

# Tailoring Messages to Individual Differences in Monitoring-Blunting Styles to Increase Fruit and Vegetable Intake

Continuing Education Questionnaire available at [www.sne.org/](http://www.sne.org/) Meets Learning Need Codes for RDs and DTRs 5150, 6020, and 6030.

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## ABSTRACT

**Objective:** To examine whether messages matched to individuals' monitoring-blunting coping styles (MBCS) are more effective in increasing fruit and vegetable intake than mismatched messages. MBCS refers to the tendency to either attend to and amplify, or distract oneself from and minimize threatening information.

**Design/Setting:** Randomly assigned messages were tailored to resonate with either monitors or blunterners and delivered at baseline, 1 week, 2 months, and 3 months later. Surveys were conducted at baseline and 2 and 4 months later.

**Participants:** 531 callers to a cancer information hotline who did not meet the 5 A Day guideline.

**Intervention:** A brief telephone-delivered message and 3 mailings of booklets and promotional items encouraging fruit and vegetable intake, tailored for either monitors or blunterners.

**Main Outcome Measure:** Fruit and vegetable intake 2 and 4 months post-baseline.

**Analysis:** Hierarchical regression modeling.

**Results:** Messages matched to MBCS were more effective than mismatched messages, particularly for the monitor message, in increasing intake at 2 months but not at 4 months.

**Conclusions and Implications:** These minimal interventions influenced fruit and vegetable intake. MBCS may be a promising target for developing tailored messages aimed at increasing intake, although additional research is needed to verify the robustness of these findings.

**Key Words:** persuasive communication, nutrition education, tailoring, monitor, coping styles (*J Nutr Educ Behav.* 2009;41:398-405.)

## INTRODUCTION

A diet rich in fruits and vegetables is associated with a decreased risk of some chronic diseases, such as certain types of cancers.<sup>1</sup> Given this benefit, the

United States launched a national campaign to disseminate messages encouraging Americans to consume at least 5 servings of fruits and vegetables per day, the 5 A Day for Better Health Program.<sup>2</sup> The campaign, however,

has met with limited success, and few Americans meet the dietary guideline.<sup>3</sup> These findings underscore the need for novel approaches to improve the persuasiveness of messages promoting fruit and vegetable intake.

One approach used to increase the persuasiveness of nutrition education messages is to tailor messages to unique characteristics of individual recipients.<sup>4</sup> The effectiveness of tailored messages is believed to be due, in part, to the increased scrutiny that recipients give these messages,<sup>5</sup> thereby increasing the likelihood of subsequent behavior change.<sup>6</sup> Some studies have reported significant effects of tailored messages on increasing fruit and vegetable intake.<sup>7-9</sup> However, others reported no tailoring effect on intake,<sup>10</sup> but they found support for changes in attitudes and intentions toward increasing intake.<sup>11,12</sup> These studies tailored messages to variables important in social cognition such as attitudes, self-efficacy expectations,

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intentions, and stages of change. The social intelligence theory of personality may help to account for the inconsistencies in these findings.<sup>13</sup> According to this theory, more so than personality traits, information processing styles and competencies distinguish individuals from each other. Hence, tailoring messages to information processing styles may be a particularly effective strategy for making health messages more persuasive.

Monitoring-blunting coping styles (MBCS) are the tendency to either attend to and amplify, or to distract oneself from and minimize threatening health information.<sup>14</sup> They reflect stable individual differences in the way people respond cognitively and emotionally to potentially threatening health information.<sup>14</sup> For example, the information could be a cancer diagnosis or personal risk information. Monitors seek out and monitor threatening or stressful information, but blunterners tend to distract themselves to blunt the information's psychological impact.<sup>15</sup> Research on MBCS has focused on the informational preferences of these 2 groups of individuals, including their health-related cognitions. Overall, as compared with blunterners, monitors are more interested in reading medical information,<sup>16</sup> concerned and distressed about health risks, perceive themselves to be at greater risk for developing disease (independent of their true level of risk), assign a greater degree of value to their personal health,<sup>17</sup> and tend to be more adherent to medical recommendations.<sup>15</sup> However, they also report more intrusive, ruminative thoughts about their health.<sup>18</sup> With respect to health information, monitors generally prefer detailed and voluminous information (even if it is negative, potentially painful, or concerning danger),<sup>19</sup> as well as advice and reassurance about their problems. In contrast, blunterners prefer minimal information and appreciate opportunities to be distracted from the message.<sup>17</sup>

