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Fundamental Processes Leading to Attitude Change: Implications for Cancer Prevention Communications

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Developing appropriate intervention strategies for cancer-related communications depends on understanding the basic mechanisms underlying persuasion. By examining the psychological processes through which attitudes change, cancer researchers can understand and predict further changes in behavior and maximize the chances of designing effective research and interventions. In the present article, we group the main persuasion processes into meaningful categories to provide a useful guide to organize the reviewed findings. One of the most common findings on cancer communication has been that matching persuasive messages to people's characteristics increases persuasion. The present review provides a detailed examination of the different psychological mechanisms through which such persuasive matching effects and exceptions might occur.

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Given that most people want to stay healthy and avoid personal injury, one might expect that changing health-relevant attitudes and behaviors would be relatively easy. Yet, it is not. For example, although adolescents are well aware of the health risks associated with cigarette smoking, a substantial minority continue to choose to smoke (e.g., Leventhal & Cleary, 1980). Similarly, despite the fact that most people are fully aware of the risks involved in carrying extra poundage, most of the people who lose weight by dieting will gain it all back (and more). In addition, despite the fact that people increasingly appreciate the risk of melanoma associated with tanning, tanning salons continue in business. As noted by Salovey and Rothman (2003), despite the fact that early detection of breast cancer allows women to have many more alternatives for effective treatment, only about half of the women who should obtain a screening mammogram actually do so.

As might be expected by these examples, numerous studies of the effectiveness of media and direct health interventions have been disappointing in terms of producing or sustaining attitude and behavior change (see Devos-Comby & Salovey, 2002; Rothman, 2000). Indeed, different investigators have pointed out that simply

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providing information and increasing knowledge about a topic is not sufficient to lead to attitude and behavior change (Helweg-Larsen & Collins, 1997; Petty, Baker, & Gleicher, 1991). Our view is that persuasive communications and behavioral interventions can be made more effective to the extent that they are designed with relevant psychological theory in mind.

Along with other social psychologists (see Salovey & Rothman, 2003), we believe that developing and selecting appropriate intervention strategies for social influence depends on understanding the basic mechanisms underlying persuasion.¹ Moreover, we believe that understanding *why* a particular intervention technique is effective increases the probability that this procedure can be integrated into interventions across diverse health domains. The primary goal of this article is to explicate the primary psychological processes responsible for attitude change. We focus on psychological processes because of their pivotal role in understanding and determining health behavior. In particular, certain mechanisms of change are more likely to produce attitudes that are strong (i.e., persistent over time, resistant to change, and predictive of behavior).

The article is divided into five sections. We describe (a) the key psychological processes underlying attitude change; (b) the relationship between communication variables and attitude change processes and their implications for attitude strength; (c) the influence of one highly studied variable, message matching (i.e., targeting, tailoring), on attitude change and strength; (d) the explicit and implicit psychological processes underlying the persuasive effects of matching; and (e) the implications of understanding attitude change processes for behavioral change.

Fundamental processes underlying attitude change

In this section, we describe the fundamental processes by which any communication variable can influence attitude change. By the term *communication variable* we refer to any aspect of the source (e.g., credibility), message (e.g., number of arguments), recipient (e.g., mood), or context (e.g., presence of distraction) that can vary in a given persuasion situation. The number of variables of potential relevance to persuasion is endless, so we will focus on some that have received research attention. Consistent with the Elaboration Likelihood Model (ELM) of persuasion (Petty & Cacioppo, 1986) we argue that any variable (i.e., whether related to source, message, recipient, or context) can influence attitude change by affecting the amount of thinking, the direction of thinking, structural features of thoughts, and by serving as arguments (evidence) or as cues (see Petty & Wegener, 1998a).

Amount of thinking

One of the most fundamental influences that a variable can exert on attitudes is to affect the amount of thinking people do about a persuasive communication. Increasing the amount of thinking can get people to carefully process the relevant information presented and therefore be influenced by it. The more motivated and able

people are to think about a message, the more their attitudes are determined by their issue-relevant thoughts in response to the message (Petty, Ostrom, & Brock, 1981). In a persuasion context, issue-relevant elaboration typically involves accessing relevant information from both external and internal sources; scrutinizing, making inferences, generating new arguments, and drawing new conclusions about the merits of the attitude object (Petty & Cacioppo, 1986).² These mental activities are likely to lead to the integration of all relevant information into the underlying structure (schema) for the attitude object, therefore making the adopted evaluation stable and coherent. Thus, attitudes based on high amounts of thinking are postulated to be *stronger* than attitudes based on little thought. That is, they are proposed to be more accessible, stable, resistant to countermessages, and predictive of behavior (see Petty, Haugtvedt, & Smith, 1995; see also Petty & Briñol, in press). Considering the amount of thinking underlying attitude change is fundamental for cancer-related communications because the overall goal of these messages is to produce long-term behavior change.

