

## Does locus of control moderate the effects of tailored health education materials?

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### Abstract

**Research in health communication has shown that individually tailored health education materials are more effective than traditional or generic materials in producing changes in health-related behaviors. However, tailored materials have not been equally effective for all individuals. Because locus of control affects behavioral outcomes in other self-change interventions, its effect on individuals' responses to tailored messages is of particular interest. The present study examined differences in cognitive responses to tailored and non-tailored weight loss materials among 198 overweight individuals. Weight locus of control significantly interacted with study group (who received either tailored or non-tailored materials), suggesting that externals may respond to tailored health education materials with counter-arguments. Implications for the development and application of tailored health communication materials are discussed.**

### Introduction

#### Health education materials (HEM) and tailoring

Printed HEM are often designed to help individuals make changes in behavior or lifestyle that will lead to better health and enhanced quality of life. Traditionally, these materials have consisted of

generic health information—often in the form of brochures, booklets or pamphlets—designed for the general population or for some demographic sub-group. Although these mass-produced materials are relatively inexpensive to generate and can provide valuable information, their one-size-fits-all approach is not sensitive to the natural variation that exists between different individuals on factors known to influence health-related decisions and behaviors (Kreuter *et al.*, 1999).

With the advent of new computer technologies, a different approach to constructing HEM has emerged in which materials are not mass produced, but rather generated one at a time by computers and tailored to the individual. Using this approach, psychosocial and behavioral data are gathered from individuals, and entered into an expert-system computer program that determines which health messages are appropriate for each individual. According to the theories of information processing [Elaboration Likelihood Model (Petty and Cacioppo, 1981)] individual tailoring should make HEM more effective by maximizing their relevance for each unique individual.

Empirical studies have demonstrated the effectiveness of tailored HEM compared with non-tailored HEM in reducing dietary fat consumption (Campbell *et al.*, 1994; Brug *et al.*, 1996), increasing fruit and vegetable consumption (Campbell *et al.*, 1997; Motsinger *et al.*, 1997; Brug *et al.*, 1998; Campbell *et al.*, 1999), increasing physical activity (Kreuter and Strecher, 1996; Marcus *et al.*, 1998; Bull *et al.*, 1999), quitting smoking (Prochaska *et al.*, 1993; Strecher *et al.*, 1994; Curry *et al.*, 1995; Shiffman *et al.*, 1997), getting cholesterol tests (Kreuter and Strecher, 1996),

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getting mammograms (Skinner *et al.*, 1994), changing individuals' inaccurate perceptions of health risks (Kreuter and Strecher, 1995), and reading nutrition labels (Kreuter, 1997).

However, many participants assigned to the tailored arm of these studies did not even remember receiving or reading tailored HEM (Campbell *et al.*, 1994; Skinner *et al.*, 1994; Strecher *et al.*, 1994; Brug *et al.*, 1996; Kreuter and Strecher, 1996). Furthermore, even though the process of tailoring should develop materials that are highly relevant to each individual, only about half of participants in some studies reported that the tailored HEM applied to them specifically (Brug *et al.*, 1996; Kreuter, 1997). Although it would be interesting to investigate how participants' remembering that they received tailored HEM and feeling that the tailored HEM were applicable to their lives related to the study outcomes, the aforementioned studies did not report that aspect in their data analyses.

In some trials, tailored HEM were not found to be more effective than non-tailored print communications in increasing fiber consumption (Brinberg and Axelson, 1990), mammography screening (Meldrum *et al.*, 1994) and smoking cessation in heavy smokers (Strecher *et al.*, 1994). To maximize the effectiveness of tailored print communication, we must better understand the circumstances under which it is most and least effective. This issue has not yet been addressed in tailoring research. One possible explanation is that certain personality characteristics of participants account for part of the variability in responses to tailoring.

