

ORIGINAL ARTICLE

# Integrating Message Effects and Behavior Change Theories: Organizing Comments and Unanswered Questions

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*Three broad classes of theories about message effects in cancer control are presented in this special supplement to the Journal of Communication. These are behavior change, information processing, and message effects theories. All three types have implications for the design of messages for cancer control. The theories are not just different approaches to a complex problem but offer complementary perspectives on the effects of messages on audiences. This summary article explores why theory is so important to efficient research in message effects and speculates about the interrelation among behavior change, information processing, and message effects models.*

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This special issue of the *Journal of Communication* resulted from papers submitted to a workshop entitled “Integrating Theories of Message Effects and Health Behavior Change to Improve Cancer Control” held at the Annenberg School for Communication at the University of Pennsylvania in November 2003. The conference was sponsored by the National Cancer Institute and cosponsored by the International Communication Association and the Annenberg Public Policy Center. The workshop grew from the recognition that advances in communication science for cancer control required not just reflection on theories about messages and their effects but integration across theories pertinent to message effects and across the many different kinds of scientists who conduct such research.

The workshop’s goals were to investigate the integration of three classes of theories in their application to problems of the prevention of risky behavior and adoption of healthy behaviors. The three classes include (a) *human information processing* theories pertinent to behavior change; (b) *behavior change theories* describing rational, emotional, social, and personal predictors of healthy and risky behavior; and (c) *message effect theories* predicting the format and content of messages that produce effects on cognitive, attitudinal, and emotional outcomes.

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The workshop sought to create a dialogue among researchers in each of these areas to propel greater theoretical coherence and improve applications in health communication. The results of the workshop are the 13 papers that comprise this special issue of the *Journal of Communication*.

In this overview article, my goal is to elaborate the connections among the theories and research presented and to raise some questions that are as yet unanswered about the design of messages for effective cancer control. To accomplish the first goal, it is useful to think of the various articles as representatives of certain categories such as behavior change, information processing, and message effects theories. Although the distinctions are sometimes blurred, the candidate articles within each group are described in Table 1. The articles from the workshop do not represent all theories and models of behavior change or information processing that are pertinent to message effects. But they are central theories. Similarly, a number of other approaches to message effects could have been included, for example, focusing on priming effects (Ybarra & Trafimow, 1998) or normative appeals (Cialdini, 2003). However, the articles in this issue represent some of the core approaches across the domain of message effects.

These categories are offered not to suggest that behavior change and information processing theories have nothing to say about message design nor that message effects theories are driven more by practicalities of message design than by theoretical considerations. To the contrary, all the articles address message design in some (more and less specific) ways, and all the articles are grounded in established theory in some way. But the categories provide at least one way to think about a hierarchical organization for an enlarged approach—if not yet a theory—about the design of effective messages.

**Table 1** Groups of Theoretical Approaches Pertinent to Message Effects

	Topic	Authors
Behavior change theories	Integrated model of behavior change	Fishbein and Cappella
	Behavioral beliefs in smoking initiation	Krosnick et al.
Information processing	Activation model of information exposure	Stephenson and Southwell
	Limited capacity model of motivated mediated message processing	Lang
Message effects	Elaboration likelihood model	Briñol and Petty
	Unimodel	Kruglanski et al.
	Emotional appeals	Dillard and Nabi
	Emotion functions	Peters et al.
	Tailoring	Rimer and Kreuter
	Narratives	Green
	Frames (gain and loss)	Rothman et al.
Systemic factors	Exemplars	Zillman
	Cultural and social	Viswanath and Emmons

In what follows, I will offer a series of summary statements about the 13 articles of this special issue. These statements may help us understand how the approaches described here contribute to the design of effective messages in cancer control.

### **Theories of message effects, not just careful testing of messages, are necessary for effective cancer control**

Messages designed to achieve persuasive goals can be conceptualized in an infinite number of different ways. Too, the number of different message components and their combinations that could possibly affect a message's overall effectiveness is virtually unfathomable. For example, consider designing a simple brochure to be placed in a doctor's offices encouraging male patients over 40 years to obtain a regular prostate-specific antigen (PSA) test along with a digital rectal exam. In addition to questions about color, font, the use of pictures, reading levels, technical terms, length, and so on, the brochure's creator must decide whether to use gain or loss frames for presenting positive and negative consequences, personal stories, statistics, intense language, strong arguments and evidence, and a thousand other possible considerations. In the face of such complexity, why not simply test each message that might be used in a public health campaign, message by message, and population by population? Given an infinity of message features, a plausible case can be made for testing the effectiveness of each unique message in each context rather than developing theories that might provide insight across contexts.