According to the cognitive-social health information-processing (C-SHIP) model,<sup>20</sup> health information that is tailored to the cognitive and affective processes that distinguish monitors and blunterners facilitates the likelihood of subsequent behavior change. Indeed, individuals who receive messages tailored to their MBCS

are more likely to engage in disease-detection behaviors (eg, colposcopy, mammography) than individuals who receive incongruent messages.<sup>21,22</sup> However, to date, no one has examined the effectiveness of tailoring messages to MBCS to encourage disease-prevention behaviors where the health threat is not as explicit. The influence of messages on disease-detection behaviors that contain the risk of finding an abnormality has been shown to differ from disease-prevention behaviors that are performed to deter the onset of a health problem.<sup>23</sup> The authors examined whether messages matched to individuals' MBCS are more effective than mismatched messages in increasing fruit and vegetable intake as a disease-prevention strategy. The authors tested the hypothesis that (a) when given a monitor-focused message (detailed information and reassuring statements about the health risks associated with a diet that does not include adequate fruits and vegetables), monitors would consume more servings of fruits and vegetables than blunterners; and (b) when given a blunter-focused message (simple, direct information highlighting the health benefits of fruit and vegetable consumption), blunterners would consume more servings of fruits and vegetables than monitors. Secondly, the authors examined the differential impact of matched versus mismatched messages on relevant health-related cognitions.

## METHODS

### Participants

Five hundred and thirty-one participants were recruited at the end of their service call to the National Cancer Institute's (NCI) Cancer Information Service (CIS) (Figure 1). The CIS is the NCI's link to the public, serving cancer survivors and their families and friends by interpreting and explaining research findings in a clear, understandable manner and providing personalized responses to specific questions about cancer.<sup>24</sup> Participants accessed the CIS by calling a toll-free number. All participants were 18 years of age or older and reported fruit and vegetable intake below the 5 A Day guideline. The majority had no personal history of cancer (88.3%), was white, and had completed

at least some college (Table). Self-reported exclusion criteria included: (a) being a cancer patient awaiting or receiving treatment; (b) being terminally ill; (c) undergoing testing for a potential cancer diagnosis; and (d) following a physician-prescribed diet limiting fruit and vegetable intake.

