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RUNNING HEAD: The Cultural Congruency Effect

The Cultural Congruency Effect:  
Culture, Regulatory Focus, and the Effectiveness of Gain- vs. Loss-Framed Health  
Messages

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## Abstract

The present study contributes a cultural analysis to the literature on the persuasive effects of matching message frame to individuals' motivational orientations. One experiment examines how members of cultural groups that are likely to differ in their regulatory focus respond to health messages focusing on either the benefits of flossing or the costs of not flossing. White British participants, who had a stronger promotion focus, were more persuaded by the gain-framed message, whereas East-Asian participants, who had a stronger prevention focus, were more persuaded by the loss-framed message. This cultural difference in persuasion was mediated by an interaction between individuals' self-regulatory focus and type of health message. Thus health messages framed to be culturally congruent led participants to have more positive attitudes and stronger intentions to perform the health behaviors, and the interaction between self-regulatory focus and message frame emerged as the pathway through which the observed cultural difference occurs. Discussion focuses on the integration of individual difference, socio-cultural, and situational factors into models of health persuasion.

Keywords: culture, regulatory focus, gain- and loss-framed messages, congruency effect

Word count: 167

## The Cultural Congruency Effect: Culture, Regulatory Focus, and the Effectiveness of Gain- and Loss-Framed Health Messages

With the major cultural differences having been demonstrated in research on individuals' cognition (e.g., Nisbett, 2003), motivation (e.g., Iyengar & Lepper, 1999), and emotion (Mesquita & Frijda, 1992), an important question is how culture could affect the process of persuasion. Although a great deal of research in psychology has focused on the cognitive, motivational, and emotional factors underlying the effectiveness of persuasion attempts (e.g., Petty & Cacioppo, 1986) and health persuasion in particular (e.g., Rothman & Salovey, 1997; Rothman, Bartels, Wlaschin, & Salovey, 2006), little attention has been paid to the particular pathways by which culture could influence persuasion. In the present paper, we explore the role of culture in the health persuasion process, and examine whether the persuasiveness of a health message is determined in part by the cultural background of the message recipient, and the extent to which the message is framed to be congruent with culturally divergent motivational styles.

The goal of the present research is to examine how cultural factors impact the health persuasion process. Beyond recognizing that cultural factors are important in health communication, we utilize existing psychological theories to determine the features of the message to vary and the psychological tendencies of an individual to appeal to. A growing body of empirical evidence shows that messages are more persuasive when there is a match between the message recipient's cognitive, affective, or motivational characteristics and the content or framing of the message. For example, messages are more persuasive when they contain content matching one's attitudes or attitude-relevant thoughts and feelings (e.g., Petty, Wheeler, & Bizer, 2000) and

motivational orientation (e.g., approach-avoidance, Mann, Sherman, & Updegraff, 2004; Sherman, Mann, & Updegraff, 2006). Messages are also more persuasive if they match an individual's ought or ideal self-guides (e.g., Evans & Petty, 2003), self-regulatory focus (e.g., Cesario, Grant, & Higgins, 2004), or self-monitoring style (e.g., Williams-Piehot, Pizarro, Schneider, Mowad, & Salovey, 2005). The present article explores the persuasive effect of health messages designed to match individuals' motivational styles as outlined in regulatory focus theory (Higgins, 1997; 1998), motivational styles that have been found to vary between East-Asian and Western cultures (Lee, Aaker, & Gardner, 2000).

### *Regulatory Focus Theory (RFT) and Culture*

Extending the basic motivational principle that individuals approach pleasure and avoid pain, Higgins (1997; 1998) proposed a self-regulatory model to allow for *distinct types* of desired end-states that are related to distinct types of self-regulatory strategies and needs. Specifically, RFT proposes that in a *promotion-focused* mode of self-regulation individuals' behaviors are guided by a need for nurturance, the desire to bring one's actual self into alignment with one's ideal self, and/or the striving to attain gains, whereas in a *prevention-focused* mode of self-regulation individuals' behaviors are guided by a need for security, the desire to bring one's actual self into alignment with one's ought self by fulfilling one's duties and obligations and the striving to ensure non-losses. Thus, prevention focus is associated with sensitivity to strategic vigilance and the presence or absence of negative outcomes; promotion focus is associated with sensitivity to strategic eagerness and the presence or absence of positive outcomes (for reviews see Higgins, 2000; Higgins & Spiegel, 2004).