The obvious counterargument is inefficiency. Individualized message testing in the absence of theory to direct the testing and in the absence of controlled testing procedures produces little knowledge that can be transferred to other contexts. The goal of theory-driven message testing is to generate knowledge that can be transferred to parallel cancer control contexts. To find that posttest intentions to get a PSA test annually are higher after reading a brochure than before provides no information about what particular feature of the brochure produced elevated intention or whether it was some particular combination of features.

Even if the testing procedure allows for isolation of the key message feature responsible for the favorable effects on intention, not knowing why the feature had its effects creates other inefficiencies that stymie the development of useful knowledge. For example, suppose two brochures are compared that differ only in the use of gain versus loss frames, with the loss-framed version producing greater elevation in the intention to screen. If we also do not know why the loss frame was more effective, we are at a loss for connecting findings with this message feature to other findings on different features that employ the same mechanism. So if the effects are mediated by emotional processes linked to the arousal of threat and efficacious means of alleviating that threat, then the effects of gain and loss frames might be understood as operating in a manner that is parallel to other message features that activate withdrawal emotions such as fear, anxiety, and apprehension. The results

would be a much more parsimonious way to think about the very complex—indeed infinitely complex—world of message features and their effectiveness.

In short, message effects theories must be the choice over simple message testing approaches for very practical reasons. We want our research to be both efficient and effective. Theory-driven research about message effects allows us to isolate which message features are most responsible for the consequences of a given message and, when the mechanisms are understood as well, to connect message features that would otherwise be seen as completely disconnected as operating through the same theoretical mechanisms.

In the articles in this issue, three classes of theories are pertinent to message effects—behavior change theories, information processing theories, and message effects theories. We next explore some of the linkages among these groups of theories.

### **Behavior change and information processing theories are complementary**

Behavior change and information processing theories are not simply two different traditions of theorizing about attitude processes but are complementary, offering information to message designers, which in combination answers questions the other approach ignores. They do not simply answer different questions, they answer complementary questions.

Behavior change theories answer questions about routes to behavioral intention and behavior change. The theories can be used to target beliefs that are plausible and viable options for change. Fishbein (this issue) points out that behavior change theories can provide useful guidance about routes and beliefs that could produce behavior changes when based on thorough and careful formative research. The research presented by Krosnick, Chang, Sherman, Chassin, and Presson on smoking initiation provides strong evidence of the role of belief in the negative consequences of smoking by adolescents as a clear barrier to initiation. This work underscores the importance of antismoking campaigns that intensify and reinforce negative consequence beliefs about smoking in young people.

Behavior change theories guide researchers to routes to persuasion and to beliefs to target in persuasive efforts but, as Fishbein points out, they do not tell us how to design messages to achieve these changes. By contrast, information processing theories tell us little about which routes to choose or which beliefs to target but do provide guidance about which combinations of audiences and messages are likely to be more amenable or more resistant to specific interventions. For example, even if behavior change research about initiation of or quitting smoking identifies beliefs about negative consequences as predictive of intention, these theories can give no guidance—and are not intended to give guidance—about how to make a targeted belief salient, memorable, or to alter that belief and have it accepted by the target audience.

Information processing theories offer answers to this question precisely addressing psychological processes and contextual characteristics associated with attention (Lang; Stephenson & Southwell), encoding, storage, and retrieval (Lang), and acceptance

(Briñol & Petty; Kruglanski, Chen, Pierro, Mannetti, Erb, and Spiegel). The link between information processing theories of messages and behavior change theories is in many ways obvious. The behavioral change (BC) theories are not about belief change mechanisms, whereas the information processing models are. The unimodel and the elaboration likelihood model (ELM) are mute about which beliefs should be the targets of persuasion. The two classes of theories complement one another with the BC theories, directing attention to routes and topics of persuasion and the other theories to audience and context characteristics that need to be considered once the topics of persuasion are selected.

