When Is Congruency Helpful? Interactive Effects of Frame, Motivational Orientation, and Perceived Message Quality on Fruit and Vegetable Consumption

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Health messages framed to be congruent with people’s motivational orientation have been shown to be generally effective in promoting health behavior change, but some inconsistencies have been found. This study tested whether the perceived quality of a health message moderated the congruency effect in the domain of fruit and vegetable (FV) consumption. Undergraduate participants (N = 109) read a health message promoting FV intake in which the frame (gain vs. loss) was either congruent or incongruent with their approach/avoidance motivational orientation. Perceived message quality and intention to increase FV intake were assessed after message exposure, and self-reported FV intake was assessed one week later. A significant interaction between congruency and perceived message quality was found on both intention and FV intake. When messages were congruent, higher intentions and FV intake were observed when perceived message quality was high, but the reverse pattern was observed when perceived message quality was low. The findings support the potential utility of using congruently-framed messages to promote fruit and vegetable consumption, while also underscoring the necessity of using high-quality messages in order for congruency to influence health-related behaviors.

Health communications intended to change health behaviors, such as fruit and vegetable intake, often emphasize the consequences of adherence or non-adherence (Michie et al., 2013). These consequences can be communicated with either a gain or a loss frame. A gain-framed message stresses the positive consequences of change, such as “if you eat five or more portions of fruit and vegetables a day you will be protected against several diseases.” In contrast, a loss-framed message stresses the negative consequences of failing to implement such changes, such as “if you do not eat five or more portions of fruit and vegetables a day you will be at risk for several diseases”.

A large body of research identifies the circumstances under which a gain or loss frame is more effective in promoting healthy behavior (for reviews see Rothman & Updegraff, 2011; Updegraff & Rothman, 2013). One relatively robust finding is that individual differences in motivational orientation moderate the relative effectiveness of gain- and loss-framed messages (Covey, 2014; Godinho, Alvarez, & Lima, 2016). Individual differences in motivational orientation include differences in approach or avoidance tendencies, that is predominance of behavioral activation system or the behavioral inhibition system (e.g., Mann, Sherman, & Updegraff, 2004; Updegraff, Sherman, Luyster, & Mann, 2007) and in the end-states to which people self-regulate their own behavior, that is, promotion or prevention regulatory focus (e.g., Higgins, 1997; Latimer et al., 2008; Sasaki & Hayashi, 2015). Among individuals primarily oriented towards achieving the presence of positive outcomes (i.e., approach-oriented and promotion oriented individuals), a gain frame is generally more effective, whereas for individuals primarily oriented towards avoiding the presence of negative outcomes (i.e., avoidance-oriented and prevention-focused individuals), a loss frame is generally more effective (e.g., Mann et al, 2004). This pattern has been called the congruency effect, as it refers to the increased effectiveness of a health message when the gain vs. loss frame is congruent with the recipient’s motivational orientation.

The congruency effect has been demonstrated across a variety of behaviors, including dental flossing (e.g., Mann et al., 2004; Uskul, Sherman, & Fitzgibbon, 2009) and human papillomavirus vaccination (Gerend & Shepherd, 2007), suggesting that using congruently-framed messages can be a useful strategy for promoting healthy behavior change. Despite these generally supportive findings (Covey, 2014), some qualifications exist. For example, some studies have not found support for the congruency effect (e.g., Meyers, 2010, a study of physical activity), and the most robust evidence for this effect comes from studies on dental flossing, indicating the need to examine congruency in other behavioral domains.
Furthermore, the proposed mechanisms by which congruency influences persuasion suggest that congruency should only support persuasion when the underlying information in a message is viewed as high quality. For example, drawing from the Elaboration Likelihood Model of persuasion (ELM; Petty & Cacioppo, 1986), Updegraff and colleagues (2007) suggested that messages that are tailored to match psychological characteristics such as motivational orientation may increase the perceived self-relevance of the message which in turn increases the recipient’s motivation to process the message thoroughly rather than superficially (see also Dijkstra, 2008). According to the ELM, when a person is both motivated and has the ability to process a message in depth, persuasion rests on the message having strong supporting information. When a message is strong, such elaboration promotes persuasion; if a message is weak, elaboration can actually decrease persuasion (Petty, Cacioppo, & Goldman, 1981). In short, elaboration makes the recipient more sensitive to the quality of the information.