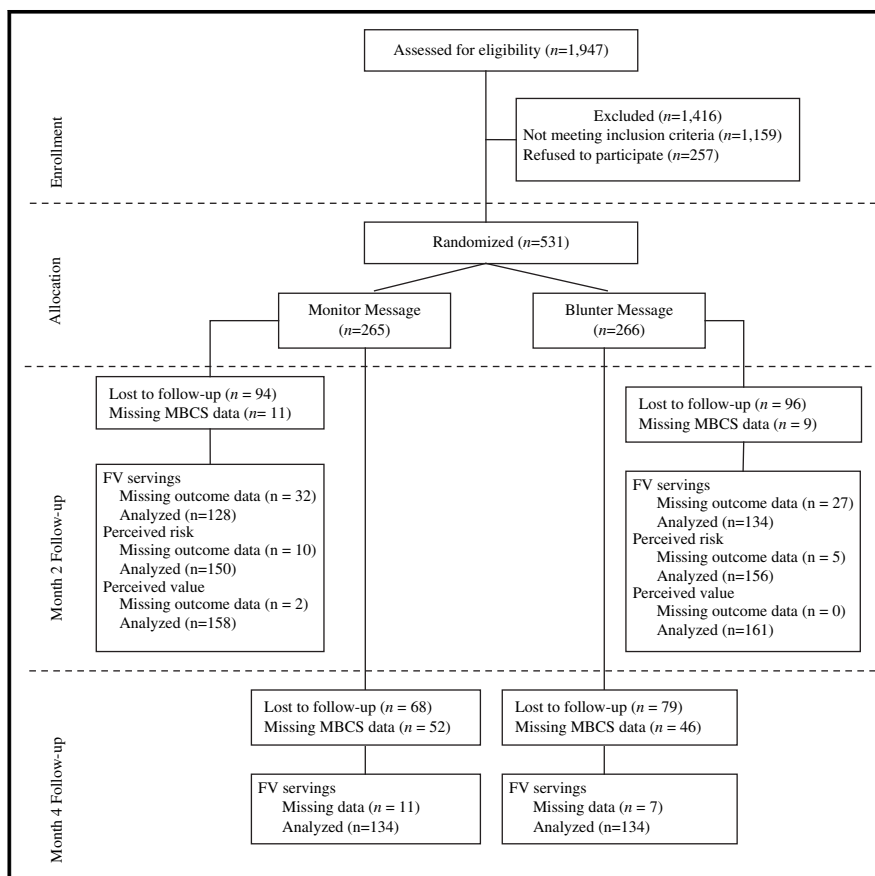
### Procedure

All research protocols were approved by Yale's Faculty of Arts and Sciences Institutional Review Board (IRB) prior to data collection. After determining eligibility and gaining informed consent, participants completed a 7-minute telephone interview and were presented with a randomly assigned fruit and vegetable promotional message tailored to either a monitor or blunter coping style. To avoid any bias in randomization, a member of the research staff randomized materials prior to the start of the study by alternating interview packets containing either a monitor or blunter message. Interviews were conducted in this alternating order, thereby assigning participants randomly to condition.

All subsequent messages were tailored consistently with the participants' condition established at baseline. Within 1 week of baseline, a packet including a tailored instructional letter, a tailored booklet, and a 5 A Day pencil were mailed to them. At 2 months, another packet of information was sent containing a second tailored booklet, a tailored magnet, and a brief follow-up survey with a preaddressed, stamped envelope. Participants who returned at least a partially completed survey were compensated with \$10. A final informational packet was mailed at 3 months and included a tailored instructional letter, tailored bookmark, and 5 nontailored recipe cards. Research assistants blind to participant condition conducted brief follow-up telephone interviews 4 months following baseline. All participants were contacted for interviews regardless of whether they had completed the survey at 2 months.

### Messages

To engage participants with a monitoring or blunting coping style,



**Figure 1.** Flow of participants through the study for fruit and vegetable intake, perceived risk and perceived value outcomes. At Month 2, missing monitoring-blunting coping styles (MBCS) data includes participants who were reached for the 2-month follow-up but failed to respond to items on the Monitoring-Blunting Style Scale (MBSS). At Month 4, missing MBCS data includes participants who completed the four-month follow-up but either were not reached at Month 2 or failed to respond to items on the MBSS at Month 2.

otherwise innocuous fruit and vegetable recommendations were made to be stressful by first presenting a cancer death rate in all messages, "Cancer accounts for 25% of all deaths in the United States." The essential information provided (eg, definition of serving sizes, ways to address barriers to fruit and vegetable intake, a list of recipes) was consistent in both message conditions. However, the presentation of this information was tailored in each message condition in accordance with MBCS.<sup>15</sup>

Overall, the messages tailored to a monitor coping style were lengthy, highly detailed explanations of why one should eat more fruits and vegetables. The monitor messages were crafted with extra reassurances to alleviate the heightened anxiety that is characteristic of monitors. For example, "Moreover, one third of annual

cancer deaths are related to preventable factors such as physical inactivity, obesity, and nutrition. *There is something you can do!* Research suggests that people who eat diets rich in fruits and vegetables live longer, cancer-free lives" (emphasis added). The monitor booklets contained additional statistical charts on important nutrients found in fruits and vegetables. In contrast, messages tailored to a blunter coping style succinctly presented, in short narrative form, reasons to eat more fruits and vegetables, leaving out statistics and details that blunterners tend to ignore (eg, "Many cancer deaths are linked to preventable factors, such as physical inactivity, obesity, and nutrition").