### **Internal/external control of reinforcement**

As part of Social Learning Theory, the construct of locus of control of reinforcement refers to the extent to which an individual believes that their behaviors are causally related to their resulting outcomes (internal), or they believe that their outcomes are determined by external factors such as luck, powerful others or fate (external) (Rotter, 1966). Having an internal locus of control has been associated with information seeking (Lefcourt and Wine, 1969), autonomous decision making (Sherman, 1973) and having a sense of well-being

(Lefcourt, 1982). Having an external locus of control has been associated with depression (Naditch *et al.*, 1975), anxiety (Feather, 1967) and being less able to cope with life stressors (Sandler and Lakey, 1982). More recent research in health psychology has demonstrated a relationship between locus of control and performance of a variety of health-related behaviors (Nir and Neumann, 1991; Springer *et al.*, 1994; Stewart and Streiner, 1995; Abbott *et al.*, 1996; Bearinger and Blum, 1997; Norman *et al.*, 1998). Among these studies, findings suggest that internals tend to respond better than externals to programs involving self-change (Chapman and Jeffrey, 1979; Saltzer, 1979; Kincey, 1980; Saltzer, 1981, 1982; Weyer, 1989; Nir and Neumann, 1995).

In particular, many studies have examined the association between locus of control and success in weight loss programs. The majority of these studies take one of two approaches. The first approach uses locus of control to predict success in a given program. For example, participants in a weight loss program completed a measure of health locus of control and it was found that locus of control combined with self-efficacy significantly predicted the percentage of their weight loss goal that the participants achieved (Weyer, 1989). In another weight loss program, obese women who were classified as internals regained less weight than their external counterparts during a 15–47 month follow-up period (Nir and Neumann, 1995). A series of studies (Saltzer, 1979 1981, 1982) also suggested an association between internal weight locus of control and both completing weight loss programs and achieving weight loss goals.

The second approach examines the effects of weight loss programs that do or do not take into account a participant's locus of control. For example, Wallston *et al.* (Wallston *et al.*, 1976) examined the association between Health Locus of Control and satisfaction with a weight loss program that was either matched or mismatched to the locus of control beliefs of the participant. Those in the matched program reported more satisfaction with the program than those in the mismatched program and also lost slightly more

weight (Wallston *et al.*, 1976). In a later study involving women in a weight loss program, those with an internal locus of control and a high need for social approval lost more weight during a follow-up period than (1) those with an external locus of control or (2) those with an internal locus of control, but a low need for social approval (Chapman and Jeffrey, 1979). In another study, a 'consistent' weight loss strategy, in which participants were told to intake a certain amount of food each day was compared with a 'variable' strategy, in which participants were told that their daily intake could vary, as long as they kept an overall average. Externals had more success in terms of weight loss in the 'variable' strategy and internals did not differ between the two strategies (Kincey, 1979). A related study examined weight loss goal setting and locus of control. Evidence was found that internals do better in a 'high target' (i.e. lose more weight) than a 'low target' situation (i.e. lose less weight) situation (Kincey, 1980).

In the present study, 198 overweight adults completed a written behavioral assessment including the Weight Locus of Control (WLOC) scale (Saltzer, 1982). Each then received, by random assignment, tailored or non-tailored HEM on weight loss. Post-intervention analyses examined the interaction between internality/externality of weight locus of control beliefs and the receipt of tailored versus non-tailored HEM on weight loss. The primary outcomes of interest were five types of cognitive responses to the HEM: (1) total number of thoughts about the weight loss materials, (2) valence of thoughts, (3) personal connection thoughts, (4) self-efficacy thoughts and (5) self-assessment thoughts. Because tailored HEM are designed to facilitate self-change, it was expected that internals would respond more favorably and externals would respond more negatively to tailored versus non-tailored HEM.

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## Method

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### Sample

Participants from the St Louis area responded to a newspaper advertisement and research staff

screened interested callers to determine whether they met the study's eligibility criteria [body mass index (BMI)  $\geq 27$  kg/m<sup>2</sup>, age  $\geq 18$  years, interested in losing weight and no use of prescription weight loss medication during the previous 6 months]. The number of callers far exceeded the study capacity and 233 callers were enrolled. Of these, 32 (13.7%) did not keep their subsequent appointment, and three had a BMI  $\leq 27$  kg/m<sup>2</sup> when height and weight were confirmed at the study site. This resulted in a final sample of 198. All participants who came to the laboratory and completed the experimental session received \$25 for their participation. The present study was approved by the Institutional Review Board and participants were treated in a manner consistent with the Ethical Principles of the American Psychological Association.