Together, the two approaches can guide researchers toward (a) selecting routes and beliefs to target and (b) considerations necessary to achieve attention, sustain attention, encode and store for later retrieval, and achieve acceptance and possibly yielding (à la McGuire, 1999). Even though they provide guidance about complex problems of message design, they do not solve these problems. Although some of the discussion about messages within information processing theories is quite specific, other discussion directs message design in only general terms. For example, activation model of information exposure (AMIE) (Stephenson & Southwell) treats message sensation value (MSV) and limited capacity model of motivated mediated message processing (LC4MP) (Lang) treats “information introduced,” both of which identify specific message characteristics that are linked theoretically to mechanisms of attention. On the other hand, the ELM and LC4MP identify more general message characteristics (argument strength and arousing message content, respectively) that are less properties of messages than they are of audience reactions to messages. Message characteristics can be manipulated by designers during message creation although audience reactions require careful formative pretesting.

### **Information processing theories focus on different stages of the persuasion process**

In his pioneering work on communication and persuasion, McGuire (1999) did a great service for both theoreticians and practitioners of persuasion by identifying a set of stages in the persuasion process that still comports well with more contemporary views of information processing. He suggested that behavior change resulting from persuasive messages required several steps including exposure, attention, encoding, storage, acceptance, accessibility, and yielding.<sup>1</sup>

The four information processing articles included in this special issue treat different aspects of McGuire's (1999) communication–persuasion sequence. Although each of the information processing articles deals with the acceptance phase in some way, there are broad differences in emphasis among the approaches, making them complementary to a large extent. For example, both Stephenson and Southwell's AMIE and Lang's LC4MP are concerned primarily with components of the process prior to acceptance and yielding, whereas Kruglanski et al.'s unimodel and

Brinol and Petty's paper on the ELM assume exposure and attention focusing instead on the factors associated with acceptance.

In the real world of cancer control, intervention messages cannot be effective, unless they break through the clutter of information and are encoded for later retrieval. At the same time, having information is not the same as agreeing with the information's implications—that is, accepting it as the basis for attitude and intention formation. Without understanding the necessary conditions that make change possible, even if these conditions are not sufficient ones, then effective message interventions are impossible.

The AMIE and LC4MP models both deal with attention to messages but more narrowly in the former case and more broadly in the latter. AMIE was design in response to a particular group of adolescents at risk for drug use (Donohew, Palmgreen, & Duncan, 1980), namely high sensation seekers (Zuckerman, 1994), and to a particular problem, namely insuring attention to antidrug messages. The model has clear implications beyond this context, and the authors draw out these implications for cancer control. Attention is used in two different senses in AMIE. The first is attention as in selective exposure to some messages rather than others. This sense helps researchers deal with the message factors that might operate to “break through the clutter,” that is, the modern media experience. The second sense of attention is attention given exposure; that is, once the message is in the immediate consciousness of the audience, are cognitive resources given over to the message as it unfolds? For example, studies using “eyes on screen” as a measure of attention given exposure can indicate visual attention to a message if not the allocation of cognitive resources (Lorch, Palmgreen, Helm, Baer, & Dsilva, 1994).

Lang's LC4MP model focuses on attention, information encoding, storage, and retrieval. The theory operates from assumptions about limited capacity processing and, as a result, invites message designers to consider attentional limits and distractions which messages and persuasive situations can introduce limiting—for good or for ill—the audience's ability to process the message's content.

The ELM and the unimodel appear to take up the process of influence where the AMIE and LC4MP approaches end. They both assume exposure and attention. The appearance is deceptive. For their apparent differences in approach to what constitutes central and peripheral information in a persuasive message, both the ELM and the unimodel accept the general assumption that the audience's ability and motivation are crucial to determining whether the information in a message will be elaborated—that is, processed deeply—or not. Lang's LC4MP is centrally concerned with ability and motivation in at least two different senses, namely as characteristics of the audience and as features of the message that can motivate (e.g., through arousal) or can undermine ability (e.g., through distraction). The ELM and unimodel offer theoretical guidance for successful persuasion through the audience's ability and motivation to process the information in messages and assume exposure and attention to this information. At the same time, features of messages can affect

the more transient aspects of ability and motivation and in the process undermine or intensify elaborative processing so central to theories of acceptance.

So although the information processing theories are complementary and, on a superficial reading, seem to focus primarily on different stages of McGuire's (1999) conceptualization of the persuasion process, they are more deeply interconnected at the level of the audience's motivation and ability. Motivation and ability operate as central to all four of these theories. Motivation and ability are determined by relatively enduring audience characteristics such as knowledge and personality as well as relatively transient characteristics such as arousing music and evocative visuals. Although such enduring characteristics of target audiences are exogenous determinants of how much elaboration of the message occurs, characteristics of messages themselves can affect transient motivation and ability, altering the resources given over to elaboration of message content.