The difficulties of creating thoughtful attitude change are familiar to health promotion researchers. For example, there are great challenges in engaging young adults in cancer prevention topics such as dieting simply because they often do not see them as personally relevant or important to their lives. Because of these challenges, it is essential for cancer-related researchers to understand what variables successfully engage the thoughtful processing of cancer-related communications in each population. A variety of different variables have been examined that can influence attitude change by affecting people's general *motivation* and *ability* to think about a message.

Perhaps the most important determinant of interest and motivation to process a message is the perceived *personal relevance* of the communication. The basic notion is that there are some situations in which some aspect of the persuasive message or issue can be linked to some aspect of the message recipient's "self," making the message personally relevant. Linking the message to almost any aspect of the self, such as one's values, one's outcomes, one's self-conception, one's identity, and so forth, can enhance self-relevance (Fleming & Petty, 2000; Petty & Cacioppo, 1990). For example, if a woman has a family history of breast cancer, then she might be motivated to think about a persuasive message about breast self-examination based on perceived self-relevance (Rothman & Schwarz, 1998). In a powerful demonstration of the power of perceived self-relevance, Burnkrant and Unnava (1989) found that simply changing the pronouns in a message from the third person (e.g., "one" or "he and she") to the second person ("you") was sufficient to increase personal involvement and processing of the message arguments. Similarly, Rothman, Salovey, Turvey, and Fishkin (1993) demonstrated that a persuasive communication emphasizing a woman's own responsibility for getting a mammogram ("Eight out of 10 lumps that *you* might find will not be breast cancer.") had more impact in the use of screening mammography than a communication emphasizing external responsibility for detecting breast cancer (e.g., "Eight out of 10 lumps that *a doctor* might find will not be breast cancer"). Notably, by increasing the personal relevance of a message,

people scrutinize the evidence more carefully such that if the evidence is found to be strong, more attitude change results, but if the evidence is found to be weak, less attitude change occurs (Petty & Cacioppo, 1979, 1990).

In addition to risk status, there are additional factors that might be relevant to increase perceived personal relevance of a cancer-related communication. One of potential importance is early diagnosis. Early diagnosis of possible cancer either through the discovery of elevated prostate specific antigen (PSA), colon polyps, or some other result that could possibly be benign would likely elevate relevance. Unfortunately, people often tend to be overconfident in their optimistic views regarding perceived risk, making it difficult to lead them to preventive behaviors (e.g., Dunning, Heath, & Suls, 2004). For example, smokers underestimate the likelihood of lung cancer death rates compared to nonsmokers, and differences hold even between light and heavy smokers (e.g., Leventhal & Cleary, 1980). Because unrealistic optimism is based in part on a need to defend the self against possible threats (Weinstein, 2003), persuasive treatments that allow people to self-affirm themselves prior to receipt of a message might be particularly useful for health communications (e.g., Sherman, Nelson, & Steele, 2000; see also Briñol, Petty, Gallardo, & DeMarree, in press).

Although increasing the perceived personal relevance of a message is an effective way to increase thinking, it is not the only one. For example, several studies have shown that when a person is not normally motivated to think about the message arguments, more thinking can be provoked by summarizing the major arguments as *questions* rather than as *assertions* (Howard, 1990; Petty, Cacioppo, & Heesacker, 1981; Swasy & Munch, 1985), by having the individual arguments presented by multiple independent sources rather than just one (Harkins & Petty, 1981; Moore & Reardon, 1987), and by making some aspect of the message surprising or unexpected (Baker & Petty, 1994; Smith & Petty, 1996).

Having the necessary motivation to process a message is not sufficient for thoughtful central route persuasion to occur, however. In addition, to create strong, consequential attitudes, people must also have the ability to process the message. For example, a complex or long message might require more than one exposure for maximal processing, even if the recipient was highly motivated to think about it (Cacioppo & Petty, 1989). Of course, repetition is just one variable that has an impact on a person's ability to think about a message. For example, if a message is accompanied by distraction (Petty, Wells, & Brock, 1976) or if the speaker talks too fast (Briñol & Petty, 2003; Smith & Shaffer, 1991), thinking about the message will be disrupted. Anxiety (e.g., about a possible positive test result) could also reduce the ability to process cancer communications.

Different media sources also have an impact on peoples' ability to think about the message. Specifically, people are generally better able to process messages that appear in the print media than those that are controlled externally (e.g., radio and television; Chaiken & Eagly, 1976; Wright, 1981). When strong arguments are presented, disrupting thinking should diminish persuasion, but when weak arguments

are presented, disrupting thinking should actually enhance persuasion by reducing the counterarguing that would have occurred.

Type or direction of thinking

When motivation and ability to think are high, people will be engaged in careful thought about a message, but that thinking can be biased by other variables in the persuasion setting. Most importantly, variables can motivate or enable people to either support or derogate the content of the information provided. The success of information in changing attitudes is a function of the number and valence of thoughts that come to mind when elaboration is high (see reviews by Eagly & Chaiken, 1993; Petty & Cacioppo, 1986).