Similarly, others have suggested that congruency may make it more likely that a recipient “feels right” in their reactions to a message (Cesario, Corker, & Jelinek, 2013; Cesario, Grant, & Higgins, 2004; Cesario & Higgins, 2008). According to this perspective, feeling right about a positive reaction to a message should increase persuasion, whereas feeling right about a negative reaction to a message should decrease persuasion. Again, this “feeling right” mechanism also suggests that congruency should intensify one’s reaction to quality of the message. Thus, two proposed mechanisms for the congruency effect—elaboration and “feeling right”—converge on the prediction that congruency should only increase persuasion when the messages are viewed as being of high quality. When perceived message quality is low, congruency may decrease persuasion. Thus, an examination of the role of message quality in the congruency effect can help identify the conditions necessary for using congruently-framed messages to promote healthy behavior.

**Message Quality and the Congruency Effect**

In the context of nearly all ELM-based research, message quality refers to the strength of a message’s underlying arguments: high quality representing strong arguments, and low quality representing weak arguments. However, persuasion is dependent upon the context, and it is hard to establish rules for developing arguments that will be systematically viewed as strong across contexts (Petty & Wegener, 1998). Message recipients may perceive a message as being high or low quality due to factors other than the strength of the underlying arguments. These factors can include perceived identification, perceived informativeness, and perceived realism (Cho & Boster, 2008), and variability exists in the degree to which people may evaluate the quality of persuasive messages (e.g., Lavine & Snyder, 1996; Snyder & DeBono, 1985). In this study, we focused on recipient’s general perceptions of a message being of high or low quality, rather than on explicit manipulations of argument strength. In doing so, this study examines the extent to which individual differences in perceptions of message quality may moderate the influence of congruency on the persuasive impact of a health-related message. We predicted that perceived message quality should act as a moderator of the influence of congruency on subsequent intentions and behavior. When perceived message quality is high, congruently-framed messages should lead to greater persuasion (i.e., intentions to adhere, subsequent behavior) than incongruently-framed messages. However, when perceived message quality is low, we predicted that congruently-framed messages should lead to less persuasion than incongruently-framed messages.

**Aims of the Study**

The purpose of this study was twofold. First, we sought to examine the interactive effects of congruency and message quality in promoting fruit and vegetable consumption, a health behavior for which the congruency effect has not yet been demonstrated. Fruit and vegetable consumption is a behavior that must be performed daily, for which people often show less than recommended levels of adherence (Hall, Moore, Harper, & Lynch, 2009). Importantly, fruit and vegetable consumption differs from other behaviors for which the congruency effect has been shown such as dental flossing, as it involves effortful long-term pay-offs, is frequent and habitual, and has a substantial influence on health (McEachan, Lawton, & Conner, 2010). Furthermore, attitudes are less strongly related to intentions and behaviors in the domain of diet compared to the domain of oral health (Godin & Kok, 1996). Thus, using framed messages to promote fruit and vegetable consumption may be more challenging than for promoting oral health, allowing for a stricter test of the utility of using congruently-framed messages to promote healthy behavior. Secondly, most prior studies examining message framing in the context of fruit and vegetable consumption have utilized immediate attitudes and intentions as the primary outcome (cf., Gallagher & Updegraff, 2012). To overcome this limitation of prior work, we utilized a one-week self-report behavioral follow-up of consumption.

**Method**

**Participants**

One hundred and twenty-seven students from a Midwestern university enrolled in the study in exchange for partial credit in a psychology course. Fourteen did not complete the follow-up questionnaire and another four were excluded from the analysis for being allergic or having medical restrictions concerning fruits and/or vegetables. This resulted in a final longitudinal sample of 109 students who received course credit for participation.

**Procedure**

After providing informed consent, participants first reported whether they had any restrictions related to fruit and vegetable intake and completed measures assessing approach/avoidance motivational orientation and past fruit and vegetable intake in an online survey (Intake). At least one week later (Time 1), participants came into the lab individually and were randomly assigned to read and listen to either a gain or loss framed message promoting fruit and vegetable intake. After the
message, participants reported their intention towards eating more fruit and vegetables in the following week. Participants then completed the manipulation check measures, rated the message’s quality and provided social-demographic information. One week after this experimental session (Time 2), participants received an e-mail with a link to the final online questionnaire that assessed their fruit and vegetable intake over the previous week.