The average age of participants was 46.5 years and the average BMI was 36.6 kg/m<sup>2</sup>. The majority were women (83%) and most were either White (78%) or African-American (21%). On average, participants had completed 14 years of education.

### Measures

#### *Q1. Eligibility screening*

In a telephone interview, Q1 assessed eligibility criteria and demographic characteristics, and collected personal identification information.

#### *Q2. Behavioral assessment*

In the same telephone interview, assessment Q2 collected data required to generate the tailored HEM, including beliefs about weight loss, motives for losing weight, perceived usefulness of different weight loss approaches, barriers to physical activity, triggers for eating and overeating (Brownell and Kramer, 1989; Brownell and Wadden, 1992), self-efficacy (Bandura, 1977) for eating healthier foods, eating less fat, increasing physical activity, and making progress toward weight loss goals, actual dietary habits and preferences, food shopping and preparation routines, preferences for sources of weight loss information, and preference for solo versus social learning activities (Brownell, 1994). All questions in Q2 were closed-ended,

offering participants a range of responses to choose from.

### *Q3. WLOC scale*

When participants arrived at the laboratory for their scheduled appointment they completed the WLOC scale to measure the extent to which they perceived having control over their weight (Saltzer, 1982). The WLOC scale consists of four items scaled in a six-point Likert-type format. It has been shown to have adequate test-retest reliability over a 24-day period ( $r = 0.67$ ), somewhat low internal reliability ( $\alpha = 0.58$  and  $0.56$  for the two administrations, respectively), was not correlated with a social desirability scale and demonstrated adequate convergent validity (Saltzer, 1982). The internal reliability in the present sample was comparable to previous trials ( $\alpha = 0.49$ ).

### *Q4. Cognitive responses*

According to Petty and Cacioppo's (Petty and Cacioppo, 1981) Elaboration Likelihood Model, people are more likely to actively and thoughtfully process information if they perceive it to be personally relevant. The model is based on the premise that under many conditions, people are active information processors—considering messages carefully, relating them to other information they have encountered and comparing them to their own past experiences. Messages processed in this way (i.e. 'elaborated' upon) tend to be retained for a longer period of time and are more likely to lead to permanent attitude change (Petty and Cacioppo, 1981). Health information that is tailored to an individual's needs has been found to stimulate significantly more elaboration than generic material (Kreuter *et al.*, 1999). Cognitive responses provide a valid measure of information processing (Petty and Cacioppo, 1981). After reading the assigned HEM, participants completed a thought-listing task in which they were instructed to list all of the thoughts they had while reading the HEM. They then rated the valence of each thought, by indicating whether it was a positive, negative or neutral thought.

### **HEM on weight loss**

Through random assignment the participants received one of three HEM (booklets) on weight

loss. Seventy-two participants received HEM that were individually tailored, 73 received a non-tailored American Heart Association (AHA) weight loss booklet, and 53 received non-tailored materials that were nearly identical to the tailored materials in format and appearance, but contained the content of the AHA materials (AHA-formatted). As described in the analyses section, the latter two groups were combined for the purpose of the present study.

The tailored HEM were generated using the Adobe PageMaker® program and text blocks were selected through computer algorithms that processed participants' responses to specific items from the tailoring survey (Q2). These HEM were tailored on variables such as main motivation for wanting to lose weight, barriers to physical activity, self-efficacy for weight loss behaviors, food shopping and preparation routines, triggers for eating and overeating, and preference for sources of weight loss information (i.e. video, Internet, class, print materials). Topics discussed in the tailored HEM included content related to the tailoring variables, such as motivation for losing weight, overcoming barriers to physical activity, building self-efficacy for weight loss behaviors, food selection and preparation techniques, triggers for eating and overeating, and resources for further information (given in accord with the participant's preference for weight loss information). The AHA booklet *Managing Your Weight* is a commonly distributed weight loss booklet, and contains a variety of general weight loss information covering topics such as choosing and preparing low-fat foods, reducing caloric intake, and increasing physical activity (American Heart Association, 1997). The AHA-formatted HEM derived its content from the AHA booklet but was generated in the format of the tailored HEM. The same paper, font and graphics were used in the AHA-formatted materials as in the tailored HEM.