Some features of the persuasion situation increase the likelihood of favorable thoughts being elicited, but others increase the likelihood of unfavorable thoughts coming to mind. Although the subjective cogency of the arguments used in a message is a prime determinant of whether favorable or unfavorable thoughts are elicited when message thinking is high, other variables can also be influential in determining whether favorable or unfavorable thoughts predominate (Petty & Cacioppo, 1990). For example, instilling “reactance” in message recipients by telling them that they have no choice but to be persuaded on an important issue *motivates* counterarguing even when the arguments used are strong (Brehm, 1966; Petty & Cacioppo, 1979). On the other hand, if people are put in a good mood prior to hearing an involving message, their thoughts will be biased in favor of the message (Petty, Schumann, Richman, & Strathman, 1993). Biased thinking, whether favorable or unfavorable, often reduces the impact of message quality on persuasion compared to objective thinking (Petty & Cacioppo, 1986). Ability factors can also produce bias. For example, people who possess accessible attitudes bolstered by considerable attitude-congruent knowledge are better *able* to defend their attitudes than those who have inaccessible attitudes or attitudes with a minimal underlying foundation (Fazio & Williams, 1986; Wood, 1982).

In general, anytime a message takes a position opposed to one’s attitudes, or disfavors one’s values, outcomes, or groups, people will be biased against it. And, when a message takes a position in favor of one’s attitudes, or is supportive of one’s values, outcomes, or groups, people will be biased in favor of it. To be clear, as noted earlier, when a message is framed as simply relevant to one’s attitudes, outcomes, values, or identity, the *extent* of information processing is affected, but when a message takes a particular position with respect to one’s attitudes, outcomes, values, or identity, the *valence* of the processing can be affected (Petty & Cacioppo, 1990).

Structural features of thoughts

The structural features of thoughts refer to dimensions other than direction (favorable or unfavorable) and amount (high or low). In particular, in this section we refer to metacognitive aspects of thinking, or thoughts about thoughts (for a review on this topic, see Petty, Briñol, Tormala, & Wegener, in press), though other structural features such as accessibility of thoughts are also important. When the amount of

thinking is high, variables can affect metacognitive features of the thoughts that are generated such as how much confidence people have in their thoughts or how biasing they seem. Confidence in thoughts is important because when thoughts are held with greater confidence, people are more likely to use them in forming their judgments (Petty, Briñol, & Tormala, 2002). On the other hand, if people doubt the validity of their thoughts, the thoughts will not have an impact on judgments. This may be one reason why some communication campaigns are unsuccessful. That is, they may produce the appropriate favorable thoughts, but these thoughts may not be held with sufficient confidence to affect judgments.

If people believe that their thoughts are biasing in some way, they can adjust their judgments in a direction opposite to the implication of the thoughts (correction processes; Petty & Wegener, 1993; Wegener & Petty, 1997; Wilson & Brekke, 1994). These metacognitive processes have the greatest impact when the amount of thinking is high because it is largely in such situations that people have a substantial number of issue-relevant thoughts with the potential to shape attitudes. Thus, individual and situational differences in the extent of thinking moderate these metacognitive processes.

The most studied metacognitive process regarding thoughts is referred to as self-validation (Petty, Briñol, et al., 2002), or the process by which people come to have confidence or doubt in their thoughts. Thought confidence varies as a function of many factors (for a review, see Briñol & Petty, 2004). The factors affecting confidence range from individual variables, such as a person's current mood state and overt behavior (Briñol & Petty, 2003), to situational factors such as the credibility of the source associated with the message (Briñol, Petty, & Tormala, 2004; Tormala, Briñol, & Petty, in press), the number of other people who share one's thoughts (Petty, Briñol, et al., 2002), and the ease with which their thoughts come to mind (Tormala, Petty, & Briñol, 2002).

Apanovitch, McCarthy, and Salovey (2003) proposed that the certainty associated with the likelihood of a test's outcome moderates the traditional effects of message framing. These authors found that only among participants who reported being certain of an HIV test outcome was a gain-framed video more successful than a loss-framed message. Among women who perceived the outcome of HIV testing as relatively uncertain, gain- and loss-framed videos produced similar effects. This research suggests that assessing the confidence with which people hold their thoughts in response to prevention communications (and manipulating the sources of that confidence) might contribute to the design of effective campaigns.

Serving as arguments

When the amount of thinking is high, people assess the relevance of *all* of the information in the context and that comes to mind in order to determine the merits of the attitude object under consideration, that is, people examine source, message, recipient, contextual and internally generated information, and feelings—as possible arguments or reasons for favoring or disfavoring the attitude object. Individuals vary in what type of information serves as persuasive evidence for any given attitude

object. For example, when thinking carefully, source attractiveness can serve as an argument for a skin protection product (i.e., “If I use the product, I’ll look like that”). As explained shortly, for other products, attractiveness might serve as a simple cue.

