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## 3 The Role of Message Tailoring in the Development of Persuasive Health Communication Messages

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This chapter provides an overview of the literature on tailored health communication messages, an innovative area of health communication research that has broad applicability to other areas of communication. Unlike traditional message targeting practices, which operate at the group level, tailored interventions involve the development of persuasive health communications designed for (and based upon an assessment of) the individual. We introduce tailoring and discuss the historical context of message tailoring research. We then provide a broad review of seminal and more recent message tailoring studies. Next, we discuss the mechanisms through which tailored messages may exert their effects, reviewing theoretical perspectives as well as empirical data. Finally, we consider future directions for research on tailored health communication.

### Introduction

For decades, persuasion research has focused on answers to what seems like a relatively simple question: What elements of a message make it persuasive? A glance at any persuasion volume reveals that the persuasiveness of a message involves factors including its source, receiver, channel, content, and contextual characteristics. Because the receiver in this equation can have markedly different responses to the other elements (e.g., source evaluation, channel preference), a major implication for persuasion thus encompasses “knowing your audience” (see also related review by Hornikx & O’Keefe, this volume). In the area of mass communication campaigns, scholars discussed this critical mantra years ago (although it took several decades to be consistently put into action; see Rogers & Storey, 1987). For example, in 1947, Hyman and Sheatsley argued that simply providing individuals with *more* information would *not* necessarily lead to a more enlightened American public. Instead, individuals must be exposed to and absorb the information that is presented. Given that Hyman and Sheatsley’s (1947) data suggested

that many Americans were apathetic and uninterested in acquiring new information, the possibility of public information campaigns reaching their goals seemed unlikely. They concluded that "the psychological characteristics of human beings must be taken into account" (p. 413) with regard to successfully carrying out campaigns that effectively impacted populations.

Rejecting one interpretation of Hyman and Sheatsley's (1947) work, namely that an apathetic public was to blame for failed mass communication campaigns, Mendelsohn (1973) suggested another probable cause:

An impressive fund of data gathered over the past thirty years indicates that the publics who are most apt to respond to mass-mediated information messages have a prior interest in the subject areas presented. As a consequence, information directed to this *segment of a potential audience* requires *totally different communications strategies* and tactics from information that is to be disseminated to an audience that is initially indifferent. (p. 50, emphasis added)

Mendelsohn added that "communicators who intend to use the mass media to produce information gains or attitudes and behavior modification must realize that their targets do not represent a monolithic mass" (pp. 50–51).

As we discuss next, this insight led to practices that have become widespread in communication and health communication—audience segmentation and message targeting. These practices, however, focus entirely on identifying group-level similarities and designing messages that may resonate with particular groups and subgroups. This chapter introduces a newer practice that focuses on *individual*-level characteristics and designing messages to resonate with individuals. This practice is termed message tailoring (see Kreuter, Farrell, Olevitch, & Brennan, 2000; Kreuter & Skinner, 2000; Kreuter & Wray, 2003).

In this chapter, we broadly overview message tailoring research, a health communication research area that has broad applicability to other areas of communication. We accomplish this goal by introducing message tailoring and discussing the historical context of message tailoring research. We then provide a broad review of seminal and more recent message tailoring studies. Next, we discuss the mechanisms through which tailored messages may exert their effects, reviewing theoretical perspectives as well as empirical data. Finally, we consider future directions for research on tailored health communication.

### Audience Segmentation and Message Targeting

Research indicates that, in order to develop effective communications, scholars/practitioners must carefully define their audience—that is, they must engage in audience segmentation (Grunig, 1989; Rogers & Storey, 1987). According to Grunig, as well as Rogers and Storey, *audience segmentation* refers to the practice of dividing one's audience into homogenous subgroups that are internally similar yet differ from one another. Why might this practice

be effective? When audiences are divided into groups with more similar than different members, research suggests that they react similarly (and positively) to campaign messages designed for the segment. This practice of designing campaign messages for particular audience segments can be referred to as *message targeting* (Kreuter, Strecher, & Glassman, 1999; Palmgreen & Donohew, 2003).

Given that audiences can be segmented on an almost infinite number of variables, a large literature has been devoted to approaches to segmentation and targeting. Indeed, modern applications encompass segmenting audiences on demographic, geographic, psychographic, attitudinal, cultural (see Hornikx & O'Keefe, this volume), and behavioral variables (Albrecht & Bryant, 1996; Goldberg, Fishbein, & Middlestadt, 1997; Slater, 1996). Albrecht and Bryant noted that many writings center on criteria to be used in making segmentation decisions (see also Hornik & Ramirez, 2006; Slater, 1995, 1996). According to Hornik and Ramirez, considerations in such decisions include potential differences in audience segments according to the behavior under study, message preferences, channel preferences, and issues related to campaign execution. Although simple segmentation on demographic variables comprises the most widely used method (Slater, 1995), a number of more sophisticated approaches to segmentation exist (Albrecht & Bryant, 1996; Palmgreen et al., 1995; Slater, 1996).

### Tailoring at the Individual Level

The above approach relies entirely on identifying group similarities and subsequently targeting messages at the group level. For example, in a discussion of using race/ethnicity as a potential segmentation and targeting variable in the National Youth Anti-Drug Media Campaign, Hornik and Ramirez (2006) presented data on beliefs about drug use across different racial/ethnic groups, finding many similarities across these groups but some differences. However, a key question remains: Are the differences large enough to warrant segmenting the audience by racial/ethnic groups to target different messages to the different groups? An equally important question may be whether these beliefs about drug use differ as much within the groups as they do between them. That is, despite significant differences between the groups, much within-group variability likely still exists, such that at least some of the messages ultimately designed for African Americans may be more relevant for Whites, and vice versa. Such diversity of beliefs and attitudes *within* audience segments poses problems for message targeting; however, message tailoring can uniquely address such a challenge (Kreuter & Wray, 2003; Rimal & Adkins, 2003).

### Introduction and Definitions

*Message tailoring* refers to the practice of designing messages at the *individual level* (Kreuter et al., 2000). Consider these everyday examples of tailoring:

Devices on the highway assess driving speed and provide instant, tailored feedback on one's speed; computer programming in search engines, such as Google, process search terms and produce tailored advertisements for the user; supermarket scanners examine scanned grocery items and, using computer-driven algorithms, produce coupons tailored to one's food preferences, and Web sites, such as Amazon.com and Netflix.com, present tailored suggestions for items of interest when users log on to these sites based upon a large empirical database that has been created for this purpose.

Thus, unlike targeted messages that researchers develop to be effective with an entire segment of the population, tailored communication is customized to each individual person. This practice has been formally defined as "any combination of strategies and information intended to reach one specific person, based on characteristics that are unique to that person, related to the outcome of interest, and derived from an individual assessment" (Kreuter, Strecher, & Glassman, 1999, p. 277). Scholars have typically assessed those attributes through quantitative surveys. Additionally, computer technologies can efficiently and effectively match responses to survey items and scales with particular customized messages (Kreuter et al., 2000). Indeed, after advances in computer technology made individual tailoring on a large-scale basis possible, the literature on individualized tailoring "took off" (Velicer, Prochaska, & Redding, 2006).

### *Relevance to the Communication Discipline*

Message tailoring clearly pertains to a variety of areas in the communication discipline (see Table 3.1). While tailoring research has to date been conducted almost exclusively in the health communication domain—our review found only one study outside the health domain (Abrahamse, Steg, Vlek, & Rothengatter, 2007)—a variety of applications to other areas of communication should be considered. For example, those researchers studying interpersonal and computer-mediated communication may be interested in the similarities and differences of computer-tailored versus face-to-face communication. Those studying mass communication may be interested in the potential of tailored news and tailored polls on news Web sites. Those studying political communication may be interested in how tailoring could be used in political campaigns to narrowcast messages to various kinds of supporters. Finally, those studying persuasion may be interested in what comparisons of tailored and targeted messages reveal about message relevance, message processing, and persuasiveness. Thus, given the broad applicability of message tailoring to a variety of areas of communication, researchers in these areas should consider testing tailoring hypotheses in these domains.

While this chapter will reveal the many varied and diverse tailoring applications that have been developed in the health communication domain, there are also basic elements that all tailored interventions share (see Dijkstra & De Vries, 1999; Halder et al., 2008; Kreuter et al., 2000; Rimer & Glassman,

Table 3.1 Relevance of Tailored Messages to a Variety of Domains across the Communication Discipline

<i>Area of Communication</i>	<i>Application of Computer-Tailoring</i>
Interpersonal Communication /Computer-mediated Communication	Tailoring messages as adjunct to face-to-face counseling; similarities and differences of face-to-face versus computer-tailored messages
Mass Communication	Tailoring content on news websites; tailored polls; tailored communication campaigns (e.g., narrowcasting)
Political Communication	Tailoring campaign messages to supporters and interest groups
Persuasion	How to conduct effective tailoring; tailoring messages to understand message relevance; tailored versus targeted messages
Risk and Crisis Communication	Tailoring messages for differing risk groups and audiences; tailoring according to levels of risk
New Media	Tailoring messages on websites, email, and cell phones
Organizational Communication	Tailoring messages to differing audiences within an organization
Advertising/Public Relations	Simple tailored Internet advertising within search engines (e.g., Google); Complex tailored Internet advertising (e.g., Amazon, Netflix); Internet tailoring on data captured by "cookies"

1998; Velicer & Prochaska, 1999). Briefly, tailored interventions begin by assessing an individual on a variety of characteristics that are relevant to the behavior under study (e.g., demographic, behavioral, psychosocial characteristics). Assessments can be made in a variety of ways—for example, through telephone, mail, or computer surveys. Computer algorithms are then used to drive decision rules that have been developed and programmed to select particular messages that are most appropriate for an individual. Messages are derived from a *message library*, which consists of hundreds or even thousands of messages that have been created by the researchers. A feedback report is then compiled (again by the computer program), printed out, and presented to the participant in person or through the mail. Tailored computer programs that operate in clinical/community settings or programs on the Internet occur similarly. In the case of tailored counseling interventions, the process is again similar, but the message source differs. In this case, a counselor delivers the tailored content, either in person or over the phone.

### **Historical Examination of Tailoring**

Before we present a review of seminal and more recent tailoring studies, we discuss the context in which this literature began. The first studies of tailoring

largely involved computer-generated print materials, but subsequent studies quickly expanded to include other forms of tailored messages (e.g., tailored telephone counseling, tailored on-screen computer programs). Among early studies of tailored messaging, researchers described the vast potential of tailoring in the context of a health communication strategy that could be delivered at the population level while being tailored at the individual level (Velicer et al., 2006), and this dissemination largely occurred through the use of telephone and mail. For example, researchers made assessments by telephone or through the mail, and they then mailed tailored print materials to participants or engaged in tailored counseling over the telephone. This strategy achieved the kind of broad reach typically only attained with mass media while accomplishing a level of persuasion usually only gained with interpersonal communication (Rimal & Adkins, 2003).