### **Data coding**

Participants' written cognitive responses were transcribed and then coded by two reviewers who were unaware of study group assignment. Each thought or idea listed on the response form was coded

along four dimensions: personal connections, self-efficacy, self-assessment and behavioral intention. In addition, participants self-coded their responses on a fifth dimension—valence. These dimensions were selected based on previous research and on theoretical constructs of the Elaboration Likelihood Model (Petty and Cacioppo, 1981; Petty *et al.*, 1981). The most reliable finding in cognitive response research is the relationship between the valence of the responses generated and yielding to a persuasive appeal (Cacioppo *et al.*, 1981; Petty *et al.*, 1994). There were three categories of valence: (1) favorable thoughts, that support the issue, (2) unfavorable thoughts, that oppose the issue, and (3) neutral thoughts, that neither favor nor oppose the issue. Because reviewers' ratings of valence are very similar to participants' ratings, researchers commonly have study participants rate their own thoughts (Petty *et al.*, 1976; Cacioppo *et al.*, 1981).

According to the Elaboration Likelihood Model, individuals will be more motivated to process information and will process it more carefully and thoroughly when they perceive it to be personally relevant (Petty and Cacioppo, 1979). For this reason, participants' thoughts were coded into several relevant categories. First, each thought was coded as high, moderate or low on *personal connections*, or the extent to which the participant related the material to their lives or to themselves (i.e. 'I already drink a lot of water' = 'high'; 'These serving sizes sound so small' = 'low'). Second, each thought was coded for the presence or absence of *self-assessment*, in which the participant made a comment that rated themselves in some way (i.e. 'I don't get enough physical activity' = 'presence'; 'I liked the information about total daily calories' = 'absence'). Third, each thought was coded for the presence or absence of *self-efficacy*, or the extent to which the thought was related to efficacy beliefs (i.e. 'I don't think I can count calories' = 'presence'; 'I have already tried walking' = 'absence').

Research staff were trained to code the cognitive responses using a sample of 20% of participant responses. Two coders rated all thoughts on all

dimensions. Inter-rater reliability was 82% for connections to personal life, 88% for self-efficacy, 90% for behavioral intention and 86% for self-assessment. Overall inter-rater reliability was 86%. Discrepancies in coding were discussed until an agreement was reached. A total of 13 thoughts (out of 1506, <1%) were not rated for valence by the participant and were given a consensus rating by the two coders.

### Statistical analysis

The present study used a 2 (study group—tailored, non-tailored)×2 (WLOC—internal, external) ANOVA to investigate whether an interaction existed in the number of cognitive responses generated by participants in each of the coded thought categories. Participants were classified as internal or external in weight locus of control through a median split of the WLOC scores. Those below the median were classified as internal, and those at and above the median were classified as external (the WLOC is scored in the external direction, with higher scores representing externality). Because this study was concerned with comparing tailored versus non-tailored *content*, the two non-tailored content groups were combined (the AHA-formatted condition was used to rule out effects of *appearance* in a related investigation) (Kreuter *et al.*, 1999). One-way ANOVAs on the dependent variables of interest revealed no significant differences between the AHA and the AHA-formatted groups. To interpret significant interactions, simple effects testing was conducted using one-way ANOVAs across locus of control groups to determine the effect of study group.

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## Results

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Each participant reported thoughts (cognitive responses) that they either coded as positive, negative or neutral in valence. Participants generated a total of 367 positive thoughts and the average number of positive thoughts per participant was 4.73. For negative thoughts, a total of 342 were generated, at an average of 1.70 per participant. For neutral thoughts, a total of 242 were generated,

at an average of 1.20 per participant. Across these three valence categories, a total of 951 thoughts about the HEM were generated, for an average of 7.64 per participant. However, the following report focuses on the results from the negative thoughts only, as the separate analyses on the positive and neutral thoughts did not reveal significant interactions. Thus, following results are still based on the entire data set ( $N = 198$ ), but only on the negative thoughts.