Serving as cues

Variables can influence attitudes by serving as simple cues. That is, under low-thinking conditions, attitudes are influenced by a variety of low-effort processes such as mere association (Cacioppo, Marshall-Goodell, Tassinari, & Petty, 1992) or reliance on simple heuristics (Chaiken, 1987). This is important because it suggests that attitude change does not always require effortful evaluation of the information for its merits. Instead, when a person’s motivation or ability to process the issue-relevant information is low, persuasion can occur by a peripheral route in which processes invoked by simple cues in the persuasion context influence attitudes. For example, various features of a communication (e.g., pleasant scenery in a TV commercial or an attractive model) can elicit an affective state (e.g., a good mood) that becomes associated with the advocated position (as in classical conditioning, Staats & Staats, 1958). Or, the source of a message can trigger a relatively simple inference or heuristic such as “experts are correct,” (Chaiken) that a person can use to judge the message. Similarly, a person might simply count the arguments and reason that “if there are so many arguments it must be good” (Petty & Cacioppo, 1984a).

Peripheral ways to change attitudes can be very powerful in the short term. The problem is that over time, moods dissipate, peoples’ feelings about sources can change, and the cues can become dissociated from the message. These factors would then undermine the initial attitude change. Research has shown that attitude changes based on peripheral cues tend to be less accessible, enduring, and resistant to subsequent attacking messages than attitudes based on careful processing of message arguments (see Petty et al., 1995, for a review).³

The influence of communication variables on persuasion

The Elaboration Likelihood Model of persuasion (ELM; Petty & Cacioppo, 1981, 1986) identifies the key processes just reviewed and highlights their role in producing attitude changes that are consequential or not (see Petty, Priester, & Briñol, 2002; Petty & Wegener, 1999). As depicted in Figure 1, the ELM postulates that any communication variable (i.e., whether source, message, recipient, or context) influences attitudes by affecting one of the key processes of persuasion. That is, any given feature of the persuasive setting (e.g., a recipient’s mood, the attractiveness of the message source) can serve as an issue-relevant argument, or a peripheral cue, or affect the motivation or ability to think about the message, bias the nature of the thoughts that come to mind, or affect structural properties of the thoughts such as how much confidence people have in them.

If any one variable can influence persuasion by several means, it becomes critical to identify the general conditions under which the variable acts in each of the different roles or the ELM becomes descriptive rather than predictive (cf., Stiff,

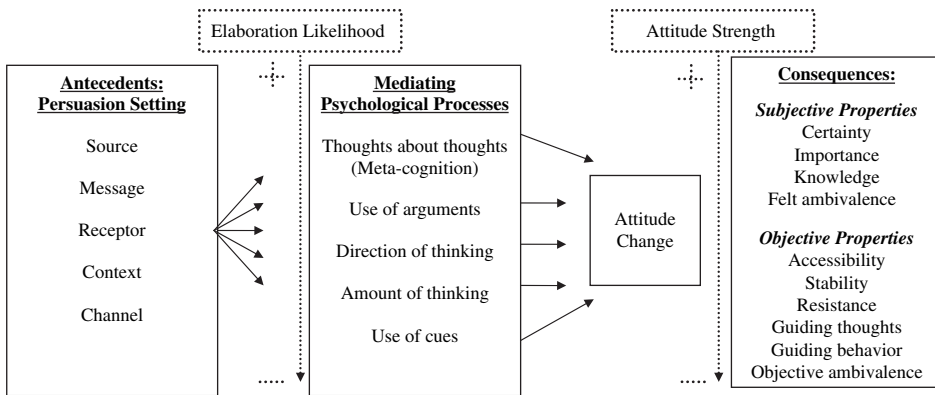


Figure 1 Fundamental processes in attitude change: antecedents and consequences.

1986). The ELM holds that when the elaboration likelihood is high (such as when perceived personal relevance is high), any given feature of the persuasive setting can serve as an argument if it is relevant to the merits of the issue. In addition, when thinking is high, variables can influence the valence of the thoughts that come to mind, thereby biasing the ongoing thinking. Or, variables can influence the structural properties of the cognitive responses that occur. The first two processes tend to occur when the variable is introduced either prior to or during the message (i.e., before or during message processing). The latter process (self-validation) tends to occur largely after thoughts are generated.

On the other hand, when the elaboration likelihood is low (e.g., low personal relevance), evaluations are likely to be the result of relatively simple associations or inferences based on salient cues. Thus, variables can determine attitudes under low elaboration to the extent that they can function as simple cues. Finally, when the elaboration likelihood is moderate (e.g., uncertain personal relevance), people may examine the persuasion context for indications (e.g., is the source credible?) of whether or not they are interested in or should process the message. A few examples should help to clarify the multiple roles that any given feature of the persuasive setting can have in different situations.

As one example, consider the mere number of arguments that a message contains. This variable serves as a simple peripheral cue when people are either unmotivated or unable to think about the information (Petty & Cacioppo, 1984a). That is, people might simply count the arguments in a message and agree more, the more information that is presented—regardless of the cogency of that information. When motivation and ability are high, however, the informational items in a message are not simply counted and used in a simple inference (more is better), but instead the information is processed for its quality. Thus, when the number of items in a message serves as a cue (low-elaboration conditions), adding weak reasons in support of a position enhances persuasion, but when the items in a message are processed in

a qualitatively different way (for merit), adding weak reasons reduces persuasion (Alba & Marmorstein, 1987; Friedrich, Fetherstonhaugh, Casey, & Gallagher, 1996; Petty & Cacioppo).