Measures

Motivational Orientation
The BIS/BAS scale (Carver & White, 1994) was used at Intake to assess participants’ motivational orientation. The scale is composed of 20 items, 13 assessing approach motivations (BAS, i.e., the desire to approach positive occurrences; Cronbach’s α = .80), and the other seven assessing avoidance motivations (BIS, i.e., the sensitivity and concern with the occurrence of unpleasant events; Cronbach’s α = .75). Agreement to items was rated on a 4-point scale ranging from 1 (“very false for me”) to 4 (“very true for me”). Motivational orientation was determined by subtracting the subject’s mean score in BIS from the mean score obtained in BAS, resulting in a measure of the degree that a person was predominantly approach or avoidance-motivated, which varied between −3 and 3, with negative values representing avoidance and positive values representing approach.

Perceived Message Quality
Perceptions about message quality were assessed by three items (Cronbach’s α = .86) used in Updegraff and colleagues (2007): “what is your overall opinion about the message?”, “how credible do you think the message was” and “would you recommend that the message be used in a public service announcement”. Answers were given on seven-point scale ranging from 1 (“very negative”)/“not credible at all”/“definitely not recommend”) to 7 (“very positive”)/“completely credible”/“definitely recommend”).

Intention
Intention to eat daily recommended portions of fruit and vegetables was assessed by three items (Cronbach’s α = .87) presented in Updegraff and colleagues (2007): “Do you intend to eat five or more portions of fruit and vegetables a day?”, “Will you try to eat five or more portions of fruit and vegetables a day?”, “Are you planning to eat five or more portions of fruits and vegetables a day?”. Response options ranged from 1 (“not at all”) to 7 (“very much”).

Manipulation Check
Two items similar to those reported by Rothman, Martino, Bedell, Detweiler, and Salovey (1999) were used to evaluate the success of the framing manipulation. The first item was “How would you describe the message in terms of the tone of the information presented?” with response options ranging from −4 (“mostly negative”) to +4 (“mostly positive”). The second item was “Would you say that the message mostly emphasized...” and answers were given on a scale ranging from −4 (“the problems of not eating fruits and vegetables”) to +4 (“the benefits of eating fruits and vegetables”).

Fruit and Vegetable Intake
Fruit and vegetable intake was measured twice with items described in Luszczynska, Tryburcy, and Schwarzer (2007): “Within the last two weeks (Intake)/last week (Time 2), how often have you eaten a portion of fruit and/or vegetables (excluding potatoes)?”. Several examples of what a portion of fruit and vegetables could be were given, such as “one cup of raw leafy vegetables” or “one medium apple, banana, orange, pear”. A similar measure has been validated against dietary biomarkers and food frequency questionnaires (Steptoe et al., 2003). Responses were given on a scale ranging from 1 (“once per week or less”) to 7 (“more than four times a day”).

Materials
The gain-framed message explained the positive effects of eating at least five portions of FV a day, whereas the loss-framed message presented the negative effects of not eating this same amount of FV (see Table 1)1. Messages were approximately 290 words in length, with white font text presented on a black computer screen accompanied by a native English-speaking female voice narration, in order to ensure that all participants received the message in full (see Appendix for full text).

Analytic Strategy
Two hierarchical regressions tested whether perceived message quality moderated the effect of congruency on intention and fruit and vegetable intake. Baseline fruit and vegetable intake was included in the first step of both regressions to account for pre-existing differences in intake. As in prior studies (e.g., Mann et al., 2004), the congruency effect was represented by an interaction between message frame and motivational orientation. The hypothesized moderation of the congruency effect by perceived message quality was tested through the three-way interaction (i.e., message frame x motivational orientation x perceived message quality). It was predicted that higher perceived message quality leads, by itself, to higher intention and fruit and vegetable intake. No specific hypotheses were held for the main effects of the other two predictors, or for the second-order interactions. Nonetheless, all were included in the model