More recently, tailoring has been applied to Internet-based health promotion programs (Lustria, Cortese, Noar, & Glueckauf, 2009). We discuss these types of interventions in the context of an updated review of the tailored message literature in this chapter. The Internet itself is a medium with great potential, and it has been described by many as holding great promise in delivering health communication messages (Cassell, Jackson, & Cheuvront, 1998; Neuhäuser & Kreps, 2003; Noar, Clark, Cole, & Lustria, 2006). In fact, according to Cassell et al., the Internet constitutes a "hybrid" channel with the reach of mass communication and the persuasive properties of interpersonal communication. The Internet, thus, lends itself very well to tailored messaging, and, not surprisingly, researchers are increasingly developing and testing tailored interventions on the Internet and with other new media technologies (e.g., cellular phones).

### Approach to Review of Message Tailoring Studies

Throughout the years, a large number of reviews of message tailoring studies have been published. Previous reviews have catalogued a number of tailored intervention studies in a number of health domains. While most reviews have focused on particular behavioral areas, such as smoking cessation (Strecher, 1999; Velicer et al., 2006), diet and exercise (Brug, Campbell, & van Assema, 1999; Kroeze, Werkman, & Brug, 2006), and mammography screening (Sohl & Moyer, 2007), a few embraced a more integrative approach of reviewing the application of tailoring across many health behaviors (Noar, Benac, & Harris, 2007; Richards et al., 2007; Rimer & Glassman, 1999; Skinner, Campbell, Rimer, Curry, & Prochaska, 1999). In addition, general reviews of computer and Internet-based interventions also typically include a number of tailoring studies (S. Bull, 2008; Portnoy, Scott-Sheldon, Johnson, & Carey, 2008; Revere & Dunbar, 2001; Suggs, 2006; Walters, Wright, & Shegog, 2006). To date, the majority of reviews have concluded that participants perceive tailored messages as more relevant, and that they are also more likely read and recall

such messages. Most reviews also have concluded that tailored messages are, indeed, more effective at impacting health behavior change as compared with targeted interventions or no-treatment control conditions (e.g., Kreuter et al., 2000; Kroeze et al., 2006; Richards et al., 2007; Rimer & Glassman, 1999; Skinner et al., 1999; Strecher, 1999). This has also been the conclusion of two recent meta-analyses on the topic of tailored interventions (Noar et al., 2007; Sohl & Moyer, 2007).

To provide a review of both seminal as well as more recent tailoring literatures across health behaviors, we supplemented the significant search effort from our previous meta-analysis (Noar et al., 2007) with a major new review to identify tailoring studies. We sought to conduct a large and representative review of the literature on individualized tailoring in the health domain. Although we could not possibly include every study that we located in our review, we chose instead to represent the literature as accurately as possible in terms of health behaviors studied and channels used for intervention delivery (e.g., traditional versus new media). Studies in our review included those in which the ultimate product of interventions consisted of print materials or on-screen feedback, including tailored Internet and cell phone/personal desktop assistant (PDA) interventions. Our review consisted of major searches of the PsycINFO and Medline databases, examination of studies identified from published review articles, and reliance on our personal knowledge of the literature. While these search efforts primarily took place through March 2008, we continued to add tailoring studies to this review throughout the summer of 2008.

The result of these efforts indicates that the tailoring literature has continued to burgeon over the past decade. As we report later in this chapter, the largest literature entails interventions with a primary focus on tailored print materials, or what have been termed the "first generation" of tailored interventions (Skinner et al., 1999). These studies examined the ability of computer-generated print materials to impact health behavior change, whether individually or in combination with other intervention components (e.g., print materials plus tailored telephone counseling). Within this "first generation" literature, researchers have most frequently studied smoking cessation, diet, and mammography screening. A fourth "area" also emerged as widely studied—that of multiple behavior change. Such studies use tailoring to attempt to impact multiple health behaviors in the context of a single intervention. While a number of multiple behavior interventions have concentrated on the two behaviors of diet and exercise together, a number considered diverse behaviors within the context of a single intervention (e.g., skin self-exam, physician screening, sun screen use).

In our reporting of the results of this review, we first discuss seminal studies of message tailoring (Table 3.2). Next we describe "first generation" tailored print-based studies within the behavioral areas that have been most commonly studied—smoking, diet, mammography, and multiple behavior changes (Table

Table 3.2 Seminal Studies of Message Tailoring

Behavior	Population	Study Conditions	Intervention Intensity	Assessment	Materials/Delivery	Theory	Tailoring Variables	Type of Feedback
<i>Diet</i>								
Brug et al. (1996)	Oil company employees (Netherlands)	Tailored intervention, comparison intervention	1 contact	In person paper/pencil (at work)	Tailored letter	TPB, SCT	Attitudes, social influences, self-efficacy, dietary behavior, awareness levels	Normative
Campbell et al. (1994)	Adult family practice patients (central North Carolina)	Tailored intervention, comparison intervention, control	1 contact	In person paper/pencil (physician's office)	Tailored one-page handouts	TTM, HBM	Stage of change, dietary intake, motives, barriers, beliefs, self-efficacy	Normative
<i>Mammography</i>								
Skinner et al. (1994)	Women age 40-65 (North Carolina)	Tailored intervention, comparison intervention	1 contact	Telephone (CATI)	Tailored letter	HBM, TTM	Stage of change, benefits, barriers, risk factors, screening status	Normative
<i>Smoking Cessation</i>								
Curry et al. (1991)	Adult HMO members (western Washington state)	Intrinsic tailored, extrinsic tailored, both, control	Up to 3 contacts over 12 weeks	Mail	Written personalized feedback (intrinsic); prize drawing information, gift (extrinsic)	Intrinsic/Extrinsic Motivation Framework	Smoking and quitting history, health concerns, desire for self-control	Normative, Ipsative
<i>Prochaska et al. (1993)</i>								
Prochaska et al. (1993)	Adult smokers (Rhode Island)	3 tailored conditions, 1 standardized comparison	Up to 4 contacts over 6 months	Mail	Stage-matched manuals, interactive feedback, counselor telephone calls	TTM	Stage of change, pros and cons, processes of change, temptations, confidence, techniques for coping	Normative, Ipsative
<i>Strecher et al. (1994)</i>								
Strecher et al. (1994)	Adult family practice patients age 40-65 (North Carolina)	Tailored, generic, control	1 contact	Telephone (CATI) or in person paper/pencil (physician's office)	Tailored letter	HBM, TTM, Attribution theory	Stage of change, benefits, barriers, perceived risks, attribution for past failure	Normative

Note: HBM = Health Belief Model, SCT = Social Cognitive Theory, TPB = Theory of Planned Behavior, TTM = Transtheoretical Model

3.3). We then specify "first generation" studies in a number of other behavioral areas that have been examined (Table 3.4). In Tables 3.3 and 3.4, we aim to represent the literature as accurately as possible in terms of scope, but we focus on more recent studies (i.e., those published since the year 2000) because many previous publications (noted above) have reviewed studies throughout the 1990s. Finally, we detail what might be termed "second generation" studies, that is, studies that have delivered tailored interventions using more recent technological advances, such as the Internet and wireless handheld computers (Table 3.5). In all of these areas, we sought to overview the diversity of approaches that have been taken in this literature, in both the more established "first generation" studies as well as the newer "second generation" studies. However, given the size of the literature and the fact that our searches likely did not uncover every study, the studies listed in the tables constitute exemplars, rather than a comprehensive listing of all studies conducted in these areas to date. In choosing which studies to put into the tables, we prioritized studies that were newer, more innovative, and contributed to our goal of representing the diversity of applications of tailoring in terms of both behaviors and channels.

Across all of the tables, we listed the authors of the study and the publication date; for multiple behavior studies, we included the behaviors addressed by the intervention. We identified the study sample, including information on age, gender, and race/ethnicity if sampling was purposive, and as much detail on the sample's geographic location as possible. We detailed study conditions and described intervention intensity, indicating how many times the intervention group(s) was (were) provided with materials over what period of time. We indicated whether subjects were assessed (for message tailoring purposes) in person (paper and pencil questionnaire or interview), by computer, by telephone, or by mail. Next, we specified the intervention materials and how they were delivered, and we listed, where possible, the theory(ies) that guided the intervention design. We also listed the variables on which the intervention was tailored. Finally, we noted the type of feedback that participants received.

### *Seminal Studies of Tailored Messages*

The first studies in the area of individually tailored health messages were published in the early 1990s (for reviews, see Brug et al., 1999; Skinner et al., 1999; Strecher, 1999). Given the importance of this seminal work, a number of these early applications of tailoring are presented in Table 3.2 and summarized here.

These early studies sought to test the concept that print materials tailored on individual characteristics would outperform "one size fits all" generic materials or materials targeted on group-level characteristics. The outcomes of interest were behavioral, including smoking cessation and dietary change. Researchers derived characteristics to tailor on from theories of behavior and behavior change, such as stage of change (i.e., readiness to change behavior),

self-efficacy, attitudes/beliefs, perceived susceptibility/risk, and social norms. In these studies, individuals were randomized to receive either tailored materials or generic/targeted materials. Studies were longitudinal and followed individuals up for many months after the interventions took place. In some cases, individuals participated for as long as 12 or 18 months.

These studies made an impact both because they tested an innovative health communication practice and because they achieved impressive results. While results varied considerably both within and across these studies, all of the studies demonstrated that tailored materials outperformed the more generic materials on the behavioral outcomes under study. These findings thus represented the first evidence that computer-generated print materials tailored on individual characteristics were more efficacious in changing behavior than generic or targeted print materials. This conclusion can hardly be overstated given the widespread use of both generic (e.g., brochures) and targeted print materials (e.g., self-help manuals).

Although these early studies revealed similar overall findings (that tailored materials were more efficacious than nontailored materials), the studies varied in important ways. Indeed, just as scholars use the term *campaign* to denote health communication efforts that vary on a multitude of dimensions (Salmon & Atkin, 2003), the term *tailored intervention* refers to a broad range of materials that have been tailored and tested in a variety of ways. Thus, although these early studies provided the basis for a literature, they did little to quell an ensuing debate regarding what makes an effective tailored message.