The mere number of arguments is only one of the message factors that can influence persuasion through different processes in different situations. To take one more example, consider the complexity of the message (e.g., difficult vocabulary, sentence structure, etc.) that is characteristic of cancer communications that include technical terminology. Such complexity could serve as a simple cue when the elaboration likelihood is low. For example, a person might use the heuristic, "this pamphlet seems to include a lot of complex information about sun blocking, therefore using it might be good." When the elaboration likelihood is not constrained to be high or low, complexity might affect the amount of thinking that occurs. That is, some people (e.g., those high in need for cognition; Cacioppo & Petty, 1982) might be challenged by a message that seems complex, but other individuals (e.g., those low in need for cognition) might eschew processing a message that is perceived as difficult (Evans & Petty, 2003). Finally, under high-elaboration conditions, other roles for message complexity are possible. In one study, for instance, it was shown that under high-elaboration conditions, complex information undermined people's confidence in their thoughts (cf. Petty & Briñol, 2002).

Source factors, such as expertise or attractiveness, have been also found to affect attitude change through different processes depending on the situation (see Petty & Cacioppo, 1984b). Depending on the elaboration likelihood and other factors (e.g., relevance to the attitude object, placement before or after the message), source factors have been found to influence persuasion by serving as a peripheral cue (Petty, Cacioppo, & Goldman, 1981; see also Chaiken, 1980), by affecting how much thinking people did about the message (Heesacker, Petty, & Cacioppo, 1983; Moore, Hausknecht, & Thamodaran, 1986; Puckett, Petty, Cacioppo, & Fisher, 1983), by biasing the direction of the thoughts (Chaiken & Maheswaran, 1994), by serving as persuasive arguments (Petty & Cacioppo), by affecting thought confidence (Briñol, Petty, et al., 2004; Tormala et al., in press), and by leading to correction processes (Petty, Wegener, & White, 1998; Wegener & Petty, 1995).

Similarly, recipient factors can serve in the same multiple roles as source and message factors. For example, depending on elaboration and other conditions, a person's mood has been found to influence persuasion by (a) affecting the amount of information processing, (b) biasing the thoughts that are generated, (c) influencing confidence in one's thoughts, (d) serving as a persuasive argument, or (e) affecting the selection and use of simple cues and heuristics (for a review, see Briñol, Petty, & Barden, 2006; Petty, Fabrigar, & Wegener, 2003). Note that both simple (e.g., source attractiveness) and complex (e.g., 8 item attributes) information can be processed as cues or arguments or serve in other roles depending on the elaboration likelihood. Next, we apply this multiple-roles framework to examine the variable that perhaps has generated more research in the domain of health persuasion than any other: message tailoring (see also Petty, Barden, & Wheeler, 2002).

Persuasive effects of message matching

One strategy that can increase the effectiveness of a health communication in changing attitudes and behavior consists of altering the arguments contained in the message to match the particular concerns of the message recipient. Matching or tailoring health communications to different aspects of an individual's personal characteristics can increase its persuasive effect for a number of cancer prevention and detection behaviors, including decreasing dietary fat intake (e.g., Brug, Glanz, Van Assema, Kok, & Van Breukelen, 1998), increasing fruit and vegetable consumption (e.g., Campbell et al., 1994), promoting smoking cessation (Dijkstra, De Vries, Roijackers, & van Breukelen, 1998), and motivating mammography utilization (Rakowski et al., 1998; Skinner, Strecher, & Hospers, 1994).

There are a variety of ways in which a message can be matched, including the use of an individualized message (matching at the individual level) and targeted messages (matching at the group level).⁴ Persuasive communications have been personalized by including recipients' demographic characteristics (e.g., gender, ethnicity) or other identifying characteristics (e.g., the person's name or occupation) in an effort to promote various health behaviors (Devos-Comby & Salovey, 2002).

Matching procedures can be used to match a large variety of needs, interests, and concerns of a recipient or a group to which the recipient belongs (Kreuter, Farrell, Olevitch, & Brennan, 2000). For example, a communication can match the individual's stage of behavior change. According to stages of change models (e.g., Prochaska, DiClemente, & Norcross, 1992), individuals pass through five distinct stages (precontemplation, contemplation, preparation, action, and maintenance) on the path to behavioral change. Educational materials that match the individual's stage of change have been found to be more effective in increasing mammography utilization than standard materials or than not providing materials (e.g., Rakowski et al., 1998). Research conducted on the stage of change model has shown that matching different therapeutic treatments (e.g., self-reevaluation, conditioning, stimulus control) with the specific change stage (e.g., contemplation, preparation) can improve the efficacy of those treatments in a variety of cancer-relevant domains (e.g., Prochaska et al., 1992).