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1Although motivational orientation was operationalized through assessing approach/avoidance tendencies, an important distinction made by Regulatory Focus Theory (Higgins, 1997) was taken into account when designing the messages used, namely disentangling between the presence of a reward and the absence of an aversive outcome (both gains) and between the presence of an aversive outcome or the absence of a reward (both losses). Prior work suggests that people are more responsive to the presence of outcomes in messages (regardless of whether they are rewarding or aversive outcomes) compared to the absence of an outcome (e.g., Dijkstra, Rothman, & Pietersma, 2011), so the gain messages focused primarily on the presence of rewarding outcomes and the loss messages focused primarily on the presence of aversive outcomes, while referring to the exact same consequences (i.e., same consequences framing, see Rothman & Salovey, 1997). Moreover, the messages controlled for the fact that some outcomes might be considered intrinsically promotional (e.g., being attractive), while others may be considered intrinsically preventive (e.g., having better health), by balancing the number of each type of outcomes.
to ensure that the hypothesized three-way interaction was not dependent upon them.

Prior to analysis, the message frame variable was dummy-coded (with 0 for loss- and 1 for gain-frame). The three variables were entered at step two as independent predictors in the regressions. The two-way interaction terms were entered at step three and the three-way interaction at step four. Considering that reduced power is associated with higher-order interaction terms (Aiken & West, 1991), and that the direction of the 3-way interaction was theoretically predicted, the significance of this interaction was determined through a one-tailed test. All other reported p-values were two-tailed. Stata’s *lincom* procedure, which estimates linear combinations of coefficients, was employed to estimate the simple effects of congruency among those perceiving low message quality (−1SD) and high message quality (±1SD), while controlling for baseline fruit and vegetable intake.

Finally, a mediated moderation model was tested using PROCESS macro (Model 7; Hayes, 2013). Intention was defined as the mediator between congruency (defined as a categorical variable) and fruit and vegetable intake, with perceived message quality moderating the relationship between congruency and intention.

### Results

#### Descriptive Statistics and Dropout Analyses

Participants’ ages ranged from 16 to 46 years (M = 19.60; SD = 3.60) and 69.8% of the sample were women. Inter-correlations, means and standard deviations for all study variables are shown in Table 2. Analyses of variance (ANOVAs) showed no significant differences on motivational orientation, perceived message quality, intention, baseline fruit and vegetable intake and age between the longitudinal sample and those who dropped

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Table 1. Outcomes related to eating (or not) the recommended amount of FV referred to in each message frame type

| Gain frame                                      | Loss frame                                      |
|------------------------------------------------|------------------------------------------------|
| Eating fruits and vegetables...                 | Not Eating fruits and vegetables...             |
| their **sufficient** daily consumption can help prevent major diseases | their **insufficient** daily consumption can **cause** major diseases |
| **Eating** fruit and vegetables supplies vitamins and minerals | **Not eating** fruit and vegetables **results in a lack of** vitamins and minerals |
| you will be helping the immune system           | you will be **damaging** the immune system      |
| which works to keep you healthy and safe from such diseases resulting in **increased** energy | which will fail to keep you healthy and safe from such diseases resulting in **decreased** energy, |
| **better** moods                                | **worse** moods                                 |
| an **increased** sense of well-being            | a **decreased** sense of well-being             |
| **Having** an adequate supply of these nutrients in the bloodstream is also **important for maintaining attractive** hair and skin promotes an **active** metabolism which **burns** fat contributing to an overall **toned** and **attractive** body | **Not having** an adequate supply of these nutrients in the bloodstream **results in non-attractive** hair and skin promotes an **inactive** metabolism which **accumulates** fat contributing to an overall **untoned** and **unattractive** body |
| **Substantial positive** effect on test performance and academic achievements | **substantial negative** effect on test performance and academic achievements |
| you will be **proud of yourself** for sticking to your goals | you will feel **disappointed with yourself** for withdrawing from your goals |
| you will be **protected** against disease       | you will be **unprotected** against disease     |
| you will feel **good** about yourself           | you will feel **bad** about yourself            |
| you will have **better** health                 | you will have **worse** health                  |