The cultural context in which an individual's self views are shaped is an important factor that fosters the development of distinct self-regulatory orientations (Lee et al., 2000). In Western, more individualistic cultures, people tend to define themselves in terms of their internal attributes such as goals, preferences, and attitudes, which make them unique compared to others (for reviews see Heine, Lehman, Markus, & Kitayama, 1999; Markus & Kitayama, 1991; Triandis, 1989). Individuals are motivated to stand out from their group (Markus & Kitayama, 1991) and tend to focus on their personal achievements and aspirations (Heine & Lehman, 1997). In individualistic cultures, where people possess a more independent self-view, individuals tend to favor promotion over prevention strategies, focusing on the positive outcomes they hope to approach rather than the negative outcomes they hope to avoid (Elliot, Chirkov, Kim, & Sheldon, 2001; Lee et al., 2000; Lockwood, Marshall, & Sadler, 2005). For example, among individuals with accessible independent self-views, promotion-focused information about an object led to more positive attitudes towards the object relative to prevention-focused information (Aaker & Lee, 2001). Similarly, compared to information framed in avoidance terms, information framed in approach terms was attended to more and recalled in greater accuracy by North Americans (Hamamura, Meijer, Heine, Kamaya, & Hori, in press).

In Eastern, more collectivistic cultures, individuals tend to define themselves in terms of their relationships and group memberships (Markus & Kitayama, 1991; Triandis, 1989). They are motivated to fit in with their group and maintain social harmony (Markus & Kitayama, 1991) and tend to focus on their responsibilities and obligations to others while trying to avoid behaviors that might cause social disruptions or disappoint significant others in their lives (Heine et al., 1999). In collectivistic cultures, where

people possess a more interdependent self-view, individuals favor prevention over promotion strategies, focusing on the negative outcomes they hope to avoid rather than the positive outcomes they hope to approach (Elliot et al., 2001; Lee, et al., 2000; Lockwood, et al., 2005). For example, for individuals with accessible interdependent self-views, prevention-focused information leads to more positive attitudes towards a product relative to promotion-focused information (Aaker & Lee, 2001). Similarly, compared to information framed in approach terms, information framed in avoidance terms was attended to more and recalled in greater accuracy by East Asians (Hamamura et al., in press).

#### *Gain- vs. Loss-Framed Health Messages*

We propose that health messages will be more persuasive if they are congruent with the cultural patterns of promotion or prevention focus predominant in Western and Eastern cultures, respectively. To do so, we draw on the extensive research on message framing. Health messages are typically framed to convey either the benefits of performing a health-promoting behavior (e.g., conducting breast self-exam), which are called gain-framed messages, or the costs associated with failing to perform a health-promoting behavior (e.g., not conducting breast self-exam), which are called loss-framed messages (Rothman & Salovey, 1997). Gain-framed messages have been shown to increase persuasion when used to promote health prevention behaviors such as using mouth rinse to prevent gum disease (Rothman, Martino, Bedell, Detweiler, & Salovey, 1999) or use of sunscreen to prevent skin cancer (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999); loss-framed messages have been shown to increase persuasion when used to promote health detection behaviors such as HIV testing (Kalichman & Coley, 1995) or mammography and breast self-examination (e.g., Banks, Salovey, Greener,

Rothman, Moyer, Beauvais et al., 1995; Finney & Iannotti, 2001). The predictions regarding health domain-dependent effects of gain and loss-framed messages are rooted in prospect theory (Tversky & Kahneman, 1981), which suggests that individuals are risk-seeking in the domain of losses and risk-averse in the domain of gains.