### **Behavior change, information processing, and message effect theories provide guidance for message design but at different levels of abstraction and application**

Each of the articles in this special issue offers suggestions about the structure of messages for cancer control. The behavior change theories direct routes to persuasion and topics for messages. Information processing theories direct general strategies for message choice—about the importance of message content and the use of attention-getting message features to orient audiences to a message or to a component of the message. Message effect theories direct the selection of specific appeals (fear and efficacy, gain and loss frames) and message features (vivid case studies rather than statistical information) and toward broader approaches through emotion or tailoring. Consider some of the message features that are discussed by each approach.

### **Behavior change theories do not direct message design but direct what messages should be about**

Formative research that describes the more important and less important routes to behavioral intention and behavior change can assist in determining which approaches to intervention are likely to be most effective. This formative work can also identify which behavioral beliefs are most likely to differentiate between intenders and nonintenders. These beliefs can be targeted in message interventions.

### **Information processing theories do not dictate specific message choices but instead use the audience's information processing predilections in combination with general message features to guide message choices**

Information processing theories are not just about the audience's psychological processes, but they are also about the interaction between audience characteristics

and message features that might interact with those characteristics to produce effective messages.

The AMIE focuses on the interaction between an audience's desire for stimulation measured by sensation seeking and a message's ability to satisfy that need measured by a series of message characteristics captured in the construct MSV. Audience members are assumed to be motivated by control of arousal (Berlyne, 1960). Those in need of higher levels of stimulation will be drawn to messages that have the capacity to provide that stimulation.

Lang's LC4MP argues that a message's impact is determined in part by individual differences among audience members as indicated, for example, by behavioral approach and withdrawal tendencies measured through testing for positivity offset and negativity bias in combination with arousal messages can create through their design (e.g., information introduced) and content. The theory assumes limited processing capacity on the part of the audience. The limited capacity is responsible for the interaction of individual differences in processing capacity and message characteristics in determining variation in attention, encoding, storage, and retrieval.

The ELM's predictions about message effects derive from the interaction between audience characteristics of ability and motivation and "message variables" (i.e., characteristics such as argument strength or rhetorical questions). Two competing processes are assumed to drive message processing: the drive to be correct in the face of ambiguous data and the drive for efficiency in information processing. The first pushes toward full information methods of decision making and deeper (or more elaborated) processing, whereas the latter invites shortcuts in decision making in favor of less elaboration. Although research from the ELM perspective has investigated a variety of message characteristics, the one that has received the greatest attention and had the most profound effect on how researchers think about persuasion has been argument strength. Elaborative processing of the message's content, particularly the arguments and evidence, depends in the ELM on the audience's ability and motivation.

Elaborative processing is determined by ability and motivation such that audiences who are able and motivated are more likely to carry out elaborated processing of the message, counterarguing weak messages and supporting strong messages (ignoring for the moment the effects of biased reactions). Ability and motivation are potentially endogenous factors even though they are often manipulated in experimental studies as exogenous (or fixed) factors. Exploring this possibility opens the links between ELM and AMIE and LC4MP models as more general models of message effects.

Kruglanski et al.'s unimodel makes the important point that all message content is information—at least potentially—and precategorizing it as central or peripheral may inappropriately prejudge what is central to the audience and what is not. The unimodel does not question the role of ability and motivation in affecting message elaboration, and, as a result, the linkages between the ELM and the unimodel on the one hand and AMIE and LC4MP on the other hand remain open avenues for integration.



**Message effect theories focus primarily, but not exclusively, on the “acceptance” phase of the persuasion process**

The claim that message effect theories such as gain and loss framing focus, primarily on what McGuire (1999) has identified as the acceptance phase of the persuasion process is a reasonable, but overly simple characterization of the role of certain classes of persuasive appeals. For example, gain and loss frames generally assume that audiences are exposed and attentive to message content, otherwise gain and loss framing could not work. At the same time, emotionally evocative images, as found in some antismoking ads to increase a sense of personal threat, can affect an audience's ongoing visual attention to a message functioning to undermine the ability to process other message content through distraction or enhancing attention by introducing new information. So although some message effect theories offer narrow attention to specific message characteristics and assume exposure, attention, and encoding of the information, others, which are often broader in scope, examine effects on audiences that are necessary conditions to the persuasion process.