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Table 2. Bivariate correlations between study variables and descriptive statistics

|               | (1) | (2) | (3) | (4) | (5) | (6) | Mean | SD  |
|---------------|-----|-----|-----|-----|-----|-----|------|-----|
| 1. Motiv. Orientation (T1) |     | 1   |     |     |     |     | 0.16 | 0.61|
| 2. P. Message Quality (T2)  | .17 | 1   |     | .41**| 1  |     | 5.21 | 1.31|
| 3. Intention (T2)            | .17 | .41**| 1   |     |     |     | 5.05 | 1.31|
| 4. FV intake (T1)            | -.09| -.05| .27**| 1   |     |     | 2.83 | 1.38|
| 5. FV intake (T3)            | .18 | .11 | .38**| .52**| 1  |     | 2.93 | 1.44|
| 6. Age (T1)                 | .18 | -.02| .05 | .21* | .23* | 1   | 19.60| 3.60|

*p < .10; **p < .05.
out (all \( p > .27 \)), and a chi-square test revealed no gender differences between the groups.

**Manipulation and Randomization Check**

As expected, the gain-framed message was perceived as being more positive in tone (\( M = 2.64; \ SD = 1.39 \)) than the loss-framed message (\( M = 0.76; \ SD = 2.33 \)), \( t(105) = 5.10, \ p < .001 \), and as mostly emphasizing the benefits of fruit and vegetable consumption (\( M = 2.43; \ SD = 1.56 \)), while the loss-framed message emphasized the costs of not eating fruit and vegetables (\( M = -0.47; \ SD = 2.20 \)), \( t(105) = 7.91, \ p < .001 \). No other differences were found between the gain vs. loss frame conditions in baseline fruit and vegetable intake, age and gender (all \( p > .10 \)), attesting the success of the randomization procedures.

**Perceived Message Quality**

As shown in Table 2, perceptions of message quality were generally positive (\( M = 5.20, \ SD = 1.31 \)) but ranged considerably (minimum = 1.67, maximum = 7). Message quality was not related to any baseline measures including baseline FV intake or motivational orientation (see Table 2). Participants perceived the gain-framed message to be of higher quality (\( M = 5.62, \ SD = 1.15 \)) than the loss-framed message (\( M = 4.76, \ SD = 1.33 \)), \( t(105) = 3.59, \ p < .001 \). However, there was no significant congruency effect on perceptions of argument quality, as the frame \( \times \) motivational orientation interaction on message quality was not significant (\( \beta = .04, \ p = .82 \)). As perceived message quality was unrelated to congruency, it allowed us to examine the extent to which message quality might moderate the influence of the congruency effect on intentions and behavior.

**Intention for Fruit and Vegetable Intake After Message Exposure**

Baseline fruit and vegetable intake predicted intentions (\( \beta = .27, \ p < .001 \)), and explained 7.1% of its variance. In the second step, message frame, motivational orientation, and perceived message quality explained 27.4% of the variance on intention. There was a significant and positive effect of perceived message quality on intention (\( \beta = .42, \ p < .001 \)). The three-way interaction was also significant (\( \beta = .33, \ p = .046 \), \( \Delta R^2 = .03 \), explaining an additional 2.9% of variance (see Table 3).

As Figure 1 shows, the difference between high and low message quality on intentions was more pronounced in the congruent (\( M = 5.78; \ SE = .21 \) vs. \( M = 4.19; \ SE = .24 \), \( t \))

### Table 3. Hierarchical regressions of intention (Time 1) and fruit and vegetable consumption (Time 2) on message frame, motivational orientation and perceived message quality