The CIS-delivered telephone message and the tailored instructional letters imparted the importance of increasing fruit and vegetable intake,

describing its association with lowered cancer risk. The tailored booklets, based on *Take Five: A Healthful Guide to Eating* designed by the Fred Hutchinson Cancer Research Center,<sup>25</sup> encouraged increased fruit and vegetable intake by addressing common barriers and facilitators. The booklets also included reasoning behind the 5 A Day recommendation, tips to increase intake, and recipes. The magnets displayed a fruit and vegetable graphic and a short, tailored statement encouraging fruit and vegetable intake. The tailored bookmarks were based on *Eat More Salads!*<sup>26</sup> and included tips on meeting the 5 A Day recommendation through increased salad intake.

## Baseline Measures

Because the length of the telephone interview and intervention was limited to 7 minutes following CIS guidelines, it was not possible to assess baseline constructs using multi-item scales. Thus, fruit and vegetable intake was assessed using a single, open-ended question. Participants were provided with a definition of serving sizes (a medium-sized apple, half cup of chopped vegetables or fruit, or a half cup of juice) and asked to indicate how many servings they eat on an average day. This item, from the Block food frequency questionnaire,<sup>27</sup> has been successfully employed in other studies with CIS-based samples.<sup>9,28</sup> Knowledge of the guidelines for fruit and vegetable intake was assessed by asking participants, "How many servings of fruits and vegetables do you think a person should eat each day for good health?" Participants' responses were coded as either correct ( $\geq 5$  servings) or incorrect ( $\leq 4$  servings). This knowledge item has demonstrated construct validity within samples of CIS callers.<sup>9</sup> Knowledge and baseline fruit and vegetable intake were used as covariates in the models predicting intake at 2 and 4 months.

## Follow-up Measures

The 2-month follow-up survey and 4-month telephone interview assessed intake by repeating the baseline measure. The 2-month follow-up survey

**Table.** Demographic and Outcome Data for the Full Sample and the Message Type Groups

	Message Type					
	Full		Blunter		Monitor	
	<i>M, SD</i>	<i>n, %<sup>a</sup></i>	<i>M, SD</i>	<i>n, %<sup>a</sup></i>	<i>M, SD</i>	<i>n, %<sup>a</sup></i>
Age (y)	49.8, 14.1		49.7, 14.5			13.69
MBCS (range: -4 to 15)	5.5, 3.9		5.4, 3.8			3.97
Gender (males)		152, 29		77, 29		75, 28
Race (white)		444, 84		215, 81		22, 86
Education <sup>†</sup>						
≤ HS grad		117, 22		60, 23		57, 22
Some college		126, 24		57, 21		69, 26
College grad		161, 30		91, 34		70, 26
Post grad		120, 23		57, 21		63, 24
Income (%) <sup>†</sup>						
< \$40,000		174, 33		87, 33		87, 33
\$40,000-59,000		107, 20		48, 18		59, 23
\$60,000-79,000		74, 14		28, 11		46, 17
\$80,000 <sup>+</sup>		140, 26		76, 29		64, 24
FV intake (servings/day)						
Baseline	2.6, 1.1		2.6, 1.1		2.6, 1.3	
Month 2	3.9, 1.6		3.8, 1.6		3.9, 1.5	
Month 4	4.0, 1.6		4.0, 1.5		4.1, 1.6	
Manipulation Check						
Interesting	3.7, 0.8		3.6, 0.8*		3.8, 0.8	
Informative	3.8, 0.8		3.7, 0.8		3.8, 0.8	
Detailed	3.6, 0.9		3.6, 0.8		3.7, 0.9	
Details beyond basics	4.1, 1.0		3.9, 1.0*		4.2, 1.0	
Month 2: Perceived risk	2.7, 1.0		2.6, 1.0		2.7, 0.9	
Month 2: Perceived value	4.5, 0.6		4.4, 0.6		4.6, 0.6	