One factor that might be implicated in tailored message effectiveness entails behavioral theory or theories used to drive the tailoring in these studies. While some studies employed a single theory (e.g., Prochaska, DiClemente, Velicer, & Rossi, 1993), others employed multiple theories to inform the tailored messages (e.g., Skinner, Strecher, & Hospers, 1994; Strecher et al., 1994). Choice of theory impacted variable selection in tailoring, resulting in studies tailoring on many different (although largely psychosocial) characteristics. As a result, these seminal studies do not provide clear findings on what factors may be best utilized in tailoring. The dialogue on this issue has only grown since these early studies.

Another factor that varied among these studies involves choice of comparison conditions. For example, some studies aimed to make the tailored and generic letters as similar as possible (Strecher et al., 1994), increasing the possibility that any effects observed could be attributed to the tailoring itself. Other studies compared tailored materials to existing self-help materials (Curry, Wagner, & Grothaus, 1991; Prochaska et al., 1993). In these cases, it is less clear that the tailoring per se was responsible for the observed effects because the intervention and comparison conditions varied on many factors beyond tailoring. For instance, study conditions differed in terms of content and length of messages, which could potentially play a part in the efficacy of interventions. We will discuss this issue further throughout the chapter.

Table 3.3 Exemplar Studies of Message Tailoring Applied to Health Behaviors Most Often Addressed in Tailoring Studies

Behavior	Population	Study Conditions	Intervention Intensity	Assessment	Materials/Delivery	Theory	Tailoring Variables	Type of Feedback
<i>Diet</i>								
Brug et al. (1998)	Adults (Netherlands)	Tailored intervention (with or without ipsative follow up), generic intervention	1 contact or 2 contacts over 4 weeks	Mail	Tailored letter(s)	TTM, PAPM	Dietary behavior, attitudes/beliefs, self-efficacy, intentions	Normative, Ipsative
de Bourdeaudhuij et al. (2007)	Adult employees (Belgium)	Tailored intervention, generic intervention, control	1 contact	Computer	Computer presentation of information	TPB, TTM	Intentions, attitudes, self-efficacy, social support, benefits, barriers, knowledge, stage of change	Normative
Elder et al. (2005)	Spanish language-dominant Latinas (San Diego, California)	Lay health advisor plus tailored print materials, tailored print materials only, targeted print materials	12 contacts over 12 weeks	In person interview (home visit)	Mailed newsletters and activity inserts	NR	Body Mass Index (BMI), goal setting, barriers, stage of change, behavioral strategies, points of influence for change	Normative
<i>Physical Activity</i>								
Haerens, Deforche, Maes, et al. (2007)	Adolescents in the 7th grade (Belgium)	Tailored intervention, control	1 contact	In person paper/pencil (at school)	Computer presentation of information	TTM; TPB; SCT; Attitude, Social Influence and Self-efficacy Model	Stage of change, attitudes, self-efficacy, social support, perceived benefits and barriers	Normative
Heimendinger et al. (2005)	Adult callers to the Cancer Information Service (United States)	Single untailored, single tailored, multiple tailored, multiple retailored	Up to 4 contacts over 12 months	Telephone	Mailed booklet followed by 2 pamphlets and 1 letter	TTM, HBM, SCT	Stage of change, outcome expectations, beliefs, diet, cost comparison with snack foods, benefits, barriers, environmental issues	Normative, Ipsative
Irvine et al. (2004)	Hospital and corporation employees (Colorado; Illinois)	Tailored intervention, waitlist control	1 contact plus unlimited use over 4 weeks	Mail	Interactive multimedia computer-based program plus printout	TTM, TRA, SCT	Gender, race, age, dietary behavior, perceived barriers, content interest	Normative

(continued)

Table 3.3 Continued

Behavior	Population	Study Conditions	Intervention Intensity	Assessment	Materials/Delivery	Theory	Tailoring Variables	Type of Feedback
Kristal et al. (2000)	Health plan enrollees (western Washington state)	Tailored intervention, control	At least 6 contacts over 1 year	Telephone	Self-help materials package, dietary analysis feedback, motivational phone call, semi-monthly newsletters	SLT, TTM, Diet individuation model	Stage of change, motives for and interest in change, dietary habits	Normative, Ipsative
<i>Mammography</i>								
Bastani et al. (1999)	Female relatives of breast cancer patients (United States; Canada)	Tailored intervention, control	1 contact	Telephone (CATI)	Tailored letter plus targeted booklet, notepad, bookmark	Adherence Model	Personal risk factors for breast cancer	Normative
Champion et al. (2007)	Low income women from a general medicine clinic and HMO enrollees non-adherent to mammography guidelines (St. Louis, Missouri; Indianapolis, Indiana)	Tailored print, tailored telephone, tailored print and telephone, usual care control	1 or 2 contacts over 1 week	Telephone (CATI)	Newsletter plus physician's letter, telephone call with same information plus responses to any questions	TTM, HBM	Perceived risk, benefits, barriers, self-efficacy, knowledge of mammography, age, family history, stage of change	Normative
Kreuter et al. (2005)	Lower income African-American women 40-65 years old (Saint Louis, Missouri)	Interventions tailored on behavioral constructs, cultural beliefs, or both, usual care control	6 contacts over ~18 months	In person paper/pencil (health center)	Mailed magazines	Theories of health behavior change	Knowledge, barriers, stage of change, perceived risk, breast cancer family history, exposure/interest in fruits and vegetables, doctor or nurse advice, behaviors, religiosity, collectivism, racial pride, time orientation	Normative

(continued)



Table 3.3 Continued

Behavior	Population	Study Conditions	Intervention Intensity	Assessment	Materials/Delivery	Theory	Tailoring Variables	Type of Feedback
Lipkus et al. (2000)	Women 50 years and older enrolled in a health plan (Raleigh, Durham, and Chapel Hill, North Carolina)	Tailored print, tailored telephone, usual care control	2 contacts over 1 or 2 years	Telephone	Booklet, telephone counseling	TTM	Name, barriers, facilitators, pros/cons, reasons for mammography, stage of change	Normative, Ipsative
Vernon et al. (2008)	Women veterans 52 years and older (United States)	Tailored and targeted intervention, targeted intervention, control	2 contacts over ~12 months	Mail	Tailored letter and booklets, targeted materials (booklets, letter, pamphlets)	TTM, HBM, SCT, TPB	Mammography behavior and intention, mammography reminder, stage of change, pros/cons, processes of change, objective and perceived risk, perceived barriers, self-efficacy, processes of change	Normative, Ipsative

*Smoking Cessation*

Dijkstra et al. (2006)	Adult smokers and ex-smokers (Netherlands)	Matched tailored, mis-matched tailored	1 contact	Mail	Tailored letter	Social Cognitive Stage Model	Stage of change, pros/cons, self-efficacy	Normative
Hoffman et al. (2006)	Low income African American smokers (Chicago, Illinois)	Tailored intervention w/ information audiotape, Tailored intervention w/ information and instruction audiotape	2 contacts over 3 months	Computer	Computer expert system, stage-based manual, stress reduction audiotape	TTM	Stage of change, pros/cons, temptations, processes of change	Normative, Ipsative
Meyer et al. (2007)	Adult patients age 18-70 years who smoke (northeast Germany)	Tailored print, physician advice, control	3 contacts over 6 months	In person (physician's office) and telephone (CATI) or mail	Tailored letters, self-help manual	TTM	Stage of change, pros/cons, self-efficacy, processes of change	Normative, Ipsative

(continued)

Table 3.3 Continued

<i>Behavior</i>	<i>Population</i>	<i>Study Conditions</i>	<i>Intervention Intensity</i>	<i>Assessment</i>	<i>Materials/Delivery</i>	<i>Theory</i>	<i>Tailoring Variables</i>	<i>Type of Feedback</i>
Prochaska et al. (2001)	Adult smokers in an HMO (United States)	Tailored only, tailored plus counselor, tailored plus stimulus control enhancement, assessment only	3 contacts over 6 months	Mail or telephone	Mailed tailored feedback reports, stage-matched manuals, telephone calls based on tailored feedback, hand-held computer to provide stimulus control	TTM	Stage of change, pros/cons, self-efficacy, processes of change, small steps to change	Normative,

*Ipsative*

Sutton & Gilbert (2007)	Callers to a "Quitline" (United Kingdom)	Tailored intervention, usual care control	1 contact	Telephone	Tailored letter plus standard information packet	Theories of smoking cessation and behavior change, including SCT and Perspectives on Change Model	Gender, age, cigarette consumption, length of longest previous abstinence, motivation and determination to quit, dependence, reasons for quitting, self-image, advantages and disadvantages of quitting, difficult situations, children, living with other smokers, social support, current health problems	Normative
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(continued)

Table 3.3 Continued

Behavior	Population	Study Conditions	Intervention Intensity	Assessment	Materials/Delivery	Theory	Tailoring Variables	Type of Feedback
<i>Multiple Behaviors</i>								
Blalock et al. (2002) – calcium intake, exercise	Adult females age 40-56 (western North Carolina)	Tailored, non-tailored intervention	3 contacts over 3-4 weeks	Telephone (CATI)	Two mailed packets of tailored materials, a telephone counseling session	PAPM	Current calcium intake and exercise, perceived adequacy of current calcium intake and exercise, stage of change, behavioral goals, barriers	Normative, Ipsative
Campbell et al. (2002) – nutrition, exercise, smoking, cancer screening	Women employed in rural, blue collar worksites (eastern North Carolina)	Intervention, delayed intervention	2 contacts over 6 months	In person (at workplace) and mail or telephone if necessary	Tailored magazines, “natural helpers”	Ecological framework, SCT, TTM, social support models	Name, workplace, age, shift, health concerns, diet, physical activity, smoking, cancer screening, choice of behavioral priority for change	Normative, Ipsative
<hr/>								
Geller et al. (2006) – skin self-exam, physician screening, sunscreen use	Siblings of melanoma patients (United States)	Tailored, usual care	3 mailings and 4 phone calls over 5 months	Mail	Tailored materials plus motivational telephone counseling	SCT, HBM, TPB, TTM, PAPM	Skin self-exam, physician screening, sunscreen use, self-efficacy, beliefs	Normative
Glasgow et al. (2006) – nutrition, physical activity	Adults with Type 2 diabetes at least 25 years of age (Denver, Colorado)	Tailored intervention, enhanced usual care	4 contacts over 6 weeks	Computer	CD-ROM, telephone calls from health coach, tailored newsletter	SCT	Health behavior, benefits, barriers, goals and strategies for change, self-efficacy	Normative
Prochaska et al. (2005) – diet, smoking, sun exposure, mammography	Primary care patients from health insurance organization (northeastern United States)	Tailored intervention, control	3 contacts over 12 months	Telephone and mail survey	Tailored reports	TTM	Stage of change, readiness to change, pros/cons, processes of change, self-efficacy, small steps to change	Normative, Ipsative
Rimer et al. (1999) – Pap test, mammography, overall cancer screening	Low income African American women (Durham, North Carolina)	Provider prompt plus tailored print plus telephone counseling, provider prompt plus tailored print, provider prompt only	Up to 4 contacts over 16 months	Telephone	Tailored birthday card, newsletter, telephone counseling	TTM	Previous screening, stage of change, barriers, pros/cons, race, age, hysterectomy	Normative