Research also suggests that the effectiveness of loss and gain-framed messages depends on characteristics of the message recipient. Most centrally, recent research (Mann et al., 2004; Sherman et al., 2006; Updegraff, Sherman, Luyster, & Mann, 2007) has shown that health messages congruent with a person's predominant motivational orientation are more effective than messages that are not congruent. Specifically, using the approach-avoidance motivational framework (see Elliot, 1997), they found that individuals who were predominantly approach oriented reported flossing more and were more generally persuaded in terms of attitudes and intentions when presented with a gain-framed health message about flossing and individuals who were predominantly avoidance oriented reported flossing more and were more generally persuaded in terms of attitudes and intentions when presented with a loss-framed health message about flossing (see Sherman, Updegraff, & Mann, 2008, for a review). Although the RFT is not theoretically equivalent to the approach-avoidance framework (for a review see Elliot, 1997), the two have common elements, with both promotion focus and approach orientation focusing on growth and both prevention focus and avoidance orientation focusing on security (Gable & Strachman, 2008).

#### *Culture and Persuasion: The Mediated Cultural Moderation Approach*

Culture exhibits itself as an important factor that can potentially influence the processes that underlie persuasion. Indeed, advertisements, consumable objects, and

particular brands are all preferred to a greater extent when they match a cultural theme of the message recipient (e.g., Aaker & Schmitt, 2001; Han & Shavitt, 1994; Kim & Markus, 1999) and researchers in health communications have begun to recognize the importance of considering cultural factors in designing messages (e.g., Kreuter, Lukwago, Bucholtz, Clark, & Sanders-Thompson, 2002; Kreuter, & McClure, 2004). Thus, from a theoretical perspective, culture is an important factor with the potential to shape the persuasive power of messages by influencing how they are understood and interpreted.

In the present research we explore the persuasive effects of matching loss- and gain-framed messages to the motivational style predominant in each culture using the framework of regulatory focus theory. We predict that the effect of message frame will be moderated by the cultural background of the message recipient such that gain-framed messages will be more effective among individuals from an individualistic cultural background (i.e., White British) whereas loss-framed messages will be more effective among individuals from a collectivistic cultural background (i.e., East-Asians).

As reviewed earlier, cultural systems shape a variety of psychological processes and motivational orientation is one potential underlying process behind cultural differences. As we base our cultural moderation predictions on research showing cultural differences in the predominant motivational orientation of individuals within a culture (Lee et al., 2000), the present study allows for the test of a specific mediated cultural moderation hypothesis. That is, we shall use the mediated moderation approach (Edwards & Lambert, 2007; Muller, Judd, & Yzerbyt, 2005; Preacher, Rucker, & Hayes, 2007) to test whether the interaction between message frame and regulatory focus can account for the message frame by cultural background moderation effect (cf. Kim & Sherman, 2007).

This approach will allow us to examine whether the influence of culture on health persuasion can be explained, in part, by individual level factors (regulatory focus), situational level factors (message frame), and the interaction of the two.

Our predictions regarding the process underlying the mediation effect are based on Higgins and colleagues' (e.g., Cesario et al., 2004; Camacho, Higgins, & Luger, 2003, also see Lee & Aaker, 2004) findings on self-regulatory fit demonstrating that when people pursue goals that fit their regulatory focus compared to when they pursue goals that are at odds with their regulatory focus, they feel right about what they are doing and it is this value experience that affects subsequent judgment of correctness and importance. Translation of the regulatory fit concept to the persuasive effects of health messages suggests that messages framed in ways that match regulatory focus may simply "feel right" and that this feeling is then transferred to an evaluation of the content of the message, which increases persuasiveness. Thus, we predict that health messages that are designed to fit with a cultural group's dominant regulatory focus will be more persuasive because they may provide the message recipients with this positive value experience. This prediction suggests that the effect of a culture by message frame interaction on persuasion may not be accounted by a simple mediation of regulatory focus, but might depend on the fit of regulatory focus to message frame. Thus, mediation mechanisms may differ in cultural groups with varying predominant regulatory focus.

More specifically, we predict a moderation effect such that the impact of the message frame will depend on the recipient's cultural background, and that this moderation effect will be mediated by the interaction between individuals' dominant regulatory focus and message frame. Consequently, the predominant regulatory focus in the East-Asian sample would predict the relative benefit of loss-framed messages,

whereas the dominant regulatory focus in the White British sample would predict the relative benefit of gain-framed messages. This mediated moderation approach provides one means to understand the process underlying cultural differences in the effectiveness of gain- and loss-framed messages. Thereby it offers a potential tool to help understand how cultural differences could predict individual differences in how they moderate situational factors, building a bridge between culture, personality, and social context.