Similarly, Herek et al. (1998) conducted an investigation on cultural matching in which it was found that messages matching a participant's specific ethnic identity were more effective in affecting the evaluation of a HIV-related message than were multicultural messages. Highly individualized messages matching several variables at once have also proven successful (e.g., combining information from questionnaires, medical records, and other sources; Kreuter, Strecher, & Glassman, 1999).

Communications have also been matched on the basis of more general individual differences. For example, Brock, Brannon, and Bridgwater (1990) found that matching messages about losing weight to self-schemas of the message recipients (measured with an adjective-rating task in which participants indicated their overall personality types) resulted in more persuasion than presenting the same information without matching to schema set. In other research, Bakker (1999) matched messages to individuals who

differed in their need for cognition (Cacioppo & Petty, 1982). This individual difference refers to a person's propensity to engage in and enjoy effortful cognitive activities. Those high in need for cognition tend to follow the central route to persuasion, whereas those low tend to follow the peripheral route (see Cacioppo, Petty, Feinstein, & Jarvis, 1986, for a review). Bakker found that those low in need for cognition were more persuaded by health-related communications when they were in a format that seemed easy (rather than difficult) to process (matching their processing style). Extending this research, Williams-Piehot, Schneider, Pizarro, Mowad, and Salovey (2003) demonstrated that messages matched to an individuals' need for cognition were better at motivating mammography 6 months later as compared to mismatched messages.

In a similar vein, Epstein used his Cognitive-Experiential Self-Theory (CEST) (see Epstein, 2003, for a review) to match messages to recipients. The CEST argues that there are two independent information-processing systems that operate in parallel (see also Strack & Deutsch, 2004). The experiential system is driven by emotion, is associative, rapid, and primarily nonverbal. Thus, it shares some things in common with the peripheral route. In contrast, the rational system is analytic, logical, and slower in information processing. Thus, it shares some things in common with the central route. Rosental and Epstein (2000; see Epstein, 2003) found matching effects for persuasion in a cancer prevention program. That is, in a study in which a rational message (emphasizing objective information) and an experiential message (including vivid individual cases) in favor of breast self-examination were presented, Rosental and Epstein found more persuasion when the message matched participants' thinking style, as assessed by the Rational-Experiential Inventory (e.g., Pacini & Epstein, 1999). In this inventory, those high in the rational mode also score high in need for cognition (Cacioppo & Petty, 1982).

In addition to these, matching messages to a number of other individual differences has affected persuasion. These variables include sensation seeking (Palmgreen, Stephenson, Everett, Baseheart, & Francies, 2002), optimism (Geers, Handley, & McLarney, 2003), uncertainty orientation (Sorrentino, Bobocel, Gitta, Olson, & Hewitt, 1988), ideal versus ought self-guides (e.g., Evans & Petty, 2003), independent versus interdependent self-construals (Lee, Aaker, & Gardner, 2000), dominance versus submission (Moon, 2002), introversion versus extraversion (Chang, 2002; Wheeler, Petty, & Bizer, 2005), sensitizers versus repressors (DeBono & Snyder, 1992), high versus low consideration of future consequences (Orbell, Perugini, & Rakow, 2004; Strathman, Gleicher, Boninger, & Edwards, 1994), locus of control (Williams-Piehot, Schneider, Pizarro, Mowad, & Salovey, 2004), and monitor-blunter coping styles (e.g., Williams-Piehot, Pizarro, Schneider, Mowad, & Salovey, 2005; for an extensive review of these and other variables, see Briñol & Petty, 2005).

Psychological mechanism underlying message matching

Although the effectiveness of matching seems to be a well-established phenomenon, most of the researchers did not focus their attention on the psychological

mechanisms by which matching leads to persuasion. Understanding such psychological processes is essential to predict the impact of attitude change on further behavioral change. This section outlines the different processes by which matching a message to some characteristic of the recipient can influence attitudes.

Perhaps the variable that has been studied most with respect to matching message to person is self-monitoring (Snyder, 1974). This individual difference makes a distinction between high self-monitors, who are oriented toward social approval, and low self-monitors, who are more motivated to be consistent with their internal beliefs and values. Much research on self-monitoring has shown that messages can be made more effective by matching the message to a person's self-monitoring status. For example, in one study, Snyder and DeBono (1985) exposed high and low self-monitors to advertisements for a variety of products that contained arguments appealing either to the social adjustment function (i.e., describing the social image that consumers could gain from the use of the product) or to the value-expressive function (i.e., presenting content regarding the intrinsic quality or merit of the product). They found that high self-monitors were more influenced by ads with image content than ads with quality content. In contrast, the attitudes of low self-monitors were more vulnerable to messages that made appeals to values or quality (see also DeBono, 1987; Lavine & Snyder, 1996; Snyder & DeBono, 1989).

But what are the mechanisms underlying the effectiveness of message matching? This is important to understand because of the strength properties that follow from different processes of persuasion (see Petty & Krosnick, 1995). As noted earlier, research indicates that attitude changes based on high amounts of issue-relevant thought tend to show more persistence over time, resistance, and influence in guiding behavior than changes based on little thought. Unfortunately, much of the available research on matching was not designed to examine underlying mechanisms, so it was not always clear whether matching affected attitudes by serving as a simple cue or an argument, or by affecting the amount or direction of thinking, or influencing confidence in thoughts.