*Note:* HBM = Health Belief Model; NR = Not reported; PAPM = Precaution Adoption Process Model; SCT = Social Cognitive Theory; SLT = Social Learning Theory; TPB = Theory of Planned Behavior; TRA = Theory of Reasoned Action; TTM = Transtheoretical Model

### Updated Review of Tailoring Studies

Our updated review of tailoring studies provides a “snapshot” of the more recent literature on tailored health messages and interventions (see Tables 3.3–3.5). These tables demonstrate that the literature has continued to grow, and, with that growth, scholars have now tested a wealth of diverse tailoring applications. While most studies have been conducted within the United States, explorations of tailoring have occurred in other countries, spanning the Netherlands, Belgium, Germany, Australia, Norway, Canada, Iran, Sweden, and the United Kingdom (Tables 3.3–3.5). Studies have been conducted with a large diversity of populations, from adolescents to adults and from U.S. Marines to chemotherapy patients. In addition, virtually all of the randomized trials conducted to date have some form of comparison group, such as a “usual/standard care,” control group, or several different levels of treatment. Many studies compare tailored interventions to control conditions or generic or personalized conditions, while others contrast tailoring across different channels (e.g., print versus telephone) or examine additive effects of different channels (e.g., print plus telephone; see Tables 3.3–3.5).

Intervention intensity comprises a factor that varies across many types of health communication interventions, and, in this literature, it also ranges greatly. While some studies used one contact with participants and followed up shortly after that contact, others had 6 or 12 contacts and followed individuals for 12, 18, or 24 months (Tables 3.3–3.5). Studies that followed people over time had an opportunity to provide not only normative feedback (i.e., a person compared to his or her peers) but also ipsative feedback (i.e., a person compared to him- or herself at a previous time point) (Velicer et al., 1993). Notably, several studies in this literature had only one contact and, thus, did not take advantage of the full potential that tailoring has to offer. For example, in the table that presents studies of tailoring across a large number of health behaviors (Table 3.4), 15 of 30 studies (50%) had only one intervention contact and could provide only normative feedback to participants. In many ways, such studies differ from those that followed individuals over time and also delivered ipsative feedback. In fact, the potential for ipsative feedback is arguably one of the most compelling and potentially effective aspects of message tailoring, yet it was *not* used in the majority of studies. Indeed, across all of the studies in Tables 3.2 to 3.5, only 28 of 72 interventions (39%) provided ipsative feedback to participants.

Tables 3.3 to 3.5 also reveal the differing assessment and delivery approaches that have been used in message tailoring interventions. Assessments have been conducted through paper/pencil surveys in person or through the mail, telephone conversations, face-to-face interactions with data collected on a laptop/desktop computer or computer kiosk (in a variety of settings), Internet-based surveys, wireless handheld computers, and investigation of medical records and billing databases. Delivery options also ranged widely, including print materials (such as letters, newsletters, magazines, booklets, and birthday cards sent

Table 3.4 Exemplar Studies of Message Tailoring Applied to a Variety of Health-related Behaviors

Behavior	Population	Study Conditions	Intervention Intensity	Assessment	Materials/Delivery	Theory	Tailoring Variables	Type of Feedback
<b>Alcohol Use</b>								
Neumann et al. (2005)	Emergency department adult patients with acute injury (Berlin, Germany)	Tailored intervention, control	1 contact	In person paper/pencil (at hospital) and computer	Computer program, tailored letter	TTM	Alcohol use, readiness to change	Normative
Werch et al. (2005)	Suburban high school students (northeast Florida)	Counselor plus tailored print materials, minimal intervention control	2 contacts over 1 week	In person paper/pencil (school)	One-on-one counseling session, mailed tailored tip sheet	SCT, HBM, TPB	Type of alcoholic beverage consumed	Normative
<b>Cervical Cancer</b>								
Campbell et al. (1997)	Adult women (Australia)	Tailored materials, control	1 contact	Computer	Tailored printout	NR	Risk factors	Normative
<b>Colorectal Cancer Screening</b>								
Jerant et al. (2007)	Adults 50 years or older (California)	Tailored computer program, non-tailored control	1 contact	Computer	Interactive multimedia computer program	TTM	Patient preference for testing, self-efficacy, barriers, stage of change, prior screening	Normative

(continued)

Table 3.4 Continued

<i>Behavior</i>	<i>Population</i>	<i>Study Conditions</i>	<i>Intervention Intensity</i>	<i>Assessment</i>	<i>Materials/Delivery</i>	<i>Theory</i>	<i>Tailoring Variables</i>	<i>Type of Feedback</i>
Marcus et al. (2005)	Callers to the Cancer Information Service 50 years or older (United States)	Single untailored, single tailored, multiple tailored, multiple retailed	Up to 4 contacts over 12 months	Telephone	Mailed booklet followed by 2 newsletters (for multiple conditions)	HBM, TTM	Name, stage of change, cancer risk, barriers	Normative, Ipsative
<i>Drug Use</i>								
Wolde et al. (2008)	Chronic benzodiazepine users (Netherlands)	Single untailored, single tailored, multiple tailored	Up to 3 contacts over 3 months	Mail and telephone	Mailed tailored letter(s)	SCT	Name, type of benzodiazepine used, outcome expectations, self-efficacy	Normative, Ipsative
<i>Early Cancer Detection</i>								
de Nooijer et al. (2004)	Adults (Netherlands)	Tailored materials, standard information, control	1 contact	Mail	Mailed tailored letter	Attitude-Social Influence-Self Efficacy Model	Knowledge of cancer symptoms, early detection intentions, reasons for early detection, risk perception, attitudes, social influence, self-efficacy, fear of cancer, fatalistic attitudes, gender	Normative
<i>Health Care Provider Behavior</i>								
Fretheim et al. (2006)	General practitioners (Norway)	Tailored program, control	1 contact, multiple computer "pop-ups"	Patient records	Computer "pop-up" messages associated with patient visits	NR	Performance of patient risk estimation, choice of prescription drugs, achievement of treatment goals	Normative
Rose et al. (1997)	Anesthesiologists (Toronto, Canada)	Tailored program, control	6-month education period plus 4 contacts over 22 months	Patient records	Feedback forms on pain management behavior	NR	Rate of use of promoted patient pain management strategies, rate of excessive pain in the post-anesthesia care unit, pain scores	Normative, Ipsative
<i>Hypertension</i>								
Friedman et al. (1996)	Hypertension patients age 60 or older (Boston, Massachusetts)	Computer-controlled telephone system, usual care	26 contacts over 6 months	In person (home) and telephone	Computer-controlled voice feedback to patients	NR	Blood pressure, understanding of prescribed medication, patient adherence, side effects	Normative
<i>Immunization</i>								
Baker et al. (1998)	Adult high risk patients (southeast Michigan)	Tailored materials, generic or personal postcard, control	1 contact	Billing database	Tailored letter	HBM	Name, risk factors	Normative

(continued)

Table 3.4 Continued

<i>Behavior</i>	<i>Population</i>	<i>Study Conditions</i>	<i>Intervention Intensity</i>	<i>Assessment</i>	<i>Materials/Delivery</i>	<i>Theory</i>	<i>Tailoring Variables</i>	<i>Type of Feedback</i>
Kreuter et al. (2004)	Parents of infants 0-1 year (St. Louis, Missouri)	Tailored materials, control	Up to 6 contacts over 24 months	In person interview (physician's office) and patient records	Tailored calendar	Social marketing	Age, gender, height, weight, name, photograph, ethnicity, parents/siblings, home environment, baby's health, appointment date and time	Normative
<i>Injury Prevention</i>								
Gielen et al. (2007) – child safety seat use, smoke alarm use, poison storage	Parents of young children making emergency department visits (Baltimore, Maryland)	Tailored intervention, personalized but generic intervention	1 contact	Computer	Tailored safety report	ELM, PAPM	Self-reported behavior related to child safety seats, smoke alarms, and poison storage; PAPM stage; child's name, age, weight, gender, ethnicity	Normative
<i>Medical Appointments</i>								
Lusk et al. (2003) – hearing protection	Automotive factory workers (Michigan)	Tailored, non-tailored, control	1 contact	Computer	Computer-based intervention, hard copy handout	Health Promotion Model, SCT	Perceived benefits, barriers, self-efficacy, interpersonal support, situational factors, type of hearing protection device (HPD) used, perceived hearing ability, self-reported use of HPDs	Normative
Nansel et al. (2002) – home and car safety	Parents of children ages 6-20 months (Washington, DC)	Tailored materials, generic materials	1 contact	Computer	Tailored handout based on interactive computer program	NR	Child's name and gender, injury risk scores, locus of control, self-efficacy, injury risk information and prevention, response efficacy, barriers	Normative
Campbell et al. (1994)	Parents of newborns (Rochester, New York)	Tailored letter, generic postcard, control	1 contact	In person interview (clinic)	Mailed tailored reminder letter	HBM	Appointment date and time, age-specific interventions	Normative

(continued)