The current study explores these questions in the context of dental flossing. Dental flossing was chosen because it is a behavior aimed at both detection and prevention of gum disease, and thus, there is not a clear preference for which type of message to employ (Rothman & Salovey, 1997; Sherman et al., 2008). We operationalize the persuasive effect of messages as both improving attitudes towards flossing and facilitating greater intentions to floss.

## Method

### *Participants*

Participants were 100 undergraduate students (31 men, 68 women, one participant failed to report sex) at a British University who completed the study without any compensation ( $n = 73$ ) or by receiving £2 upon completion of the study ( $n = 27$ ). Half of the sample identified themselves as White British and the other half as of East-Asian origin (Chinese ( $n = 43$ ), Korean ( $n = 3$ ), Taiwanese ( $n = 2$ ), Japanese ( $n = 1$ ), and Filipino ( $n = 1$ )). On average, East-Asian participants reported having lived in the UK for 22.2 months ( $SD = 10.57$ , range = 2 to 48 months) compared to White British participants who were born and lived all their lives in the UK<sup>1</sup>. The white British group ( $M = 26.58$ , Median = 21) was slightly older than the East-Asian sample ( $M = 23.88$ , Median = 22),  $F$

(1, 96) = 1.87,  $p = .18$ ; however preliminary analyses did not show any effect of age and it is not considered further.

### *Procedure*

Participants were invited to take part in a study on health communication, where they completed the study individually in a lab. First, participants completed the regulatory focus measure. Next, they were randomly assigned to read either the gain-framed or loss-framed flossing message. After reading the health message, participants completed measures assessing their attitudes toward flossing and intentions to floss (measures were adapted from Updegraff et al., 2007). Finally, participants were debriefed. Both cultural groups received the study material in English. No participant reported difficulty understanding the content of the study material.

### *Health Messages*

The current study employed the flossing messages previously used to test the impact of gain- and loss-frames on flossing-related cognitions and behaviors (e.g., Updegraff et al., 2007; Sherman et al., 2006) with a few modifications to make the articles fit the current research context. The articles emphasized consequences of flossing (or not flossing) and were educational in tone. The text included facts and figures about gum disease and proper flossing techniques. The main difference between the two versions was how the information was presented. The gain-frame message titled “Healthy Teeth and Gums Only a Floss Away” focused on the potential benefits of regular flossing (e.g., Consistent good flossing leads to more healthy gums and bones that support the teeth; Those who floss regularly are 3 times more likely to have healthier teeth with no cavities; Flossing allows a healthy-looking mouth and smile, and also greater enjoyment of foods and drinks). The loss-framed message titled “Floss Now or Suffer from Cavities

and Gum Disease” focused on the potential dangers of not flossing (e.g., If you don’t floss your teeth daily, particles of food remain in the mouth, collecting bacteria, which causes bad breath; Those who don’t floss are almost 3 times as likely to suffer from cavities; Not flossing can be the cause of serious tooth pain and sensitivity).

### *Measures*

*Regulatory focus.* Self-regulatory focus was assessed using the *regulatory focus scale* by Lockwood, Jordan, and Kunda (2002) which consists of a prevention focus subscale (9-items, sample item: “In general, I am focused on preventing negative events in my life”) (East Asian:  $\alpha = .82$ ; White British:  $\alpha = .76$ ); and a promotion focus subscale (9-items, sample item: “I frequently imagine how I will achieve my hopes and aspirations”) (East Asian:  $\alpha = .78$ ; White British:  $\alpha = .90$ ). Participants rated their agreement to the items using Likert scales ( $1 = strongly disagree$  to  $7 = strongly agree$ ).

*Attitudes towards flossing.* Four questions on a 7-point scale measured how harmful (reverse-coded), pleasant, good, and worthless (reverse-coded) participants considered flossing in the upcoming week would be (White British:  $\alpha = .71$ ,  $M = 4.76$ ,  $SD = .85$ ; East-Asians:  $\alpha = .77$ ,  $M = 4.76$ ,  $SD = .85$ ).