FV indicates fruit and vegetable; grad, graduate; HS, high school; M, mean; MBCS, monitoring-blunting coping style; SD, standard deviation.  
\* $P < .05$ ; <sup>a</sup>Some did not report.

also measured monitoring-blunting coping style (MBCS), health-related cognitions, effectiveness of the message manipulation, and social desirability.

MBCS was assessed using the 32-item version of the Monitoring-Blunting Style Scale (MBSS).<sup>14</sup> Four stressful scenarios were presented (eg, being on a turbulent airplane ride). For each scenario, participants were read 8 statements; 4 monitor-type coping strategies (eg, "I'd carefully read the information provided about safety features in the plane and make sure I knew where the emergency exits were"); and 4 blunter-type strategies (eg, "I'd make small talk with the passenger beside me"). Participants indicated (yes/no) whether each statement described how they would act in the given situation.

The MBCS score was calculated by subtracting the sum of the responses to the blunting items from the sum of the responses to the monitoring items (range = -16 to 16; higher scores indicate more monitoring, lower scores indicate more blunting). The Kuder-Richardson (KR20) coefficients indicated that the internal consistency of each subscale as well as of the composite scale was adequate, though not ideal,  $KR20_{\text{monitor}} = 0.65$ ;  $KR20_{\text{blunter}} = 0.57$ ;  $KR20_{\text{composite}} = 0.67$ . The MBSS has demonstrated reliability and construct validity within health-related contexts.<sup>14</sup>

Monitoring-blunting coping style was measured fully in the 2-month survey rather than at baseline owing to the time restrictions placed on the baseline interview by the CIS. Responses to the MBSS were unlikely to

have been affected by the intervention, as theory and empirical evidence suggest the MBSS is a measure of an individual's stable, dispositional monitoring-blunting coping style, and the MBSS has appropriate test-retest reliability.<sup>14</sup> Additionally, participants completed an abbreviated version of the MBSS at baseline including only 2 of the 4 scenarios. The abbreviated, 16-item baseline assessment of MBSS demonstrated attenuated reliability compared to the full 32-item scale administered at follow-up ( $KR20_{16\text{-item}} < 0.56$  vs  $KR20_{32\text{-item}} < 0.66$ ). Thus, the full 32-item scale was used in all subsequent analyses. Scores for the scenarios administered at baseline and follow-up correlated strongly ( $r [n = 327] = .61, P < .001$ ), suggesting that, as expected, MBSS scores are resistant to influence by monitor and blunter messages.

Health-related cognition, an important predictor of health behaviors,<sup>29</sup> was examined using 2 single-item measures rated on a 5-point scale. To measure perception of cancer risk, participants indicated how likely it was that they would die of cancer (1 = not likely; 5 = extremely likely). To measure perceived value of health, participants indicated whether being healthy was important to them (1 = not important; 5 = extremely important).

A manipulation check of the print materials delivered at Month 2 was conducted using 4 items modified from existing process evaluations of CIS-based campaigns encouraging fruit and vegetable intake.<sup>30</sup> Participants were asked to rate whether the booklets (a) were interesting, (b) were informative, (c) were detailed, and (d) provided details beyond the basic facts about fruit and vegetable intake and cancer prevention. Each item was rated on a 5-point scale ranging from 1 (not interesting/informative/detailed/disagree a lot) to 5 (extremely interesting/informative/detailed/agree a lot). The investigators expected the messages to be considered equally interesting and informative, but the monitor brochure to be rated as more detailed.