The ELM, of course, holds that all of these provide possible mechanisms by which matching can influence attitudes. For example, when thinking is set at a high level (e.g., a topic of high personal interest, high accountability for a decision), then matching could bias the direction of thinking. Indeed, some research suggests that high self-monitors are more motivated to generate favorable thoughts to involving messages that make an appeal to image rather than an appeal to values (e.g., Lavine & Snyder, 1996). In contrast, when the circumstances constrain the likelihood of elaboration to be very low, a match of message to person is more likely to influence attitudes by serving as a simple cue (e.g., DeBono, 1987). That is, even when the content of the message is not processed, if a source simply asserted that the arguments are consistent with a person's values, a low self-monitor might be more inclined to agree than a high self-monitor by reasoning, "if it links to my values, it must be good."

Furthermore, when thinking is not already constrained by other variables to be high or low, matching a message to a person could increase thinking about the message. This interpretation would be consistent with results obtained by Kreuter et al. (1999) in which participants generated more thoughts in response to messages designed to match the recipients. Also in accord with the interpretation that matching can increase thinking, matched information has been found to be more likely to be read, remembered, and perceived as more relevant than mismatched health communications (Brug et al., 1998; Skinner et al., 1994). Research that has manipulated the quality of the message arguments along with a matching manipulation and shown that matching can increase persuasion when the message is strong but decrease it when it is weak provides especially cogent evidence for the view that matching can affect the extent of thinking. For example, in one study, Petty and Wegener (1998b) matched or mismatched messages that were strong or weak to individuals who differed in their self-monitoring. In this research, high and low self-monitors read image (e.g., how good a product makes you look) or quality (e.g., how efficient a product is) appeals that contained either strong (e.g., beauty or efficacy that last) or weak arguments (e.g., momentary beauty or efficacy). The cogency of the arguments had a larger effect on attitudes when the message matched rather than mismatched the person's self-monitoring status indicating that matching increased attention to message quality (see also DeBono & Harnish, 1988; Wheeler et al., 2005).

In summary, the accumulated research suggests that matching of a message to some characteristics of the recipient can influence attitudes by serving as a peripheral cue when elaboration is low, by biasing thoughts when elaboration is high, and by enhancing the amount of information processing when elaboration is moderate. Additionally, it is worth noting that matching message contents and/or frames with personality types might influence attitude change by other mechanisms under other circumstances. For example, another possibility is that when a message is matched to the person, people might come to accept the message position simply because the message "feels right" (Cesario, Grant, & Higgins, 2004) or is easier to process (e.g., Lee & Aaker, 2004). These simple fluency experiences might influence attitudes under relatively low thinking conditions. Or, the processing fluency and/or the "feeling right" experience might affect persuasion by influencing thought confidence (Cesario et al., 2004; Tormala et al., 2002) if this feeling seems to follow the thought generation. As described for other variables, this metacognitive role would be more likely to occur under relatively high elaboration conditions.

Unconscious processes in message matching

All the individual differences relevant to attitudes and persuasion described so far (e.g., need for cognition, self-monitoring) have been measured by directly asking people about their self-views. However, just as people can hold conscious, easily reportable self-conceptions, there can be less consciously held aspects of the self-concept as well (McClelland, 1985; Wilson, Lindsey, & Schooler, 2000). Early on,

these types of dimensions were assessed with projective tests (Proshansky, 1943) and other indirect measures. More recently, investigators have begun to assess these self-conceptions with more contemporary implicit measures based on reaction times. The most popular of these measures, the Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998) and the Evaluative Priming Task (Fazio, Jackson, Dutton, & Williams, 1995) are designed to assess automatic reactions to various objects, including the self. Automatic aspects of personality, motivations, and attitudes are important because they can influence information processing and behavior in certain contexts independent of more deliberative aspects of one's self (see Fazio & Olson, 2003; Greenwald & Banaji, 1995).

The importance of the distinction between explicit and implicit individual differences is especially apparent when there is a discrepancy between them. Briñol, Petty, and Wheeler (in press) have suggested that such discrepancies can have important consequences for information processing and attitude change. For example, because internal inconsistencies that are explicit are often associated with aversive feelings (e.g., Abelson et al., 1968) and enhanced information processing (e.g., Maio, Bell, & Esses, 1996), individuals with discrepancies between their automatic and deliberative self-conceptions or their more automatic and deliberative evaluations might similarly be (implicitly) motivated to reduce this ambivalence by seeking and processing discrepancy-relevant information (see also Petty, Tormala, Briñol, & Jarvis, 2006). Extensive elaboration of such information might reduce discrepancies by changing either the deliberative or the automatic dimension of the self-concept or attitude object (Briñol, Petty, Horcajo, & Barden, 2006).