| Outcome variable and step | Variables entered | \( \beta \) (Step 1) | \( \beta \) (Step 2) | \( \beta \) (Step 3) | \( \beta \) (Step 4) |
|---------------------------|------------------|----------------------|----------------------|----------------------|----------------------|
| Intention (T1)            | Baseline FV intake | .266 ***             | .298 ***             | .300 ***             | .281 ***             |
|                           | Message Frame     | -.083                | -.090                | -.122                |                      |
|                           | MO                | .138                 | .141                 | .164                 |                      |
|                           | P. Quality        | .424 ***             | .427 ***             | .386 ***             |                      |
|                           | Frame \( \times \) MO | -.045                | -.123                |                      |                      |
|                           | P. Quality \( \times \) MO | .091                | -.157                |                      |                      |
|                           | Frame \( \times \) P. Quality | .011                | .046                 |                      |                      |
|                           | Frame \( \times \) MO \( \times \) P. Quality |                      | .327 **              |                      |                      |
| \( R^2 \)                 | .071              | .274                 | .281                 | .310                 |                      |
| \( \Delta R^2 \)          | .078              | .203                 | .007                 | .029                 |                      |
| FV Intake (T2)            | Baseline FV intake | .518 ***             | .546 ***             | .535 ***             | .519 ***             |
|                           | Message Frame     | .024                 | .019                 | -.007                |                      |
|                           | MO                | .211 **              | .184                 | .204                 |                      |
|                           | P. Quality        | .095                 | .042                 | .006                 |                      |
|                           | Frame \( \times \) MO | -.004                | -.074                |                      |                      |
|                           | P. Quality \( \times \) MO | .065                | -.156                |                      |                      |
|                           | Frame \( \times \) P. Quality | .089                | .123                 |                      |                      |
|                           | Frame \( \times \) MO \( \times \) P. Quality |                      | .289 **              |                      |                      |
| \( R^2 \)                 | .269              | .330                 | .338                 | .360                 |                      |
| \( \Delta R^2 \)          | .269              | .061                 | .008                 | .022                 |                      |

*Note. Message frame is a dummy variable (0 = loss-frame; 1 = gain-frame); MO = motivational orientation; P. Quality = perceived message quality.*** \( p < .10 \); ** \( p < .05 \); *** \( p < .01 \).*
(107) = 4.84, p < .001, Cohen’s d = .94) than in the incongruent conditions (M = 5.42; SE = .24 vs. M = 4.70; SE = .21, t (107) = 2.32, p = .022, Cohen’s d = .45), suggesting that congruency made intentions more strongly tied to perceptions of message quality. When message quality was perceived as low, congruent messages led to somewhat but not significantly lower intentions than incongruent messages, t(107) = 1.63, p = .11, Cohen’s d = .32; when message quality was perceived as high, congruent messages led to somewhat but not significantly higher intentions than incongruent messages, t(107) = 1.13, p = .26, Cohen’s d = .22.

**Fruit and Vegetable Intake During the Following Week**

Baseline FV intake significantly predicted FV intake at the one-week follow-up (β = .52, p < .001). As hypothesized, the three-way interaction between message quality, frame, and motivational orientation was significant and positive (β = .29, p = .035), ΔR² = .02. **Figure 2** depicts the interaction between congruency and perceived message quality on FV intake. Perceived message quality was related to FV intake when frame was congruent, with those perceiving higher quality reporting higher intake (M = 3.48; SE = .22) than those who perceived lower quality (M = 2.46; SE = .25), t(108) = 2.93, p = .004, Cohen’s d = .56, but no effect of perceived message quality was found on fruit and vegetable intake when frame was incongruent with motivational orientation (M = 2.86; SE = .22, t(108) = .52, p = .60, Cohen’s d = .10). When message quality was perceived as low, congruent messages led to somewhat but not significantly lower FV intake than incongruent messages, t(107) = 1.19, p = .24, Cohen’s d = .23. Importantly, when message quality was perceived as high, congruent messages lead to significantly greater FV intake than incongruent messages, t(107) = 2.37, p = .02, Cohen’s d = .46, below the mean), a mediated moderation effect was found, with a negative significant indirect effect of congruency on fruit and vegetable intake through intention emerging, βindirect effect = -.11, 95% CI [-.22; -.03]. Put simply, when people perceived the message as being of poor quality, congruency led to lower intentions and, consequently, to lower fruit and vegetable intake. However, at high levels of perceived message quality (i.e., values at one standard deviation above the mean) the indirect effect of congruency on fruit and vegetable intake through intention was non-significant βindirect effect = .05, 95% CI [-.02; .15].

**Discussion**

A growing body of literature attests the effectiveness of matching a health message’s frame to individuals’ motivational orientation (Updegraff & Rothman, 2013). However, these
congruency effects have not always been obtained (Covey, 2014), underscoring the need to identify boundary conditions of the congruency effect. The present study sought to test whether perceived message quality may impose limits to the effectiveness of congruently framed messages, while also examining the extent to which the congruency effect could apply to the domain of fruit and vegetable intake.