A 2 (study group—tailored, non-tailored)  $\times$  2 (WLOC—internal, external) ANOVA was conducted on the total number of negative thoughts. The main effect of group was not significant, but the main effect of WLOC was,  $F(1,196) = 3.97$ ,  $P = 0.05$ . Those with an internal WLOC had significantly fewer negative thoughts ( $M = 1.48$ ,  $SD = 1.95$ ) than those with an external WLOC ( $M = 1.91$ ,  $SD = 2.09$ ),  $P = 0.05$ . The study group  $\times$  WLOC interaction was significant,  $F(1,196) = 5.21$ ,  $P = 0.02$  (see Figure 1). Simple effects testing revealed that among internals, those in the non-tailored group expressed significantly more negative thoughts ( $M = 1.83$ ,  $SD = 2.08$ ) than those in the tailored group ( $M = 0.97$ ,  $SD = 1.65$ ),  $P = 0.04$ . Among externals, there was no significant study group effect.

The same analysis was conducted on high personal connection thoughts negative in valence. The main effect of study group was not significant. The main effect of WLOC was marginally significant,  $F(1,195) = 3.16$ ,  $P = 0.08$ , with internals having fewer negative high personal connection thoughts ( $M = 0.86$ ,  $SD = 1.36$ ) than externals ( $M = 1.14$ ,  $SD = 1.74$ ). The study group by WLOC interaction was significant,  $F(1,195) = 4.28$ ,  $P = 0.04$  (see Figure 1). Simple effects testing revealed that among internals, there was no significant effect of study group. Among externals, those in the non-tailored group expressed marginally fewer negative high personal connection thoughts ( $M = 0.93$ ,  $SD = 1.47$ ) than did those in the tailored group ( $M = 1.57$ ,  $SD = 2.17$ ),  $P = 0.07$ .

For moderate connection thoughts negative in valence, the main effect of study group was significant,  $F(1,196) = 6.99$ ,  $P = 0.01$ , with those

in the tailored group having significantly fewer negative moderate connection thoughts ( $M = 0.32$ ,  $SD = 0.69$ ) than those in the non-tailored group ( $M = 0.67$ ,  $SD = 1.03$ ). The main effect of WLOC was not significant. The study group by WLOC interaction was significant,  $F(1,196) = 4.40$ ,  $P = 0.04$  (see Figure 1). Simple effects testing revealed that among internals, those in the non-tailored group ( $M = 0.79$ ,  $SD = 1.09$ ) expressed significantly more negative moderate connection thoughts than did those in the tailored group ( $M = 0.14$ ,  $SD = 0.35$ ),  $P = 0.001$ . Among externals, there was no significant study group effect.

For strong self-efficacy thoughts negative in valence, neither the main effects of study group nor WLOC were significant, but the interaction was,  $F(1,196) = 5.95$ ,  $P = 0.02$  (see Figure 1). Simple effects testing revealed that among internals, there was no significant effect of study group. Among externals, those in the non-tailored group expressed significantly fewer negative strong self-efficacy thoughts ( $M = 0.40$ ,  $SD = 0.70$ ) than did those in the tailored group ( $M = 0.89$ ,  $SD = 1.80$ ),  $P = 0.05$ .

Similarly, for self-assessment thoughts negative in valence, neither the main effects of study group nor WLOC were significant, but the interaction was  $F(1,196) = 8.65$ ,  $P = 0.01$  (see Figure 1). Simple effects testing revealed that among internals, there was no significant effect of study group. Among externals, those in the non-tailored group ( $M = 0.73$ ,  $SD = 1.39$ ) expressed significantly fewer negative self-assessment thoughts than those in the tailored group ( $M = 1.71$ ,  $SD = 2.20$ ),  $P = 0.005$ .

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## Discussion

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### Summary of results

The interactions revealed some support for the hypothesis that weight locus of control internals would respond more favorably to tailored than non-tailored HEM and that externals would respond more favorably to non-tailored than tailored HEM. Respondents with an internal locus

Does locus of control moderate the effects of tailored HEM?