*Intentions to floss.* Two items asked participants to specify the degree to which they intended to floss over the following week (I intend to floss my teeth each day in the upcoming week,  $1 = extremely unlikely$  to  $7 = extremely likely$ ) and to indicate how many times they intended to floss in the upcoming week on a scale ranging from 0 to 8+. These two measures were highly correlated,  $r = .58$ ,  $p < .001$ , and were therefore averaged to form an index of intention after they were transformed to standardized scores (unstandardized means: White British:  $M = 3.19$ ,  $SD = 1.99$ ; East-Asians:  $M = 3.89$ ,  $SD = 1.83$ ).

Attitude and intention scores were highly correlated in both samples,  $r_{EA} = .46, p = .001$ ;  $r_{WB} = .42, p = .002$ ; and were therefore combined to form an index of persuasion (East-Asian:  $\alpha = .73, M = 4.55, SD = 1.08$ ; White British:  $\alpha = .77, M = 4.44, SD = 1.12$ ). The following analyses were conducted using this combined measure of persuasion.<sup>2</sup>

### Results

In the analyses below we report two-tailed tests for main effects and interactions. Given our specific predictions regarding the direction of differences in the effects of gain- and loss-framed messages and endorsement of prevention and promotion regulatory focus in East-Asian and White-British samples, we followed up by testing the specific contrasts and simple slopes using one-tailed tests.

#### *Effects of Cultural Background X Message Frame*

The dependent measure of persuasion was analyzed using a 2 (cultural background: East-Asian vs. White British) X 2 (message frame: loss vs. gain) ANOVA. No significant main effects of cultural background ( $F(1, 96) < 1$ ) or message frame ( $F(1, 96) < 1$ ) emerged, but a significant cultural background X message frame interaction was obtained,  $F(1, 96) = 8.45, p = .005$ . As shown in Figure 1, White British participants were more persuaded by the health message when given the gain-framed message ( $M = 4.75, SD = 1.10$ ) than when given the loss-framed message ( $M = 4.13, SD = 1.07$ ),  $p = .02$ . East-Asian participants were more persuaded by the health message when given the loss-framed message ( $M = 4.86, SD = 1.03$ ) than when given a gain-framed message ( $M = 4.24, SD = 1.06$ ),  $p = .02$ .<sup>3</sup> This finding supports our moderation hypothesis that the effect of the message frame will depend on the recipient's cultural background and establishes the existence of the first necessary step to conduct the mediated moderation analysis.

*Regulatory focus X cultural background.* We first compared the prevention and promotion scores within each cultural group using a mixed-model ANOVA with the two regulatory foci as within-subjects variables and cultural background as a between-subjects variable. The cultural background X type of regulatory foci interaction emerged as a significant effect,  $F(1, 98) = 5.12, p = .026$ . As predicted, East-Asian participants endorsed prevention focus ( $M = 5.03, SD = .89$ ) more strongly than promotion focus ( $M = 4.70, SD = 1.00$ ),  $p = .030$ , whereas White British participants endorsed promotion focus ( $M = 4.91, SD = 1.17$ ) more strongly than prevention focus ( $M = 4.04, SD = .94$ ),  $p < .001$ .

*The mediated cultural moderation analysis*

In the following analyses, which were conducted to examine the mediating role of a message frame X regulatory focus interaction, we used a measure of regulatory-focus that represented the degree to which each participant was more prevention-focused or more promotion-focused following previous practice (e.g., Lockwood et al., 2002). This measure was created by subtracting promotion-focus scores from prevention-focus scores (prevention – promotion). Thus positive difference scores represent individuals who more strongly endorse a prevention regulatory focus and negative difference scores represent individual who more strongly endorse promotion regulatory focus.

To examine the role of self-regulatory focus in interaction with message frame in mediating the interaction between cultural background and message frame, we conducted a mediated moderation analysis (Muller, et al., 2005; Edwards & Lambert, 2007; Preacher, et al., 2007) with the measure of persuasion as the dependent variable. To this end, the continuous regulatory focus variable was centered and both categorical variables were effect-coded (-1 and 1 for gain-framed and loss-framed messages respectively and -

1 and 1 for White British and East-Asian participants respectively) and the product terms used for interactions were calculated by multiplying the relevant variables (see Table 1 for results of least squared regression analyses).

