Relevance for cancer control

Healthy People 2010 proposes to eliminate health disparities by 2010. (U.S. Department of Health and Human Services, 2000) The continuing disparities in access to preventive services and treatment among different population subgroups make it unrealistic that we will come anywhere close to this goal in the next few years, even though there is rapid progress in such biomedical scientific areas of pharmacogenomics, genetics, and treatment. In cancer, despite the tremendous progress in basic biomedical sciences and the understanding of carcinogenesis, more than 50% of cancers are attributable to "lifestyle" factors such as tobacco use, energy imbalance (poor diet and sedentary life style), viral infection through sexual activities, alcohol abuse, and exposure to sun (Curry, Byers, & Hewitt, 2003; Hiatt & Rimer, 1999). The National Cancer Institute's Cancer Control Program Review Group called for basic and behavioral research in population sciences to complement biomedical approaches in reducing cancer risk, morbidity, and mortality. Fundamental to this approach is the concept that cancer control can be advanced only by drawing from different disciplines including social and behavioral sciences such as epidemiology, surveillance, and biomedical sciences (Hiatt & Rimer, 1999), including communication sciences (Viswanath, 2005).

In this article, while acknowledging the work done so far on communication in cancer control, we argue that in addition to focusing on individual level of analysis, studies that take into account structural factors that influence health behaviors and message effects can significantly enhance our understanding of human health behavior in a social context and in offering avenues for planned social change.

Cancer control strategies seldom attract the attention from the media they deserve possibly because of lack of drama, novelty or confrontation, and complexity (Viswanath, 2005). Similarly, cancer-related disparities attract less attention from either the press or the public. Yet, attracting and sustaining media and audience attention through strategic message design may offer one pathway to media coverage and media effects. In this context, this essay is a theoretical speculation on how literature on message effects and media effects can be bridged with literature from social epidemiology and social ecological model of health to pursue an agenda for a systematic

study and promotion of public health communication and the role it can play in the elimination of health disparities. We believe that research melding these two literatures offers great promise in examining the role of communication in cancer control along all stages of the continuum—from prevention, detection, diagnosis, treatment, and survival/end-of-life stages and equalizing services to sections of the population.

Notes

1 We are not suggesting that other social determinants such as social policies or neighborhoods are not important. These three are chosen for illustrative purposes, and lack of space precludes us from elaborating on others.
2 See Secretary of U.S. Department of Health Human Services, Tommy Thompson's testimony to the United States House Committee on Energy and Commerce, February 12, 2003. Available at http://energycommerce.house.gov/108/Hearings/02122003hearing786/Thompson1294.htm
3 Although this is not a systematic content analysis, it does indicate increasing media attention to obesity. Inclusion of print media as well as local television news in an analysis of coverage on obesity may actually provide a more complete and accurate picture on how obesity is evolving into a public health problem.
4 Tuskegee experiments are infamous experiments where African Americans suffering from syphilis were left untreated.

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