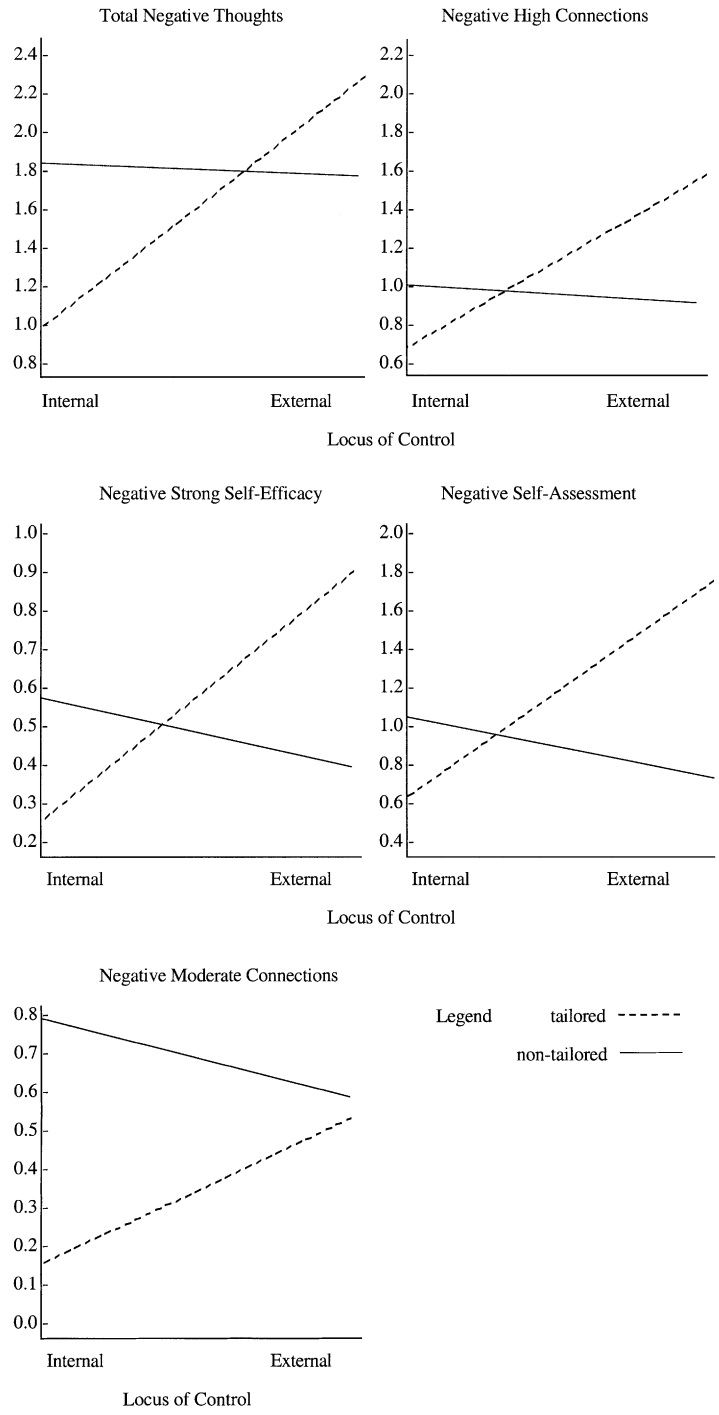


Fig. 1. Study group (tailored, non-tailored) × WLOC (internal, external) interactions.

of control who received non-tailored HEM generated more total negative thoughts and more negative moderate personal connection thoughts than did internals who received tailored materials. Respondents with an external weight locus of control who received tailored materials generated more negative high connection thoughts, more negative self-efficacy thoughts, and more negative self-assessment thoughts than did externals who read non-tailored materials. There were no differences for individuals with an internal weight locus of control in the quantity of negative high personal connection thoughts, negative self-efficacy thoughts and negative self-assessment thoughts generated in response to tailored versus non-tailored HEM. For externals, there were no differences due to tailoring on the total number of negative thoughts or the number of negative moderate connection thoughts generated.

### **Explanation of findings**

Externals believe their outcomes are due to situational factors, such as luck, fate or powerful others, and not, as with internals, to self-behaviors, information seeking (Lefcourt and Wine, 1969) or autonomous decision making (Sherman, 1973). Thus, it is reasonable to expect that externals would react negatively to HEM that directly addressed their own lifestyle (i.e. personal connections), their perceived competence to carry out the behaviors needed to lose weight (i.e. self-efficacy) and encouraged personal evaluation of their own status with regard to lifestyle (i.e. self-assessment). These findings may also help explain why some participants in previous tailoring studies have not remembered receiving or reading tailored HEM (Skinner *et al.*, 1994; Strecher *et al.*, 1994; Brug *et al.*, 1996; Kreuter and Strecher, 1996).