To examine the consequences of implicit–explicit discrepancies, Briñol, Petty, and Wheeler (in press) conducted a study in which both deliberative and automatic self-dimensions (e.g., self-esteem) were measured. Results showed that as discrepancies between the two increased, participants engaged in more thinking about a persuasive message that was framed as self-relevant. In this research, message processing was assessed by the impact of strong versus weak arguments on attitudes and valenced thoughts related to the proposal about dietary change (i.e., increasing vegetable consumption). These findings suggest that discrepancies between deliberative and automatic self-conceptions are important to understand because such discrepancies can influence attitudes by affecting the extent of information processing.

Attitudes–behavior link

We have argued that it is important to understand the process by which any variable has influenced a person's attitude. For example, if matching a message to a person produces persuasion by serving as a simple cue under low-elaboration conditions, the attitude induced will be less predictive of behavior than if matching produced the same amount of persuasion, but worked by increasing positive thoughts to the message arguments under high-elaboration conditions. Thus, predicting behavioral changes depend on understanding of the different processes by which attitude change occurs (see Figure 1).

In addition to examining the mechanisms responsible for attitude change, understanding attitude–behavior correspondence depends on a number of other relevant factors (see Fishbein & Cappella, 2006). Several models of the process by which attitudes guide behavior have achieved widespread acceptance, such as Fishbein and Ajzen's (1975) *theory of reasoned action*, and Ajzen's (1991) *theory of planned behavior*.

In contrast to the thoughtful processing highlighted by the theories of reasoned action and planned behavior, Fazio (1990) has proposed that much behavior is rather spontaneous and that attitudes guide behavior by a relatively automatic process. That is, if the relevant attitude comes to mind, consistent behavior is likely to follow. Fazio argued that attitudes can guide behavior without any deliberate reflection or reasoning if (a) the attitude is accessed spontaneously by the mere presence of the attitude object and (b) the attitude colors perception of the object so that if the attitude is favorable (or unfavorable), the qualities of the object appear favorable (or unfavorable).

For some cancer communications, attitude change, though an important first step, may still be insufficient to produce the desired behavioral responses even if appropriate new attitudes were formed by the central route. People may also need to rehearse the new attitude sufficiently so that it overcomes and replaces past attitudes (e.g., Petty et al., 2006), or they may need to acquire new skills and self-perceptions of confidence that allow newly acquired attitudes and intentions to be translated into action. Bandura's (1977, 1986) social cognitive theory provides a framework to understand these processes.

Summary and conclusions

A fundamental understanding of the basic mechanisms of persuasion can be useful in a wide variety of social contexts. In this article, those mechanisms include persuasion variables that can (a) affect the amount of information processing, (b) bias the thoughts that are generated or (c) one's confidence in those thoughts (or other structural features), (d) serve as persuasive arguments or evidence, or (e) affect attitudes by serving as simple cues and heuristics. Notably, any given variable, whether part of the source, message, recipient, or context, is capable of serving in these roles. By grouping the persuasion processes into meaningful categories, we aimed to provide a useful guide to organize and facilitate access to key findings in this literature and to maximize the chances of designing effective research and interventions related to cancer prevention.

Perhaps the most common finding in the literature on cancer communication has been that matching persuasive messages to people's characteristics increases persuasion. Consistent with the multiple-roles notion of the ELM, matching messages with personality has been found to influence persuasion by different processes depending on the likelihood of thinking.

This review also notes that the same basic human characteristics, such as motives, personality, and attitudes, are often assessed by reliance on what people consciously

and deliberately report about their self-concept. However, there might be other more automatically accessible individual differences relevant to attitude change. Matching persuasive messages to automatic aspects of the self-concept and studying the combinatory effects associated with both explicit and implicit individual differences constitute important avenues for future research.

Notes

- 1 Attitude change simply means that a person's evaluation is modified from one value to another. There are many ways in which such changes can occur. Although persuasion is often seen as one of the particular ways in which attitudes are changed (i.e., as a consequence of exposing the recipient to some communication delivered by a source), we do not draw a sharp distinction between the terms persuasion and attitude change because the fundamental processes underlying change (with or without a persuasive communication) are the same.
- 2 More specifically, elaboration refers to the process by which people add something of their own to the information available. For ease of presentation, however, we will use the terms elaboration, thinking, and information processing similarly.
- 3 For expository purposes, we have emphasized the distinction between the central and the peripheral routes to persuasion. That is, we have focused on the prototypical processes at the end points of the elaboration likelihood continuum. In most persuasion situations (which fall somewhere along this continuum), some combinations of central and peripheral processes are likely to have an impact on attitudes.
- 4 In the domain of health communication, this matching approach also has been referred to as tailoring (at the individual level), targeting (at the group level), and other similar terms. In this article, we will use the more general term, matching. Although some researchers (e.g., Kreuter & Rimer, 2006) draw a distinction between personalization and targeting, we believe that these types of matching share important underlying conceptual similarities. After reviewing matching effects in a variety of social-psychological domains, Petty, Wheeler, and Bizer (2000) suggested that the most important of these underlying factors has to do with establishing a link to the self.

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