Social desirability was evaluated using an abbreviated, 13-item version of the Marlowe-Crowne Social Desirability scale.<sup>31</sup> This scale is useful for detecting and controlling for response bias in

self-report measures of fruit and vegetable intake<sup>32</sup> and was included as a covariate in the models predicting fruit and vegetable intake. Participants indicated (yes/no) how they tend to act in 13 social situations (eg, "I'm always willing to admit it when I make a mistake"). The scale demonstrated adequate internal consistency in the current study (KR20 = 0.71).

### Statistical Analyses

Between-group comparisons (ie, analyses of variance [ANOVA], chi-square) of baseline sample characteristics and intervention message type groups were conducted to assess the success of the randomization process and to identify participant characteristics associated with study attrition. The effects of matching messages to monitoring-blunting coping style (MBCS) were tested separately using hierarchical regression analyses. In each regression model, message type, participant MBCS, and interaction term (message type by participant MBCS) were entered separately. In the models predicting fruit and vegetable intake, social desirability and baseline fruit and vegetable intake and knowledge were included as covariates. In the model predicting perceived risk, history of cancer was included as a covariate. Prior to conducting these analyses, MBSS scores were zero-centered,<sup>33</sup> and message type was dummy-coded (blunter = 0, monitor = 1). Two restructured regression equations (one for each message condition) were calculated to provide a conservative interpretation of significant message type by participant MBCS interactions. Level of significance was set at  $P < .05$ .

## RESULTS

### Study Attrition and Manipulation Check

Between-message group comparisons of sample characteristics revealed no significant message type by MBCS interactions, suggesting that randomization was successful ( $P > .05$ ). Compared to participants who returned the 2-month follow-up survey, participants who did not return the survey consumed fewer servings of fruits and vegetables at baseline ( $P <$

.05) and were more likely to be younger ( $P < .001$ ), non-white ( $P < .05$ ), and less educated ( $P < .01$ ). At 4 months, participants who did not complete the interview also consumed fewer servings at baseline ( $P < .05$ ) and were younger ( $P = .001$ ) than participants who completed the interview. Loss to attrition at either follow-up was not associated with experimental condition ( $P > .05$ ).

**Manipulation check.** Separate hierarchical linear regression models revealed a main effect of message type on the items assessing whether the print materials were interesting ( $F[2, 314] = 3.05, P < .05, \beta = .13, P < .05$ ) and provided details beyond the basic facts ( $F[2, 310] = 3.98, P < .05, \beta = .14, P < .05$ ). Individuals who received the monitor booklets were in stronger agreement that their booklets were interesting and provided details beyond the basic facts than participants who received the blunter booklets (Table). No differences were found between message types with regard to ratings of whether the booklets were detailed or informative. Participant MBCS and the interaction term did not emerge as a significant predictor of the manipulation check items.

### Outcomes

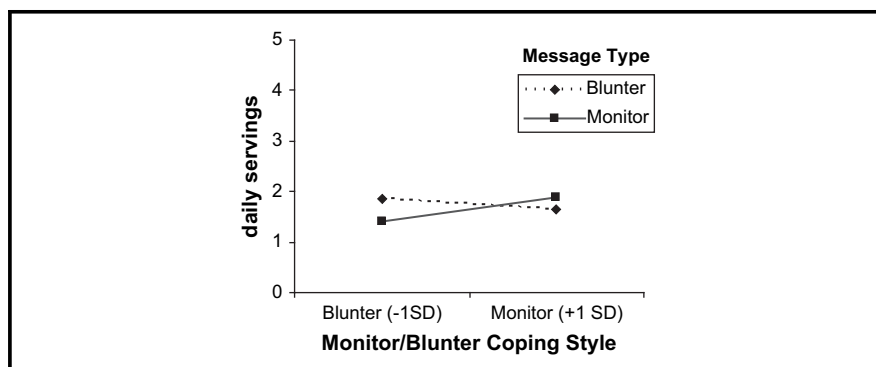
**Fruit and vegetable intake.** Overall, a repeated-measures ANOVA revealed that participants made significant positive changes in their intake from baseline to follow-up ( $F[2, 526] = 169.48, P < .001$ ). Post hoc  $t$  tests indicated fruit and vegetable intake increased from baseline ( $M_{servings} = 2.60, SD = 1.12$ ) to 2 months ( $M_{servings} = 3.88, SD = 1.55$ ) and again from 2 to 4 months ( $M_{servings} = 4.04, SD = 1.57, P < .05$ ).