Green's (this issue) work on narratives is a case in point. Narrative forms of communication may invite inadvertent persuasive effect in part through the ability of effective narratives to sustain attention in low-motivation audiences. Although a story's “lesson” to monitor one's PSA levels may affect the intention to get a PSA, it may do so in part by sustaining attention to a narrative context that would be lost in an alternative format such as expository. The effect of narrative on intention may occur in part because narratives have a greater capacity to sustain attention throughout the message than would expository discourse. By affecting a necessary condition for persuasive effect (i.e., attention), narrative may allow an impact on the acceptance phase.

Message effect theories offer recommendations about message design that differ in their level of specificity: strategic approaches, emotional appeals, and specific, narrow appeals. More strategic approaches include tailoring and narrative. By strategic approaches, I mean that the approach tells us how to craft messages so that the targeted behavior change will be accepted by the audience but do not tell message designers what to tailor or what the narrative should be about. Neither of these approaches represent a persuasive appeal. Instead, they represent a strategy for presenting a persuasive appeal. For example, suppose that formative research showed that women older than 40 would be more likely to get a mammogram screening on a regular basis if they were told about the negative consequences of avoiding early detection rather than the positive consequences of early detection (i.e., a loss frame). This loss appeal could be employed as a part of tailoring (to women who find such statements especially risky) or within a narrative framework. The delivery vehicles for appeals are tailored messages and narratives. Strategic approaches to message design are not persuasive appeals. They are content free in the sense that they do not offer a reason for an action in themselves. The beliefs that are targeted by a tailored or narrative approach must come from outside the approach—for example, from behavior change theories.

Emotional appeals offer a unique class of persuasive appeals. The articles by Dillard and Nabi and by Peters, Lipkus, and Diefenbach suggest in the breadth of their treatment the importance and complexity of emotional appeals. I want only to make three brief points about emotional appeals to identify their unique role in persuasion. First, emotional appeals are really a set of potential persuasive appeals. They identify specific content and hence, are appeals, as the reason for doing something or avoiding doing it. For example, an antismoking message might appeal to adolescents not take up smoking because the behavior is disgusting. The same behavior with pregnant women might employ an appeal to fear over consequences for the fetus. Both approaches are emotional, but each involves a different appeal—that is, a reason for not smoking. The reasons are it is disgusting or it is a threat to my baby.

Second, emotionally evocative messages are not only appeals that can affect acceptance but also potential distractions that can affect ability to process the message or motivators enhancing attention to the message and its contents. We ignore these effects at our peril in message design. For example, if an emotionally evocative image in a persuasive message was to draw the audience's attention to the image but away from the message's strong arguments, the image could undermine rather than enhance elaboration and undermine acceptance.

Third, the creation of emotionally evocative messages—itself a major issue in message design—remains more art than science although the science is starting to get some attention. Specifically, research on appraisal processes has identified detailed components of situations that, once construed by the audience, form the determinants of emotional reaction to the situation (Omdahl, 1995; Smith & Ellsworth, 1985). The translation of these “stimulus evaluation checks,” as Scherer (1984) calls them, to the context of message appraisal holds promise for a more scientifically based assessment of message factors that can produce reliable emotional reactions without making unnatural claims about reducing artful message design to simplistic principles.

Some message effects theories have targeted very specific message features exploring in a variety of contexts, including cancer control, the impact of those features on attitudes, intentions, and behaviors. Two of the more comprehensive and effective examples of message effects theories in this arena are included in this special issue—Rothman, Bartels, Wlaschin, and Salovey's gain and loss frames and Zillman's exemplification theory. Each offers specific direction in message design in a cancer control context, and each derives from a broader theoretical base. In the case of gain–loss frames, the theoretical base is prospect theory (Slovic, Finucane, Peters, & MacGregor, 2002), whereas in the case of Zillman's approach, exemplification theory has its roots in cognitive heuristics (Fiske & Taylor, 1991) that has been so central to understanding human decision making.

Both approaches have produced bodies of important and useful research. Both have also struggled to produce data supporting a clear explanation of the mechanism through which gain–loss and exemplification effects operate. The most commonly

cited explanation for gain–loss effects is emotional mediation in gain–loss (Salovey, Schneider, & Apanovich, 2002) and cognitive availability in exemplification studies (Zillman & Brosius, 2000). If these expected mechanisms are found valid, then the connections between the research in gain–loss frames or vivid exemplars and the information processing approaches to message effects become ripe for examination. If a vivid exemplar about skin cancer draws attention and enhanced encoding, it may also have the capacity, if poorly designed, to distract the audience from other message content or lead to cognitive overload and defensive processing as some have suggested (Keller & Block, 1997). The point is that even very specific message effects theories such as gain–loss and exemplification offer explanatory mechanisms that engage with the broader explanatory mechanisms of certain of the information processing theories. Exploring these connections will enrich information processing theories by making them more specific regarding message design and enrich the narrow message effect theories by linking them to a broader array of potential message features.