Table 3.4 Continued

Behavior	Population	Study Conditions	Intervention Intensity	Assessment	Materials/Delivery	Theory	Tailoring Variables	Type of Feedback
<i>Pain Management</i>								
Ahles et al. (2006)	Adult patients (New Hampshire, Rhode Island, Vermont)	Tailored, tailored plus telephone consultations, usual care	1 contact via letter, up to 9 telephone calls from nurse	Mail	Mailed tailored letter plus health education booklet, telephone consultations from nurse-educator, supplemental mailed written and audio materials	Cognitive-behavioral approaches, problem-solving therapy	Presence and level of pain, "psychosocial problems"	Normative
<i>Patient Information/ Decision Making</i>								
Hoffmann et al. (2007)	Adult stroke patients (Brisbane, Australia)	Tailored intervention, generic control	1 contact	In person interview (hospital)	Tailored booklet	NR	Topics about which the patient desired information, desired amount of information, font size preference	Normative
McBride et al. (2002) – hormone replacement therapy	Women 45-55 years old (United States)	Tailored intervention, delayed intervention control	1 contact	Telephone	Trifold brochure, worksheet, booklet, question checklist	NR	Perceived menopausal status, hysterectomy, prior HRT use, accuracy of perceived cancer risk	Normative
<i>Physical Activity</i>								
Skinner et al. (2002) – BRCA testing	At risk adult women (United States)	Tailored materials, non-tailored control	1 contact	Mail	Booklet	Decision counseling model	Sociodemographic characteristics, medical history, pros/cons of testing, intrusive thoughts, preference for information (type and amount), knowledge, probability of genetic mutation	Normative
Bull et al. (1999)	Adult patients (southeastern Missouri)	Tailored and personalized, general and personalized, general only, usual care control	1 contact	In person paper/pencil (physician's office)	Two-page printed materials	TTM	Stage of change, exercise goal, motives for exercising, barriers, preferred physical activity	Normative
Haerens, Deforche, Vandelanotte, et al. (2007)	Adolescents (Belgium)	Tailored intervention, control	1 contact	In person paper/pencil (in school)	Computer-based (CD) intervention	TPB; SCT; Attitude, Social Influence and Efficacy Model; TTM	Attitudes, self-efficacy, social support, knowledge, benefits, barriers, stage of change	Normative
Kerr & McKenna (2000)	White collar employees (United Kingdom)	Tailored campaign materials, control	1 contact	In person paper/pencil	Black and white A4 pages mailed through inter-office mail	TTM	Stage of change	Normative

(continued)

Table 3.4 Continued

Behavior	Population	Study Conditions	Intervention Intensity	Assessment	Materials/Delivery	Theory	Tailoring Variables	Type of Feedback
Marcus, Napolitano, et al. (2007)	Sedentary adults 18-65 years (northeastern United States)	Tailored via print, tailored via telephone, control	14 contacts over 12 months	In person paper/pencil and mail	Computer expert system report, stage-targeted booklets, tip sheets; telephone counseling guided by same materials in print condition	TTM, SCT	Physical activity, stage of change, processes of change, pros/cons, self-efficacy	Normative, Ipsative
Shirazi et al. (2007)	Women 40-65 years (Iran)	Tailored, control	9 contacts over 10 weeks	In person paper/pencil (health center) and physical assessment	Group-based instructional sessions, home-visit exercise instruction, mailed reminder cards and pamphlets	TTM	Stage of change	Normative, Ipsative
<i>Prostate Cancer</i>								
Myers et al. (1999)	African American males 40-70 years (Chicago, Illinois)	Enhanced or minimal intervention	2 contacts over 3 years	Telephone	Tailored print materials and telephone contact	Preventive Health Model	Name, age, race, family history of prostate cancer, presence or absence of prostate cancer symptoms	Normative
<i>Safer Sex</i>								
Kiene & Barta (2006)	College students (Connecticut)	Tailored program, control	2 contacts over 2 weeks	Computer	Computer-based tailored program	Information-Motivation-Behavioral Skills Model of Health Behavior, TTM	Condom use information, motivation, behavioral skills, goal setting, barriers, benefits, gender	Normative, Ipsative
Roberto et al. (2007)	Rural high school students (Kentucky)	Tailored program, control	6 contacts over 6 weeks	Computer	Computer-based tailored program, interactive CD-ROM	EPPM	Sensation seeking, impulsive decision making, knowledge	Normative
Scholes et al. (2003)	Sexually active adult women 18-24 years (North Carolina, Washington)	Tailored program, control	2 contacts over 3 months	Telephone (CATI)	Tailored magazine, tailored newsletter	TTM, TRA	Stage of change, beliefs, norms, intentions, efficacy, barriers/facilitators, perceived STD risk, partner type, ethnicity, binge drinking, STD history, number of partners, oral contraceptive use, children	Normative, Ipsative
<i>Sun Safety</i>								
Lewis et al. (2005)	Zoo education directors (United States)	Tailored materials, generic materials	3 contacts	Mail and telephone	Tailored project-related materials, follow-up phone calls	Diffusion theory	State-specific UVR and skin cancer data, zoo characteristics and resources	Normative, Ipsative

Note: ELM = Elaboration Likelihood Model; HBM = Health Belief Model; NR = Not reported; PAM = Precaution Adoption Process Model; SCT = Social Cognitive Theory; TPB = Theory of Planned Behavior; TRA = Theory of Reasoned Action; TTM = Translational Model



through the mail or given in person), on screen feedback on a computer, Internet Web site, or handheld computer, or feedback delivered over the telephone.

Moreover, consistent with other reviews, theories used to guide tailoring as well as variables actually tailored on have differed greatly across studies. As we detail later in this chapter, similar to other reviews (Kreuter et al., 2000; Noar et al., 2007; Skinner et al., 1999), we find that theories widely applied in this literature include the transtheoretical model (TTM; Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992), the health belief model (Janz & Becker, 1984), social cognitive theory (Bandura, 1986), and the theory of planned behavior (Fishbein & Ajzen, 1975). Also similar to findings in earlier reviews, many studies use more than one theory to guide message tailoring, and few studies show "fidelity" to any one particular theoretical perspective in their choice of variables on which to tailor (Noar et al., 2007; Sohl & Moyer, 2007). Indeed, just because a researcher described a theory as informing a tailored intervention does *not* mean that researcher used all (or even most) of the components of that theory in tailoring. In that manner, researchers have used theory quite liberally in many of the applications of tailoring to date. Also, many studies tailored on additional variables that were not part of a particular theory.

This updated review finds that tailoring has now been applied to more than 20 different health behaviors and is increasingly being delivered with the use of technologies such as the Internet and cell phones/PDAs. In addition, a recent Internet intervention study aimed at reducing household energy use demonstrates that tailoring is now beginning to move beyond the health domain (Abrahamse et al., 2007). What does this updated review tell us as a whole, however? While the diversity of tailoring approaches that have been developed and evaluated to date comprises a strength of this literature, some aspects of this diversity can be considered a weakness. That is, one overriding conclusion about this literature is the lack of consensus regarding "best practices" in tailoring research. This issue is inextricably tied to understanding mechanisms of effective tailoring, which we address next. The discussions of tailoring mechanisms as well as future directions for research will also expose other gaps in this literature, such as the need for many more basic message design studies (as opposed to larger field trials) as well as meta-analyses to synthesize this large literature and help us to parse out the "active ingredients" of effective tailoring.

### Mechanisms of Tailoring

The updated literature review reveals that studies of tailored health messages and interventions have blossomed over the past decade. The vast number of randomized trials of such interventions has helped to answer the question of *whether* tailored interventions work. As we have described, many reviews (e.g., Brug et al., 1999; Skinner et al., 1999; Strecher, 1999) find support for

the efficacy of numerous tailored interventions. Moreover, two recent meta-analyses of portions of the tailoring literature have concluded that tailored messages are more efficacious in sparking behavioral change when compared to nontailored messages (Noar et al., 2007; Sohl & Moyer, 2007). While many tailored interventions have been effective, we lack an understanding of *why* they have been effective. A critical question that must be raised as we move toward building a science of tailoring is the following: What are the ingredients of effective tailoring?

Early on in the tailored health literature, researchers referred to this "black box" of tailoring that often resulted from a "kitchen sink" approach where highly tailored interventions were compared to no-treatment control conditions (Abrams, Mills, & Bulger, 1999). In such cases, if the tailored communication was effective, scholars could not identify the components that led to efficacy (including whether tailoring was a significant contributor to intervention efficacy). Thus, Abrams et al. recommended moving beyond "basic 'first generation' research designs to more rigorous tests of the active ingredients in tailored communications" (p. 302).

This review suggests that most studies in this body of literature continue to be trials that primarily focus on whether tailored intervention packages are efficacious, rather than trials focused on *under what circumstances* tailoring is most efficacious. Thus, for the most part, Abrams et al.'s (1999) advice has not been heeded. For example, many newer trials explored whether tailored components delivered through different communication channels (e.g., print, telephone, in person) affect behavior change differently (see Tables 3.3–3.5). While the issue of channel selection remains an important question to answer, these studies tell us little about the ingredients of effective tailoring within individual channels.

Some recent empirical work, however, has advanced our understanding of how tailoring may exert its effects as well as what may make for more versus less effective tailoring. We begin by detailing how tailoring may exert its effects from a theoretical perspective. Next, we consider perceived message relevance and a message effects perspective on tailoring. We then discuss theories that have been used for tailoring and discuss how the domains used in tailoring could be usefully expanded. Finally, we consider future directions for research in tailored communication.

### How Does Tailoring Exert its Effects?

From a theoretical perspective, how does tailoring achieve its effects? The elaboration likelihood model (ELM; Petty & Cacioppo, 1981; also see Kreuter & Wray, 2003) provides the most common explanation. The ELM comprises a dual process model of persuasion that has been used to explain the mechanisms of tailoring, and in that manner can be described as a theory "of" tailoring. The theory suggests that individuals engage in two types of message

Table 3.5 Exemplar Studies of Message Tailoring Using the Internet/New Media for Intervention Delivery

Behavior	Population	Study Conditions	Intervention Intensity	Assessment	Delivery Site	Theory	Tailoring Variables	Type of Feedback
<b>Alcohol Use</b>								
Simon-Armdt et al. (2006)	Active duty U.S. Marines (southern California)	Tailored intervention only	1 session	Computer	Internet via office computers	EPPM	Alcohol use, risk information, estimated BAC, alcohol-related problems, money spent on alcohol, location of military base	Normative
Weitzel et al. (2007)	Private university students (southeastern United States)	Tailored messages, control	Up to 12-14 messages over 2 weeks	In person paper/pencil (at school) and wireless handheld computer	Wireless handheld computers	NR	Alcohol use, self-efficacy, outcome expectancies	Normative
<b>Asthma</b>								
Joseph et al. (2007)	Urban African-American high school students (Detroit, Michigan)	Tailored intervention (with or without pretest), generic websites control	4 sessions over 6 months (self-paced)	Computer	Internet via school computers	TTM, HBM	Controller medication adherence, rescue inhaler availability, smoking, beliefs, attitudes, barriers to change	Normative, Ipsative
<b>Bullying</b>								
Evers et al. (2007)	Middle and high school students (United States)	Tailored intervention, control	3 sessions over the school year (self-paced)	Computer	Internet plus CD-ROM via school computers	TTM	Bullying behavior (bully, victim, passive bystander), intention to stop bullying behavior, pros/cons, processes of change, self-efficacy	Normative, Ipsative
<b>Chemotherapy</b>								
Kearney et al. (2006)	Chemotherapy patients (United Kingdom)	Tailored intervention	Daily sessions during two treatment cycles	Handheld computer	Handheld computers	NR	Symptoms of chemotherapy	Normative
<b>Injury Prevention</b>								
Yardley & Nymann (2007) – falls	Adults 65 years or older (United Kingdom)	Tailored intervention, control	1 session	Computer	Internet	NR	Self-rated balance, health problems, activity preference	Normative