As hypothesized, perceived message quality influenced the extent to which congruently-framed messages led to persuasion, both for immediate intentions as well as for fruit and vegetable intake a week later. Across both outcomes, perceived message quality had a stronger effect in the congruent compared to the incongruent frame conditions. Put simply, when the message was congruent with recipients’ motivational orientation, participants were more sensitive to the perceived quality of the message. Furthermore, only when perceived message quality was high did congruent messages lead to greater FV intake than incongruent messages. The mediational analysis suggest that this effect was driven, in part, by the lower intentions reported by those who received a congruent message that was perceived as being of low quality.

The major implication of the present findings is that attention should be paid to message quality when employing message tailoring strategies such as congruency to promote behavior change. Even in cases where message quality is not explicitly manipulated as through an argument strength manipulation (cf. Updegraff et al., 2007), variability in people’s perceptions of message quality may be enough to augment or even reverse framing effects. Thus, measuring people’s perceptions of message quality may help to disentangle effects that may have been obscured in previous research. Furthermore, when relying on message tailoring strategies such as congruency, it is imperative that the messages themselves are designed to be and subsequently assessed as being high in perceived quality by the intended audience. Such findings are also relevant for policy makers and the field of health communication. Considering the role of perceived message quality, formative research with members of the target audience is recommended to ensure that health promotion messages are perceived as being of high quality prior to their use.

The findings are also consistent with two mechanisms proposed for the congruency effect: elaboration (Dijkstra, 2008; Updegraff et al., 2007) and “feeling right” (Cesario et al., 2013, 2004; Cesario & Higgins, 2008). While our study aimed to understand the role of perceptions of message quality and congruency on behavioral measures of persuasion, it did not specifically examine which of the two mechanisms best accounted for the pattern of findings. Future research may benefit from examining this issue in greater detail. However, as discussed by Dijkstra (2008), our findings suggest that message tailoring strategies such as congruency may not be de facto effective methods for increasing persuasion, and a greater understanding of the mechanisms that underlie the processing of congruently-framed health messages can highlight the conditions under which tailoring strategies such as congruency are most effective in producing behavior change.

We found that the participants who were more approach-oriented reported greater FV intake at one week than those who were more avoidance-oriented. In line with results from previous research showing that young adults tend to construe dietary change in promotional rather prevention terms—that is, as a behavior they strongly “want” to do rather than feel they “ought” to do (Updegraff, 2013)—fruit and vegetable consumption may have been primarily viewed as a promotion health behavior by our study participants. Given that approach-oriented individuals tend to resonate more with the promotion concerns that this behavior might reflect (Rothman, Wlaschin, Bartels, Latimer, & Salovey, 2008), it is understandable that approach-oriented individuals reported higher levels of intake, although this explanation needs to be formally tested in future research.

The fact that the gain-framed message was perceived as being of higher quality is also worthy of note. This may be explained by fruit and vegetable intake being conceived by our young adult sample as a behavior that serves promotion-oriented concerns such as accomplishment or vitality more so than prevention-oriented concerns such as safety or reduction of long-term health risks. As stressed by Rothman et al. (2008), for behaviors that reflect promotion-oriented concerns, gain-framed messages may be perceived as having better “fit” and general appeal than loss-framed messages, leading to a tendency to evaluate the gain frame more positively than the loss frame for fruit and vegetable intake promotion. Alternatively, the loss-framed message may have evoked a greater sense of threat (e.g., Shen & Dillard, 2007), which may have led to greater message derogation by some participants. However, we emphasize that although gain-framed messages were perceived as being of higher quality than loss-framed messages, there was no overall difference in their effect on either intentions or subsequent intake, underscoring the importance of examining how framing interacts with other factors such as motivational orientation to influence intentions and behavior. Furthermore, it highlights the limits of relying simply on perceptions of message quality as evaluations of message effectiveness, as perceptions of message quality did not predict subsequent FV intake.