### Some directions for message effect theories

#### Choosing one appeal framework rather than another

Message effects theories have yet to address questions about what kind of appeal should be selected from the appeals or strategies available to the message designer. To appreciate this issue, assume for the moment that formative research has been conducted on treatment seeking for smoking so that it is already known that the attitudinal route is the most salient route to the intention to seek treatment and that a particular behavioral belief has been identified as a potential target of persuasion—for example, avoiding manipulation by tobacco companies (Fishbein). Assume, further, that exposure to the message and attention to its contents are not issues because the messages will be delivered in a context where both can be assured. The question that still remains is what approach to belief change should be undertaken. Should the message use a rational or emotional appeal? If the appeal is a rational one, should the message be manipulated by framing it clearly as gain or loss or manipulated by making the consequences carried by vivid exemplars or both?

In short, researchers and message designers in public health have had little guidance from our theories about message effects for choosing among appeals.<sup>2</sup> More is known about choosing between appeals within a message framework (e.g., gain vs. loss) than between frameworks (e.g., vivid exemplars vs. strong arguments in an expository frame). This issue raises a second problem. When multiple features are incorporated in the same message, how can we study the effectiveness of combinations of features? In the example of treatment seeking, will a loss-framed vivid exemplar that activates fear work better or worse than a gain-framed vivid exemplar that activates disgust? The complexity of consequences when three or more message features are involved calls for new methods and integration across theories. Recent work reported in the Rimer and Kreuter and manuscript suggests the potential value

of fractional factorial designs in addressing this question empirically (see also Collins, Murphy, Nair, & Strecher, 2005).

### **Moving from the art of message design to the science of message design**

The creation of effective persuasive messages is a matter of both science and art. Much of the research reported in this special issue emphasizes the science of message effects and little on the science of message design. Part of the reason for this imbalance is that certain aspects of message design are much less under the control of a priori principles than others. For example, ascribing gain and loss frames to an appeal is relatively straightforward, making this approach to message design particularly easy to implement. On the other hand, potentially powerful techniques such as strong arguments, transporting narratives, and emotionally evocative texts or videos are not susceptible to implementation via simple design principles. Tools for the evaluation of argument strength (Cacioppo, Harkins, & Petty, 1981) transportation through narrative worlds (Green) and emotional involvement are available. The tools for evaluation of each are really just a way to replace message design with audience evaluation.

Researchers are clearly aware of this problem. Areni (2002), Morley and Walker (1987), and Johnson and Smith-McLallen (2006) are working on the logical and psychological features of strong and weak arguments. Others have carried out studies translating appraisal theories of emotional response into the message, especially video message, domain (Dillard, Kinney, & Cruz, 1996). The structure of effective narrative has received attention in cognitive psychology (Bruner, 1986; Schank & Abelson, 1995) and film theory (Bordwell, 1985; Grodal, 1994). Although helpful, there is much distance to be covered.

### **Multilevel approaches**

The theories in this special issue are oriented primarily toward the design and effects of messages aimed at individuals for cancer control. Viswanath and Emmons, on the other hand, draw our attention to institutional, social, and cultural factors that can operate to maintain differences in healthy behavioral choices and in disparities in risk. The next generation of thinking about message effects should give serious consideration to both the methods for multilevel data gathering and analysis (Raudenbush & Bryk, 2002) and the multilevel theory development (e.g., agent-based models, Wooldridge, 2004).

### **Summary**

In conclusion, all the theories presented in this issue are pertinent to the effects that messages can have. The theories are complex not only because each offers a different lens through which to see but because the light they can provide on the impact of persuasive messages on cancer control is refracted through the contiguous lenses that the other theories offer. Understanding the relationships among the theories is a major challenge, but one for which the payoff could be significant improvement in health.

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## Notes

- 1 McGuire's (1999) steps are more complex than those listed here, but this subset is sufficient for our purposes.
- 2 Some research has been done on matching the basis for the appeal with the audience's thinking style (Rosenthal & Epstein, 2000) and also with the emotional or rational basis for the attitude (Fabrigar & Petty, 2003).

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