In a test of the hypothesis that individuals who received matched messages would be especially motivated to consume fruits and vegetables, the overall hierarchical model predicting intake at the 2-month follow-up was significant ( $R^2_{adjusted} = 0.21, F[6, 255] = 12.56, P < .001$ ). Controlling for covariates, the message type by participant MBCS interaction emerged as a significant predictor of intake ( $R^2_{change} = .01, \beta = .16, P < .05$ ) (Figure 2). As predicted, in the monitor message condition intake was related positively to participant MBCS, sug-

gesting that the effectiveness of the monitor message increased when a monitor coping style was more predominant ( $R^2_{change} = .03, \beta = .16, P < .05$ ). For the blunter message, the relationship between participant MBCS was in the predicted negative direction but was not statistically significant ( $R^2_{change} = .003, \beta = -.06, non-significant$ ). At 4 months, although the model was significant ( $F[6, 261] = 13.24, p < .001$ ), neither the main effect nor the message type by participant MBCS interaction emerged as significant predictors of intake. Thus, no tailoring effect was found at 4 months.

**Health-related cognition.** Separate regression models were conducted to examine the effects of matched messages on perceived risk and perceived value of health. The overall models for both perceived risk ( $R^2_{adjusted} = .03, F[4, 301] = 3.45, P < .01$ ) and perceived value ( $R^2_{adjusted} = .02, F[3, 315] = 3.25, P < .05$ ) were significant. In a model predicting perceived risk while controlling for cancer history, a main effect for participant MBCS emerged ( $\beta = .27, P = .001$ ); a stronger monitor coping style was associated with greater concern of dying from cancer. The message type by participant MBCS interaction also was significant ( $R^2_{change} = .02, \beta = -.20, P < .05$ ). As expected, in the blunter message condition, perceived risk of dying from cancer was correlated positively with participant MBCS. Perceived risk was lower among blunTERS who received a blunter message than monitors who received the same message ( $\beta = .25, P < .01$ ). In the monitor message condition, however, perceived risk was not related to participant MBCS ( $\beta = -.006, non-significant$ ).

In the model predicting perceived value of health, a main effect for message type emerged ( $\beta = .12, P < .05$ ). The importance of being healthy was greater for participants who received the monitor message versus participants who received the blunter message. There was a significant message type by participant MBCS interaction ( $R^2_{change} = .01, \beta = .16, P < .05$ ). In the monitor message condition, the importance of being healthy increased as a monitor coping style was more predominant ( $\beta = .19, P < .05$ ). In the blunter message condition, the



**Figure 2.** The message type by participant monitoring-blunting coping styles (MBCS) interaction predicting fruit and vegetable intake at the 2-month follow-up.

importance of being healthy tended to increase as a blunter coping style was more predominant; although this effect was not significant ( $\beta = -.05$ , non-significant).

## DISCUSSION

This study examined whether messages matched to individuals' monitoring-blunting coping styles are especially effective at increasing fruit and vegetable intake. As hypothesized, matched messages were somewhat more successful than mismatched messages in increasing intake, particularly for the monitor message. The effectiveness of the monitor-focused messages for encouraging intake tended to increase as coping styles became predominantly monitor oriented. However, the blunter-focused message was not significantly more effective in increasing intake as coping styles became predominantly blunter oriented. An overall tailoring effect was found after 2 months, but the effectiveness of matched information diminished after 4 months. The impact of this minimal intervention faded over time, a reasonable outcome given that participants listened to a brief tailored message over the telephone and received 3 tailored sets of materials over 4 months. It is likely that participants received other information related to fruit and vegetable intake that affected their intake during the study period, attenuating the differential impact of the matched information.