To examine the mediating role of regulatory focus and message frame for our measure of persuasion, we first regressed the persuasion measure onto message frame, cultural background, and message frame X cultural background interaction. This regression equation is equivalent to the ANOVA results reported earlier; there was a significant interaction of message frame and cultural background ( $\beta = .29, t(96) = 2.93, p = .004$ ) with no significant main effects present. In the second regression equation, regulatory focus was regressed onto message frame, culture, and their interaction. There was a significant main effect of cultural background ( $\beta = .21, t(96) = 2.15, p = .034$ ), indicating that, as shown earlier, the East-Asian participants scored higher on prevention-focused self-regulation than did White British participants (recall that positive scores on the RFT measure indicate higher prevention scores relative to promotion scores). The second significant main effect pertained to the effect of message frame ( $\beta = .22, t(96) = 2.30, p = .024$ ), such that those in the loss-framed condition scored higher on prevention-focused self-regulation than those in the gain-framed message condition.<sup>4</sup> Finally, in the third regression equation, the persuasion variable was regressed onto message frame, cultural background, message frame X cultural background interaction, regulatory focus and regulatory focus X message frame interaction. The results showed that the regulatory focus X message frame interaction was significant ( $\beta = .27, t(96) = 2.66, p = .009$ ), whereas the cultural background X message frame interaction was no longer significant ( $\beta = .11, t(96) < 1, p = .32$ ). Thus, supporting mediated cultural moderation, the

interaction between cultural background and message frame for persuasion to floss was mediated by the interaction between regulatory focus and message frame.

Next, we examined how regulatory focus predicted the effect of message frame within each culture to explain the process by which the regulatory focus X message frame interaction mediates the culture X message frame interaction. We predicted that for White British participants, regulatory focus would predict the relative benefit of gain-framed messages, whereas for East Asian participants, regulatory focus would predict the relative benefit of loss-framed messages. To do so, we conducted simple slope analysis as suggested by Baron and Kenny (1986) and Muller et al. (2005). For East Asians, this analysis revealed that the slope for the regulatory focus was significant in the loss-framed message condition,  $\beta = .88$ ,  $t(46) = 1.91$ ,  $p = .03$ , but not significant in the gain-framed message condition,  $\beta = .10$ ,  $t(46) < 1$ , *ns* (see Figure 2a). The significant positive slope of the regression line in the loss-framed message condition indicates that the stronger the endorsement of the prevention regulatory focus the greater the persuasive value of the loss-framed message was amongst East Asians.

For White British, however, the opposite pattern emerged, such that the slope for the regulatory focus was significant in the gain-framed message condition,  $\beta = -1.01$ ,  $t(46) = 2.14$ ,  $p = .02$ , but not in the loss-framed message condition,  $\beta = -.39$ ,  $t(46) = 1.12$ ,  $p = .14$  (see Figure 2b). The significant negative slope of the regression line in the gain-framed message condition indicates that the stronger the endorsement of the promotion regulatory focus (lower scores on this variable reflect higher promotion scores), the greater the persuasive value of the gain-framed message was amongst White British. These simple slope analyses highlight the point that the culture X message frame

interaction on persuasion can be explained, in part, by the message frame fitting with the dominant regulatory focus within each culture.

### Discussion

This study demonstrates cultural differences in the effectiveness of gain- and loss-framed messages in a dental health domain and how these differences are mediated by a match between individuals' self-regulatory focus and message frame. White British participants were more persuaded (i.e., had more positive attitudes and stronger intentions to floss) when they received the gain-framed message than when they received the loss-framed message. By contrast, East-Asian participants were more persuaded (i.e., had more positive attitudes and stronger intentions to floss) when they received the loss-framed message than when they received the gain-framed message.