(continued)

Table 3.5 Continued

<i>Behavior</i>	<i>Population</i>	<i>Study Conditions</i>	<i>Intervention Intensity</i>	<i>Assessment</i>	<i>Delivery Site</i>	<i>Theory</i>	<i>Tailoring Variables</i>	<i>Type of Feedback</i>
<i>Multiple Behaviors</i>								
Ezendam et al. (2007) – nutrition, exercise, sedentary behaviors	Adolescents (Netherlands)	Intervention, control	8 sessions over 10 weeks	Computer	Internet via school computer	PAPM, TPB	Knowledge, behavior, Body Mass Index (BMI), attitude, subjective norm, perceived behavioral control, stage of change, social support, skills, planning	Normative
Prochaska et al. (2008) – exercise, stress, smoking, weight	Medical university employees (United States)	Health risk intervention (HRI) only, HRI + motivational interview, HRI + tailored intervention	Unlimited sessions per behavior over six months (recommended minimum = 3 sessions per behavior)	Computer	Internet	TTM	Stage of change, pros/cons, efficacy, processes of change	Normative, Ipsative
<i>Physical Activity</i>								
Tate et al. (2006)	Overweight adults 20-65 years old (United States)	Computer-automated e-mail feedback, human e-mail counseling, no control	1 in person session plus weekly Internet e-mails over 6 months; unlimited access to study Web site	In person (at clinic) and computer	Internet (e-mail)	Cognitive-behavioral theory	Weight, calorie intake, physical activity	Normative, Ipsative
Woolf et al. (2006) – diet, physical activity, tobacco use, alcohol use	Adult primary care patients (northern Virginia)	Tailored intervention, control	1 or more sessions	Computer	Internet	TTM	Diet, physical activity, tobacco use, alcohol use, stage of change	Normative
Marcus, Lewis, et al. (2007)	Sedentary adults age 18-65 (Providence, Rhode Island; Pittsburgh, Pennsylvania)	Tailored Internet, tailored print, standard Internet	At least monthly visits over 12 months	In person paper/pencil, interview and physical assessment (at research site) and computer	Internet	TTM, SCT	Stage of change, self-efficacy, pros/cons, processes of change, physical activity	Normative, Ipsative

(continued)

Table 3.5 Continued

Behavior	Population	Study Conditions	Intervention Intensity	Assessment	Delivery Site	Theory	Tailoring Variables	Type of Feedback
Spittaels et al. (2007)	Adults 25-55 years old at worksites (northern Belgium)	Tailored intervention only, tailored intervention plus email feedback, non-tailored advice	1 session; 5 email messages over 8 weeks	Computer	Internet	TTM, TPB	Stage of change, intentions, attitudes, self-efficacy, social support, knowledge, benefits, barriers	Normative, Ipsative
Smoking Cessation								
Etter (2005)	Adults (via Swiss-based program available in five languages)	"Original" and "modified" versions of a tailored intervention	1 session; follow-up email messages at 1- and 2- months post session	Computer	Internet	TTM, TPB, theories of relapse prevention and tobacco dependence	Demographics, smoking status, stage of change, tobacco dependence, attitudes, self-efficacy, self-change strategies, coping methods, intention to use nicotine replacement therapy	Normative, Ipsative

Note: EPPM = Extended Parallel Process Model; HBM = Health Belief Model; NR = Not reported; PAPM = Precaution Adoption Process Model; SCT = Social Cognitive Theory; TPB = Theory of Planned Behavior; TRA = Theory of Reasoned Action; TTM = Translational Model

processing—central route and peripheral route. Central route processing is characterized by a careful examination of the arguments contained within a message, while peripheral route processing is characterized by a reliance on heuristics or cues that may be persuasive but tend to be unrelated to the core arguments contained within a message. In addition, as Petty and Cacioppo argued, central route processing results in attitudes that more likely remain stable over time and relate to future behaviors as compared with peripheral route processing.

Given that central route processing is advantageous from a persuasion and health behavior change perspective, what factors increase the chances that central route processing will take place? The ELM suggests that the extent to which individuals will elaborate with regard to a message and engage in central processing is heavily influenced by personal involvement with a message (Petty & Cacioppo, 1981). Personal involvement most likely occurs when one perceives a message to be personally relevant. As discussed above, individuals tend to interpret tailored messages as personally relevant more often than generic ones, thus increasing the chances that central processing will take place and that the result will be attitude and/or behavior change.

Indeed, Kreuter, Strecher, and Glassman (1999) suggested that communication messages range from the most generic to most customized along this continuum: (1) generic communication, (2) personalized generic communication, (3) targeted communication, (4) tailored communication, and (5) interpersonal communication. Generic communication pertains to all audiences, while personalized generic communication is similar except that superficial characteristics (e.g., name) are used to give the illusion of customization. Message designers customize targeted communication at the group level but tailored communication at the individual level. Interpersonal communication, being synchronous in nature, has the greatest potential to be the most efficacious of all communication types. However, Kreuter, Strecher, and Glassman observed that the impact of counseling interventions is limited by issues of reach and cost, while computer-based tailored interventions have an advantage on these issues. In addition, although interpersonal communication holds the *potential* to be the most highly tailored, not all interpersonal communication is tailored. Indeed, level of tailoring within interpersonal communication likely correlates with the knowledge, skill, and motivation of the communicator (Spitzberg & Cupach, 1984).

Surprisingly, these message types have yet to be compared within the context of a single study. Many studies have compared some of these message types (see Tables 3.3–3.5), although as mentioned earlier, the comparability of study conditions on features such as message content and length has not always been taken into account. Thus, while we may draw conclusions from some of the studies that have been conducted, we struggle to advance major conclusions regarding the relative efficacy of generic, targeted, and tailored messages. In fact, our review suggests that most tailoring studies have taken place

in the context of larger "in the field" randomized controlled trials rather than smaller lab-based studies. Smaller studies would be capable of achieving finer manipulations of messages and examining the impact of those manipulations on various outcome variables. In fact, literatures such as message framing have engaged in many more small scale lab-based studies where elements of messages (e.g., gain versus loss frame) have been carefully manipulated, leading to stronger conclusions regarding the relative efficacy of those message types (e.g., see O'Keefe & Jensen, 2006).

As Kreuter and Wray (2003) observed, "Importantly, it is not yet known whether tailored or targeted messages are more effective.... There are, however, situations in which each approach would seem to have an advantage over the other" (p. S228). Kreuter and Wray acknowledged contextual influences on whether one or another approach may be wiser. For example, if little variability exists on a factor within the target audience, than targeting may be just as effective as tailoring because a lack of variability would result in most individuals in the population receiving a similar message (i.e., targeted message). In addition, tailoring requires a mechanism to gather data and then deliver feedback to the audience of interest. If such a mechanism does not exist in a particular context, than targeting may be a more sensible option. Thus, although theoretically more customized messages may be capable of greater impact (Kreuter, Strecher, & Glassman, 1999; Petty & Cacioppo, 1981), this issue is more complex than it appears on the surface.

One recent study attempted to fill a gap in this literature by comparing the efficacy of generic, targeted, tailored, and attention control messages in the context of a single experiment (Roberto, Raup-Krieger, & Beam, 2008). This project randomized Hispanic participants to receive a print message about kidney disease that was developed according to one of the four message conditions. The attention control condition contained a very basic informational message about kidney function. The generic condition featured a message that attempted to convince the participants that they were at high risk for kidney disease. The targeted message was identical to the generic condition except that the researchers created it to be specific to Hispanics (in both language and images). Finally, the tailored condition mirrored the targeted condition except that it presented tailored (rather than targeted) feedback on perceived susceptibility to kidney disease. Results indicated that the tailored message outperformed the generic and targeted messages, which, in turn, outperformed the control message on perceived susceptibility. According to Roberto et al., the tailored, targeted and generic messages outperformed the control message on behavioral intentions, but they did not significantly differ from one another. No significant differences on attitudes toward talking to a doctor about kidney disease emerged among any of the message types. Thus, the hypothesis that more customization would lead to greater persuasion was only partially supported.

### *Perceived Message Relevance*

An additional tenet of the ELM perspective on the effects of tailoring also deserves attention. The ELM suggests that tailoring achieves its effects by enhancing perceived relevance to the message. This suggestion essentially posits a mediational model where individuals perceive a more customized message as more personally relevant, and this enhanced personal relevance promotes greater attention, elaboration, message processing, and, ultimately, persuasion. Reviews of the tailored message literature have found that, compared with similar nontailored messages, tailored messages are generally more likely to be read, understood, recalled, rated highly, and perceived as credible (Kreuter et al., 2000; Kreuter & Holt, 2001; Rimer & Glassman, 1999; Skinner et al., 1999). Many of these factors indicate perceived message relevance. In addition, Kreuter, Bull, Clark, and Oswald (1999) explicitly sought to better understand the role of message relevance in tailoring by making a number of assessments of potential indicators of this construct, such as the number of positive thoughts about and personal connections to the materials and positive self-assessment thoughts. Kreuter et al. found that those participants who received tailored materials evaluated them more positively on all of these dimensions as compared with a generic brochure formatted to look like the tailored materials.

Dijkstra (2005) also examined potential indicators of perceived message relevance in tailored communications. Results suggested that participants rated the tailored materials significantly higher than the standard materials on being "directed at you personally" and "takes into account your personal situation as a smoker." This study also revealed, however, that *personalization* of generic materials may also enhance the relevance (and, in this case, the efficacy) of those materials. The term *personalization* refers to the incorporation of recognizable aspects of a person into tailored content, such as a person's name or the type of cigarettes smoked (Dijkstra, 2008). Dijkstra (2005) compared a personalized condition that contained the same text as the standard nontailored materials but included the person's name and number and type of cigarettes smoked. This condition fared about as well as the tailored condition on measures of perceived relevance and also on number of smoking quit attempts, although participants rated the message as significantly less "interesting" than the tailored condition. This study demonstrated that enhancing standard smoking cessation materials with even a minimal amount of personalized information may improve the perceived relevance and, potentially, the efficacy of those materials. It also raised the question of how much of the efficacy of tailored materials stems from individuals' perceptions that materials have been tailored as opposed to how much materials actually were tailored.