Some limitations of this study need to be mentioned. First, the sample was composed of young adults, most of whom were women, which may impose some limitations to the generalization of the present findings. Also, although our measure of fruit and vegetable intake has been validated in prior research (Steptoe et al., 2003), fruit and vegetable intake was assessed through self-report and may be subject to errors in recall. Although our one-week follow-up improves upon past research that has tended to rely on immediate attitudes and intentions as primary outcomes (see Gallagher & Updegraff, 2012, for review), the relatively short follow-up duration did not allow us to examine whether effects would persist for longer periods of time. While the short follow-up window might capture immediate changes in behavior, it is also possible that it did not allow ample time for some participants to instantiate changes in consumption by, for example, shopping for fruits and vegetables. Message quality was measured rather than manipulated, so our study does not identify which ingredients make young adults perceive a message as having higher or lower quality. Future research should attempt to identify which message characteristics increase the likelihood of messages being considered of high quality, as well as to replicate the present findings with messages explicitly...
manipulated to be perceived as high versus low quality and in other behavioral domains. Nevertheless, the major contribution of our study is to show that, even when the underlying strength of the arguments is objectively the same, variation in people’s perceptions of quality is still meaningful, and influences framing effects in a manner consistent with explicit manipulations of argument strength (see Updegraff et al., 2007).

The present study makes three important contributions to the health communication and message framing literatures. First, it shows that matching the frame of a health message to people’s motivational orientation is not a simple method that will always work, and reinforces the need to understand the exact circumstances under which congruency may improve adherence to health behaviors. Second, it shows that only when the supporting message is perceived of generally high quality, congruency can promote increases in fruit and vegetable consumption. Our findings also underscore the importance of understanding the mechanisms that underlie message tailoring effects such as the congruency effect (see also Dijkstra, 2008), as a better understanding of the mechanisms can identify contexts in which such strategies are most likely to be effective.

Funding
This study was supported by a grant from the Portuguese Foundation for Science and Technology (FCT), with the reference SFRH/BD/66193/2009, awarded to the first author.

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Eating 5 portions of fruit and vegetables a day is easy, and most of all it’s tasty! If you (eat/do not eat) this amount of fruit and vegetables per day, you will (be protected/unprotected) from certain cancers.

There have probably been times in the past when you have managed to eat 5 portions a day. This means that eating a sufficient amount of fruit and vegetables simply takes motivation and organization. If you (do it/do not do it) you will (be proud of/feel disappointed with) yourself for (sticking to/withdrawing from) your goals.

Eating 5 portions of fruit and vegetables a day is easy, and most of all it’s tasty! If you (eat/do not eat) this amount of fruit and vegetables per day, you will be (protected/unprotected) against disease, you will feel (good/bad) about yourself and you will have (better/worse) health!

Appendix: Health message promoting fruit and vegetable intake (gain/loss frame)

The World Health Organization recommends a daily intake of at least 5 portions of fruit and vegetables. Fruit and vegetables are important components of a healthy diet, and their (sufficient/insufficient) daily consumption can help (prevent/cause) major diseases, such as cardiovascular diseases and certain cancers.

(Eating/Not eating) fruit and vegetables (supplies/results in a lack of) vitamins and minerals that play a fundamental protective role in the body, and help to repair already damaged tissues. (If you eat/If you do not eat) the recommended portions of fruit and vegetables (you will be helping/you will be damaging) the immune system, which (works/will fail) to keep you healthy and safe from such diseases.

Furthermore, (a balanced/a non-balanced) diet that (is/is not) rich in fruit and vegetables has a direct effect on the brain, resulting in (increased/decreased) energy, (better/worse) moods and (an increased/decreased) sense of well-being. (Having/Not having) an adequate supply of these nutrients in the bloodstream (is also important for maintaining attractive/results in non-attractive) hair and skin, and promotes an (active/inactive) metabolism, which (burns/does not burn) fat, contributing to an overall (toned/untoned) and (attractive/unattractive) body. Plus, (good nutrition/bad nutrition), (rich/poor) in fruits and vegetables, can have a substantial (positive/negative) effect on test performance and academic achievements.

There have probably been times in the past when you have managed to eat 5 portions a day. This means that eating a sufficient amount of fruit and vegetables simply takes motivation and organization. If you (do it/do not do it) you will (be proud offeel disappointed with) yourself for (sticking to/withdrawing from) your goals.

Eating 5 portions of fruit and vegetables a day is easy, and most of all it’s tasty! If you (eat/do not eat) this amount of fruit and vegetables per day, you will be (protected/unprotected) against disease, you will feel (good/bad) about yourself and you will have (better/worse) health!

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