Beyond demonstrating that culture moderates the effect of gain- vs. loss-framed messages on health persuasion, the present study adopted a mediated cultural moderation approach to examine the pathway by which culture influenced persuasion. The results of the mediated moderation analysis demonstrates that the interactive effects of cultural background and message framing on persuasion to engage in a health behavior was mediated by the interaction between self-regulatory focus and message frame. Thus, we show that the effect of the culture by message frame interaction on persuasion could not be explained by a direct mediation path of an individual difference variable (regulatory focus), but by a mediation path catalyzed by a situational variable (message frame). Providing individuals in different cultural groups with messages that fit with their dominant regulatory focus may have led to a 'feeling right' experience (e.g., Cesario et al., 2004), which resulted in increased persuasion. These findings add to the growing

literature on persuasive communication that provide evidence of stronger persuasive effects of messages designed to match (vs. mismatch) characteristics of the message recipient and to earlier work demonstrating the role of culture in moderating responses to gain- and loss-framed messages.

As suggested by Muller and colleagues (2005) mediated moderation analysis allows researchers "...to recognize that there is more than one way by which an overall moderated effect might be produced" (p. 854). In line with this statement, we do not suggest that cultural variation in individuals' psychological functioning can be reduced to regulatory focus or its fit with a situational variable (e.g., message frame), but that it can be one useful tool by which researchers can unfold the process underlying how people from different cultural backgrounds respond to culturally congruent information.

#### *Implications for Theories of Health Behavior Change*

These findings also contribute to larger theories of health behavior change by demonstrating how individual difference factors (motivational orientation), socio-cultural factors (cultural background), and situational factors (message frame) are likely to influence components of health models, such as attitudes towards and intentions to perform the health behavior, the two variables we used to make up our measure of persuasion. As these are key constructs in models of health behavior, such as the theory of planned behavior (Ajzen & Fishbein, 1980), these findings demonstrate how integration of such factors into existing health behavior change models can contribute to a more comprehensive understanding of the moderating factors that determine when change occurs.

Future research is needed to examine the cultural congruency effect demonstrated here using behavioral outcome measures. We maintain that in spite of the lack of a

behavioral outcome measure in the current study, the present findings make an important contribution to the existing literature on communication and persuasion in the health domain. Research shows that to change actual behavior, it is important to bring about change in the antecedents of behavior, such as attitudes and intentions (e.g., Sheeran, 2002). These antecedents of behavior change are key indices of a person's mental readiness for action in several psychological models of behavior (e.g., theory of reasoned action, theory of planned behavior, protection motivation theory) (for a review, see Webb & Sheeran, 2007).

From an applied perspective, the recognition of the role of cultural factors in health persuasion is important given the existing disparities between different cultural groups on a wide range of health-related outcomes and behaviors (e.g., U.S. Health Department Services, 2000). Making health communications congruent with cultural themes to increase persuasion and enable behavior change can contribute to the reduction of such disparities. Moreover, according to a 2002 report by the Institute of Medicine, it is not clear "... whether there is added benefit in addressing health disparities by using communication that takes diversity into account." The current research demonstrates that a cultural analysis can yield an added benefit in addressing such disparities by systematically testing the effectiveness of health communication designed to target cultural themes and examining the processes by which such health communications exert their effects.

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Authors' notes

<sup>1</sup> The length of stay in the UK of the participants in the East-Asian group did not correlate significantly with any of the study variables and was therefore not included in the analyses as a covariate.

<sup>2</sup>Analyses were carried out using standardized scores since the range of response options varied across questions. The reported means and *SDs*, however, are based on non-standardized scores to facilitate interpretation.

<sup>3</sup> When analyses were performed separately for attitudes and intentions, a similar pattern of results were obtained such that White British had more positive attitudes towards flossing and greater intentions to floss over the following week when the gain-framed message was given compared to when the loss-framed message was given, whereas East Asians had more positive attitudes towards flossing and had greater intentions to floss when the loss-framed message was given compared to when the gain-framed message was given.

<sup>4</sup> This finding was unexpected since regulatory focus was assessed prior to the manipulation of the message frame and participants were randomly assigned to the message frame conditions. Additional analysis showed that participants in the different conditions did not differ from each other in terms of age and gender, variables that could potentially be responsible for this unexpected effect.