Webb, Simmons, and Brandon (2005) varied the amount of personalization in smoking cessation materials to explore potential mechanisms of tailoring. The study compared standard smoking cessation materials to both minimally

and extensively personalized materials. The minimally personalized material contained the individual's name and a statement about how the report was created especially for them. The extensively personalized materials were similar except that approximately 50 personalized features were integrated into the report, including several instances of the participant's name, gender, age range, rate of cigarette consumption, length of time smoking, and cigarette brand smoked. In all cases, the actual smoking cessation content was identical. On measures related to perceived message relevance (e.g., caught attention, credible, trustworthy, interesting, etc.), Webb et al. reported a statistically significant linear pattern, indicating that participants interpreted the extensively personalized materials as most relevant, followed by minimally personalized and then standard materials. Webb et al. found a similar pattern on readiness to quit smoking, but it was not statistically significant. The study also revealed that those participants who most valued tailored information were most likely to exhibit changes on readiness to quit smoking in the personalized conditions. Similar to Dijkstra (2005), Webb et al. argued that personalizing health communication materials on even very basic features enhances the perceived message relevance and possibly the efficacy of those materials.

In some ways, however, these studies can be viewed as inconsistent with findings from the tailoring literature, which has relied almost entirely on tailoring on constructs from behavioral theories. The use of such behavioral theories and the matching of content based upon variables central to those theories (e.g., attitudes, self-efficacy) have been offered as an explanation for the efficacy of tailored messages (e.g., Prochaska et al., 1993). This matching of appropriate content to individuals based upon assessment has been referred to in recent writings as *adaptation* or *content-matching* (Dijkstra, 2008; Hawkins, Kreuter, Resnicow, Fishbein, & Dijkstra, 2008), and it comprises the central strategy employed in the early studies of message tailoring (see Table 3.2). The Webb et al. (2005) and Dijkstra (2005) studies, however, suggest that personalization may account for some of the effects of tailored interventions. As noted above, from an ELM perspective, even simple personalization has the potential to make the material appear more personally relevant to the reader and, thus, increase the chances of persuasion.

Moreover, Webb, Hendricks, and Brandon (2007) replicated the Webb et al. (2005) results almost exactly and provided evidence that priming individuals on the value of personalized or standard information enhances both perceived message relevance and readiness to quit smoking. Webb et al. concluded that "selling" participants on the value of the materials (whether standard or tailored) may enhance their effectiveness. Given that many tailored interventions appear to already contain messages that tell participants that the materials have been "specifically designed for them," this study raises the question of whether a placebo effect is responsible for some of the effects of tailored interventions. That is, does telling participants that a message has been specifically designed for them (whether or not it is in fact true) cause them to pay greater

attention to such a message and view it as more personally relevant? The Webb et al. studies suggest that the answer is "yes," and that this suggestion of tailoring, in and of itself, could be responsible for some of the effects of tailoring (see Webb, Simmons, et al., 2005; Webb, Hendricks, et al., 2007).

Finally, while further studies may help us disentangle issues of personalization versus content matching, currently, many scholars (Hawkins et al., 2008; Rimer & Kreuter, 2006) agree that perceived message relevance is very important to the ultimate impact of tailored interventions. Scholars have rarely tested, however, whether perceived message relevance actually statistically mediates the relationship between exposure to the message and behavior change (Kreuter & Wray, 2003; Rimer & Kreuter, 2006) as well as whether a more complex relationship exists between exposure to a message, perceived relevance, message processing, and ultimate persuasion. To answer this important question, we need longitudinal studies that empirically examine the relationship between a variety of message-based factors, perceived message relevance, and later behavioral change. Such research will also need to address what exactly makes a message personally relevant (e.g., see F. C. Bull, Holt, Kreuter, Clark, & Scharff, 2001; Ruiter, Kessels, Jansma, & Brug, 2006). Obtaining answers to this large and complex question may advance our understanding of tailored health communication and also inform the issue of the importance of personalization compared with tailoring.

### Using Theory for Tailoring

In the realm of tailoring mechanisms, another issue that must be discussed constitutes the use of theories "for" tailoring. Tailoring can be achieved on virtually any variable that is capable of assessment (Rakowski, 1999). Thus, what variables should be tailored on to achieve the greatest intervention effects? Reviews of the tailoring literature demonstrate that, to date, a relatively small set of behavioral theories has been widely used in tailored interventions (see Kreuter et al., 2000; Kroeze et al., 2006; Noar et al., 2007; Skinner et al., 1999; Sohl & Moyer, 2007). These "usual suspect" theories are the transtheoretical or stages of change model (TTM; Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992), the health belief model (Janz & Becker, 1984), theories of reasoned action (Fishbein & Ajzen, 1975) and planned behavior (Ajzen & Madden, 1986), and social cognitive theory (Bandura, 1986). Each of these theories posits a number of psychosocial factors that may influence behavior change, and analyses of concepts from the theories reveal many similar constructs across the theories, including attitudes and beliefs, self-efficacy, social norms, perceived threat, behavioral intentions, and stages of change (Noar, 2005–2006; Noar & Zimmerman, 2005). Tailored interventions typically customize content based upon these concepts in efforts to match the right messages to the right individuals and, ultimately, persuade individuals to change their health behavior. This principle exemplifies one of the elegant features of tailored interventions. For a particular individual,

theoretical mediators that do not need to change (e.g., perceived threat) can be de-emphasized or ignored altogether, while those that do need to change can be emphasized in intervention feedback (e.g., self-efficacy).

Notably, although these theories have been widely applied in tailoring, "application of theory" varies by study. Some researchers have suggested or implied that a tailored intervention should choose a single theory and tailor messages on all components from that theory in order to "count" as a "theory-based project" (Velicer et al., 1993, 2006). This standpoint, however, appears to be the minority view. Alternatively, other researchers suggest a process through which scholars select theoretical determinants on the basis of the empirical literature and subsequently use them in tailoring messages, regardless of theoretical origin (Kreuter et al., 2000; Rimer & Kreuter, 2006). Indeed, some reviews of tailored interventions demonstrate that multiple theories are used in tailoring, and, at times, little correspondence emerges between theories applied and variables tailored upon (e.g., see Noar et al., 2007; Richards et al., 2007; Sohl & Moyer, 2007). This fact makes it difficult to test which theory provides the most fruitful basis for tailored interventions, although testing which theoretical concepts may be most effective can and has been examined (see Noar et al., 2007; Sohl & Moyer, 2007).

To date, tailoring has almost entirely been conceived of as a way to customize intervention content (based on these behavioral theories) to individuals. As a result, nearly all tailoring has focused on what scholars believe to be the behavioral determinants of tailoring, which come from the theories of behavior and behavior change listed above (Kreuter et al., 2000; Noar et al., 2007; Rimer & Kreuter, 2006). A broader perspective would be that variables related to intervention content represent just one domain of tailoring that is possible. Indeed, Rimer and Kreuter argued that at least four approaches to tailoring can be used to enhance health communication and these approaches can be adapted to represent tailoring message domains. These four domains are (1) matching content to information needs and interests; (2) placing information in a meaningful context; (3) using design, production, and channel elements to capture attention and enhance message processing, and (4) presenting the type and structure of information preferred by participants. Table 3.6 lists these four domains, and includes possible theories and theoretical constructs that have been (or could be) applied in tailoring.

As noted above, matching content to individuals has been the main emphasis of the tailoring literature to date. In this domain, however, little work has been done applying behaviorally oriented theories within the communication discipline such as the extended parallel process model (Witte, 1992) and risk perception attitude framework (Rimal & Real, 2003). These theories lend themselves nicely to tailoring as they suggest "profiles" of individuals based on the theoretical concepts of perceived threat and self- and response-efficacy, variables that easily can inform the content of a message (see Rimal & Adkins, 2003; Skubisz, Reimer, & Hoffrage, this volume). Beyond manipulat-

ing content, placing information in a context meaningful to participants may be as important as the selection of particular theoretical determinants, especially in terms of the perceived relevance of the material (see Dijkstra, 2008; Hawkins et al., 2008; Noar et al., 2007). For example, creating materials that are tailored on factors such as gender, age, race, and culture may make that information more meaningful and relevant to participants. In fact, in their meta-analysis of print tailored materials, Noar et al. found that tailoring on demographic factors such as gender, race, or age enhanced the efficacy of tailored materials. They also found an additive effect such that tailoring in more areas (e.g., demographic, theoretical, behavioral) led to greater effects of interventions. Similarly, Kreuter et al. (2005) demonstrated the ability of tailoring on cultural variables to enhance the efficacy of materials tailored on behavioral theory constructs alone (also see Hornikx & O'Keefe, this volume). These studies suggest that moving beyond the content domain to include demographic and cultural variables in tailoring may lead to more efficacious interventions.

The third and fourth domains have to do with the design, structure, and type of messages. The third domain concentrates on gaining (and keeping) the attention of the participant and facilitating message processing. Demographic and cultural variables may go some way in gaining participants' attention, but variables such as message sensation value might also be used in tailoring to optimize the "look and feel" of messages for participants. For example, delivering high sensation value messages to high sensation seekers and low sensation value messages to low sensation seekers may be a strategy to help garner and keep the attention of individuals, particularly for high sensation seekers (Palmgreen & Donohew, 2003). In addition, tailoring based upon individuals' need for cognition, by applying "message cognition value," could facilitate central processing (Harrington, Lane, Donohew, & Zimmerman, 2006). Although the message cognition value construct is new to the field, several studies have demonstrated that tailoring messages on message sensation value can have positive effects (e.g., Harrington, Lane, Donohew, Zimmerman, Norling, et al., 2003; Lorch et al., 1994; Palmgreen et al., 1991; Roberto et al., 2007).

Finally, message structure and type in the delivery of tailored messages may also be important, particularly with regard to message processing. For example, delivering tailored messages in forms other than didactic materials, such as through the use of narratives (Kreuter, 2008) or tailoring message type based on preference for narrative or statistical presentation of information, comprise compelling avenues for research. Tailoring could also be conducted on preference for particular type of appeal, such as presenting information in the form of a fear appeal versus a guilt appeal. Tailoring on message frame—such as gain or loss frame—based upon individual differences found through assessment in this area could also be valuable (see Latimer, Salovey, & Rothman, 2007; Latimer et al., 2008).