Consistent with both the social intelligence theory of personality<sup>13</sup> and the C-SHIP model,<sup>20</sup> the information processing styles examined in this

study (ie, individuals' monitoring-blunting coping styles) appear to be suitable for tailoring to facilitate behavior change. However, the findings were not entirely straightforward, as the authors obtained a stronger matching effect for the monitor message as opposed to the blunter message. The nature of the health behavior under study may account for this difference. Previous research has shown that for one disease-detection behavior, mammography use, messages matched to women's MBCS tended to be especially effective among blunTERS.<sup>22</sup> Monitors may have been more motivated to act because of their characteristically higher level of attentiveness to threat,<sup>15</sup> regardless of the coping style to which the information was tailored. However, for a disease-prevention behavior, like fruit and vegetable intake, where a health threat is less explicit, perhaps monitors were not feeling particularly distressed and thus were sensitive to message cues and content rather than mere threat information.<sup>17</sup> Indeed, the results from the current study showed that monitors who received matched as opposed to mismatched messages reported greater importance of being healthy. Plus, blunTERS do not engage in health behaviors in general, because they downplay the personal relevance of health threats.<sup>17</sup> Accordingly, these findings showed that blunTERS who received matched as opposed to mismatched messages reported a lower likelihood that they would die of cancer.

The present findings are based on a sample of relatively educated, white, female callers to the CIS. The re-

stricted heterogeneity in participant demographic characteristics limits the generalizability of these findings. In addition, the messages and the matching technique may not be as effective with other groups of individuals who are less motivated to seek out health information. For logistical reasons, this experiment's primary outcome measure relied on self-reported fruit and vegetable intake. Although self-report must always be interpreted with some degree of caution, social desirability has limited influence on self-reported dietary intake.<sup>34</sup> Indeed, social desirability was only weakly correlated with self-reported fruit and vegetable intake at follow-up ( $0.11 < r < 0.14$ ), and the authors statistically controlled for social desirability in the models. Participant attrition rates were high, but they corresponded to those typical of CIS-based behavior change interventions.<sup>9,22,28</sup> The attrition rates may have been a result of the stress many participants were experiencing while managing the care of a sick or dying relative (eg, a spouse with cancer for whom they initially contacted the CIS). Thus, attrition rates might be reduced if these studies were conducted in a different population.

The study was also limited by the lack of a "standard-treatment" control group; rather, the mismatched message condition served as a comparison for the matched message group. The assumption underlying this design is that similar to a control condition, the messages in the mismatched condition included information that would not be salient to the recipient and would lead to less behavior change than a matched message. Research and practice would benefit from the inclusion of a standard treatment control condition in future message-matching studies.

Lastly, the MBSS measure has limitations. True, the scale is simple to administer, acceptable for applied research settings, and appropriate to real-world assessment and dissemination. However, the constructs underlying the scale are complex. The MBSS may be limited in its ability to capture the context in which monitor-blunter coping strategies are applied in real life and the extent to which the strategies are used.<sup>35</sup> The internal consistency of the

monitoring scale, but not necessarily the blunting scale,<sup>35</sup> has been acceptable.<sup>14</sup>

## IMPLICATIONS FOR RESEARCH AND PRACTICE

Despite their limitations, these findings have practical applications for nutrition education research. Nutrition information tailored both to the cognitive (eg, amount of information, level of detail) and affective (eg, reassurance about health risks) processes that distinguish monitors and blunters may facilitate dietary change. Blunters who received matched messages had the least worry about dying from cancer. Monitors who received matched messages thought it was most important to be healthy. The evidence from this study suggests that messages tailored to individuals' monitoring-blunting coping styles should be considered as a potential strategy for bolstering the effectiveness of nutrition education campaigns, although additional research is warranted to confirm the robustness of these findings. Although this study was related to tailoring nutrition information for cancer prevention, tailoring information to monitoring-blunting styles could be used for conveying other types of health information, such as about diseases or conditions that may have different levels of threat or fear attached.

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