The significant weight locus of control and study group differences in reporting of negative thoughts may reflect differences in counter-arguing of the materials. Counter-arguing occurs when an individual receives a persuasive message and generates negative cognitions in response to that message. When individuals counter-argue against messages, they are less persuaded by the message content.

In the context of the present study, externals exposed to tailored weight loss materials clearly reacted more negatively to the information than when they received non-tailored materials.

### **Limitations**

With its convenience sample, some groups (e.g. less motivated, less educated, certain ethnic groups) were not represented in the study. As a result, this type of investigation should be replicated in a more diverse sample. In addition, the sample was recruited from a newspaper advertisement, calling for individuals who were interested in losing weight. This resulted in the recruitment of a highly motivated sample that was probably not entirely representative of the local population. The results may have looked differently had we collected a (1) more representative or (2) less motivated sample.

It would also be beneficial to replicate this type of investigation in other health domains in which tailoring has been used, such as smoking cessation, dietary change, physical activity and cancer screening. One could at best speculate that internals and externals may respond differently to tailored versus non-tailored HEM dealing with these other health issues. Finally, there are measurement limitations in that the WLOC showed somewhat low internal reliability. However, normally low internal reliability would result in increased difficulty in detecting significant group differences. Because the present results were detected with the WLOC, this may be considered a more conservative test of the hypothesis.

### **Practical implications**

The findings have important implications for tailoring research. If externals vigorously counter-argue tailored HEM, such materials may need to be modified for use with these individuals. Saltzer (Saltzer, 1981) found that women in a weight loss program who were internal in weight locus of control were more likely to lose weight than those women with external weight locus of control beliefs. In a similar study (Saltzer, 1982), women with internal weight locus of control beliefs were more likely to reach their weight loss goals than



were women with external weight locus of control beliefs. These findings indicate that the weight loss programs were more effective for internals than they were for externals, suggesting that externals may have different needs that are not met by traditional weight loss programs. Thus, it may be appropriate to tailor such programs to the locus of control beliefs of the participants. One possibility would be for tailored materials to attempt to change locus of control among externals. This probably is not feasible given that locus of control is believed to be a relatively stable personality trait (Rotter, 1966). More promising is the possibility of including locus of control as a variable on which HEM could be tailored. At the simplest level, health messages for externals might focus less on personal responsibility for change, and more on helping an individual to access outside expertise and resources to support change. In a more elaborate tailoring scheme, an assessment could identify whether a person is internal or external, then follow-up with more detailed questions depending on their locus of control beliefs. For those found to be externals, we might assess specific dimensions of externality such as chance or powerful others (Wallston *et al.*, 1978). Based on these data, more specific tailored messages could be generated. For example, if an individual's externality was best explained by a belief in the power of God, behavior change messages could acknowledge and reinforce this belief, and craft an appeal that framed self-change within this context (e.g. translating biblical scriptures that promote self-care and responsibility). It may be impossible for self-change HEM to remove entirely the responsibility of the individual, but messages tailored to dimensions of external locus might make them more palatable.

Weiss (Weiss, 1977) cited the equivocal nature of the research findings concerning weight loss and locus of control, and suggested that if this is an important mediating variable, programs could be based on the weight locus of control beliefs of the individual. He also stated that this was not yet a practical option. Although previous attempts to match programs to the locus of control of the individual were not successful in producing

behavioral change, these studies are quite dated and used group-level matching versus individual-level tailoring. Technological advances have now made it possible to produce highly customized materials designed for one specific individual. HEM can be tailored to multiple aspects of the individual, providing materials that fit their lives much better than the aforementioned group-matched materials.

The application of tailored communication is exploding in a wide variety of fields, including health education and health communication. To maximize the effectiveness and efficiency of this approach, we must learn more about the conditions under which it is most effective. This study provides the first empirical explanation for the variability in effectiveness of tailoring. Hopefully it will stimulate others to examine new characteristics that might further expand our understanding of this promising approach.

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