## The Future of Tailored Health Communication

What is the future of tailored health communication? To be able to answer this question, we must begin with a clear understanding of the past. Although the literature has greatly progressed since the first tailoring studies were published, many basic questions about tailoring that were posed a decade ago remain unanswered (Abrams et al., 1999; Rakowski, 1999; Skinner et al., 1999). Indeed, this review reveals that we know much more about *whether* tailored interventions work than we do *why* and *under what conditions* they work. This conclusion has been drawn by other recent reviewers of the literature on tailored health interventions (e.g., Dijkstra, 2008; Hawkins et al., 2008; Kroeze et al., 2006; Noar et al., 2007; Richards et al., 2007; Rimer & Kreuter, 2006). We next discuss directions for future research in terms of 4 areas that may help advance a cumulative science of tailoring. These include additional meta-analyses, new primary studies, message design research, and message effects perspectives in tailoring.

### Importance of Meta-Analyses

While new studies can lend critical answers to such questions in tailoring, meta-analytic projects also hold the potential to be fruitful as conduits for cumulative knowledge. Two recent meta-analytic projects in the tailoring area (Noar et al., 2007; Sohl & Moyer, 2007) have just begun to synthesize this rapidly growing literature. Although narrative reviewers of the literature can report on the kinds of studies that have been conducted, meta-analytic studies can offer valuable insights in terms of answering questions involving study findings and outcomes (Noar, 2006b). Such projects could take advantage of the large literature that already exists in tailoring and glean insights from the many randomized trials that have already been conducted (Snyder et al., 2008). In this manner, such projects could facilitate reflection on the first decade and a half of tailoring research and help set the agenda for the future of tailoring studies. Over time, a set of "best practices" in tailoring, informed by both theory and data, could perhaps be developed to provide guidance for effective tailored interventions. Advancing our understanding of how tailoring does (and does not) work across particular health behaviors, channels, and populations is critical in building a cumulative science of tailored health communication. We must also determine how the diversity of theoretical variables, constructs, and domains can be most fruitfully applied to tailored messages and interventions. In addition, as tailored message researchers work to build this cumulative science, we strongly urge the adoption of clear and consistent reporting guidelines for publications, including clearly specifying features such as assessment strategies, tailoring variables (what was tailored on and how it was achieved), and detail on intervention materials.

### New Primary Studies

While meta-analyses are capable of examining the large number of studies that have already been conducted, new studies can test novel ideas in tailoring. Additional randomized trials examining the ability of tailored interventions to outperform alternative interventions, while useful in informing the "efficacy" question, may *not* lead us toward a more sophisticated science of tailoring (Abrams et al., 1999; Hawkins et al., 2008). A number of studies could be undertaken, however, that would help improve the knowledge base regarding what makes effective tailoring. Such studies would encompass randomized trials that tease out various components of tailoring by comparing a variety of intervention conditions that incrementally add various tailoring components and examine their influence on outcomes (e.g., behavior change; Abrams et al., 1999; Hawkins et al., 2008; Kreuter et al., 2005; Kroeze, Oenema, Dagnelie, & Brug, 2008; Resnicow et al., 2008; Strecher et al., 2008). Although scholars have long called for such studies in the tailored health literature, as Abrams et al. observed, few exist. In addition, many of these studies could be driven by research questions aimed at testing tailoring variables beyond the content domain, as suggested in Table 3.6. Studies could also be driven by more recent distinctions that have been made in the tailoring literature, such as the differences between personalization, content-matching/adaptation, and various types of feedback (Dijkstra, 2008; Hawkins et al., 2008). These distinctions have given tailoring researchers a language with which to describe a variety of tailoring components and mechanisms that previously had simply been a part of the "black box" of tailoring. Newer studies, thus, can examine the unique role that each of these strategies plays in the efficacy of tailored messages.

### Message Design

Notably, many of the domains listed in Table 3.6 focus on message design of tailored interventions, and this area constitutes one in which health communication researchers can likely make important contributions. Indeed, not surprisingly, tailored interventions have mostly been tailored on content (i.e., content-matching) in part because much of the tailoring literature has been driven by theories of health behavior (rather than communication or persuasion theories). While behavioral theories tell us what theoretical content interventions should stress, they do not tell us how to design the intervention messages in ways that make them personally relevant and persuasive (Cappella, 2006; Noar, 2006a; Slater, 2006). For guidance on this question, communication theories related to message design and persuasion can be applied (Cappella, 2006; Harrington et al., 2006; Noar, 2006a; Slater, 2006). Communication researchers, thus, could contribute to this literature by considering (and empirically testing) how "message design" of tailored interventions can



Table 3.6 Domains in Which Tailoring Can be Achieved and Associated Theories and Variables

Purpose	Theories	Variable Types	Specific Constructs/Variables	Outcomes
Match content to individual's information needs & interests	Trans theoretical Model and Stages of Change Health Belief Model Social Cognitive Theory Theory of Reasoned Action Theory of Planned Behavior Extended Parallel Process Model	Psychosocial variables, past behavior	Attitudes, beliefs, self-efficacy, social norms, perceived susceptibility, perceived severity, behavioral intentions, stage of change, previous behavior	Argument strength (content was convincing)
Place information in a meaningful context	Audience segmentation Personalization Culturally-oriented theories	Demographic, cultural variables	Gender, age, race Gender norms, cultural norms, ethnic identity, racial pride, religiosity, collectivism	Perceived relevance (intervention was designed for me and reflects my beliefs and values)
Use design, production, and channel elements to capture and keep individual's attention	Activation Model Sensation-seeking Targeting Limited Capacity Model	Message design variables ("look and feel")	Message sensation value	Attention (intervention kept my attention)
Present information in type and structure preferred by individual	Exemplification Theory/ Narratives Entertainment Education Message Framing Emotional appeals	Message structure variables (type of appeal)	Narrative vs. statistical Gain vs. loss framing Fear, guilt, warmth, and other appeals	Message processing (thought about information, recalled information later on)

be enhanced, perhaps by careful experiments or randomized trials that compare differing message design approaches (see Table 3.6). This research should include testing basic design questions such as whether tailoring on visual elements increases the efficacy of tailored interventions, as implied by the findings of a recent meta-analysis (Noar et al., 2007).

### Message Effects

We also need to disentangle the process by which tailored messages exert their effects. Figure 3.1 presents one such hypothesized pathway. Based upon both the ELM (Petty & Cacioppo, 1981) and McGuire's persuasion model (McGuire, 1989), this message effects model suggests that exposure to a message results in an immediate judgment of perceived relevance. If receivers rate relevance as low, then they pay little attention to that message and likely turn their attention to something else. If receivers judge perceived relevance as moderate or high, they may instead attend more closely to that message and devote more cognitive resources to it. An interrelationship likely exists among these factors, such that processing of the message may ultimately lead to a judgment that the message is not relevant after all or that the arguments are not persuasive. Conversely, the design of the message may not be stimulating enough to keep attention. In any of these cases, the individual may turn away to something else and, again, fail to be persuaded (also see Byrne & Hart, this volume).

If the message is sufficiently compelling, however, and convinces an individual of its personal relevance, keeps attention, and results in central processing, the message may ultimately lead to information seeking, persuasion (e.g., attitude, behavior change), or both. Indeed, when we consider tailoring from a message effects perspective, the role of tailoring variables beyond the content domain becomes clearer. For instance, the role of content domain variables primarily entails the development of convincing arguments for change. Other tailoring variables, however, may be more useful in garnering attention, fostering perceived relevance, or encouraging message processing (also see Hawkins et al., 2008). For example, both Table 3.6 and Figure 3.1 suggest that tailoring on demographic factors and contextual variables, and using personalization strategies may aid in raising the perceived relevance of the message; theoretical concepts such as message sensation value might be applied to garner and keep attention to the message, and approaches such as narratives and message appeals might be used to enhance message processing. These assertions constitute empirically testable hypotheses that might be the subject of further tailoring research. Such work holds the potential to greatly advance our understanding of how tailored messages exert their effects and could provide guidance for the next generation of tailored health communication.

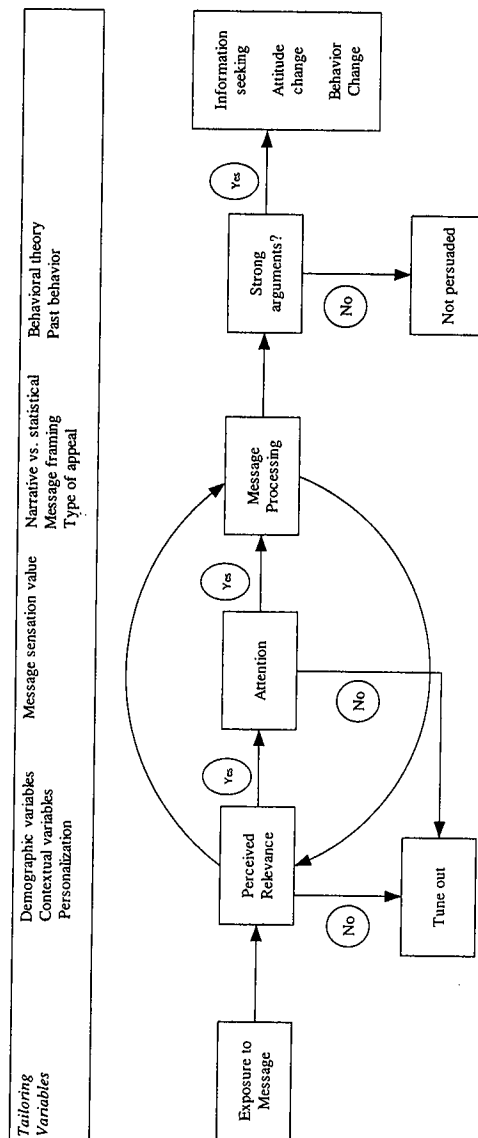


Figure 3.1 Hypothesized message effects model for tailored message.

## Conclusion

This chapter has provided an overview of the area of individually tailored communication, an exciting area of persuasive messaging in health communication with strong possible implications for other areas of the communication discipline as well. Its focus on matching messages to the unique beliefs, attitudes, needs, and preferences of individuals makes it fundamentally different from the common mass communication practices of audience segmentation and message targeting, which operate at the group level. The possibility of reaching entire populations with individually tailored messages is upon us, and opportunities to bring such messages to populations will only grow with the further advancement of new technologies.

This chapter reveals the extraordinary breadth of the tailoring literature, yet it also reveals the limited depth with which we understand the effects of tailored communications. Future studies in this area could advance the science of tailored communication by studying the mechanisms and moderators of efficacious tailored interventions. While the roots of this literature lie in psychology and public health, communication researchers have a unique role to play by applying communication and persuasion theory to better inform this work from a theoretically-oriented, message-based perspective.

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