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Original article

## Attitudes toward health-messages: The link between perceived attention and subjective strength



### *Attitudes à l'égard des messages de santé : rapport entre attention subjective et intensité des attitudes*

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#### ABSTRACT

**Introduction.** – Many efforts are invested in promoting healthy attitudes and behaviors; nonetheless there is no clear, definitive evidence of sustained effectiveness of those efforts in all cases.

**Objective.** – The present study examined the role of perceived attention in changing attitudes toward vegetable consumption as well as the perceived stability and resistance of those changes (attitude strength).

**Method.** – Participants were randomly assigned to read a strong or weak health communication arguing in favor of vegetable consumption. After reading the message, participants reported attitudes toward this health issue, the perceived attention, and the perceived strength associated with their evaluations.

**Results.** – Participants who reported high (vs. low) perceived attention showed a greater effect of argument quality on persuasion. Furthermore, such participants also reported stronger attitudes compared to those who reported low perceived attention.

**Conclusion.** – This study showed that attitudes toward vegetable consumption can be changed after reading a persuasive message, and that the extent of perceived attention moderated the extent to which those changes were perceived as stable and resistant (stronger attitudes).

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#### RÉSUMÉ

**Introduction.** – On ne ménage pas les efforts pour promouvoir les attitudes et les comportements de santé ; il n'y a pourtant aucune preuve à l'appui de leur efficacité sur le long terme.

**Objectif.** – Cette étude examine le rôle de l'attention subjective dans l'évolution des attitudes envers la consommation de légumes, ainsi que la persistance et la résistance de cette évolution.

**Méthode.** – Les participants ont d'abord dû lire un rapport de santé qui vante les bienfaits des légumes ; certains recevaient un rapport peu convaincant, les autres des arguments plus puissants. Tous ont ensuite rendu compte de leurs attitudes envers cette question diététique en précisant la portée, selon eux, de leurs évaluations.

**Résultats.** – Les participants démontrant une attention subjective élevée (par opposition à faible) à la lecture du rapport ont aussi produit les arguments les plus persuasifs. De plus, les attitudes de ces mêmes participants ont été plus assurées par rapport à ceux qui démontraient une faible attention subjective.

**Conclusion.** – Cette étude montre que les attitudes envers la consommation de légumes peuvent être modifiées par la lecture d'un message fort, et que leur persistance et leur résistance est fonction de leur degré d'attention subjective.

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## 1. Introduction

There is a growing interest in promoting healthy habits. These efforts have focused on positive outcomes such as improving eating habits, increasing exercise, and intake of vegetables and fruits (Batista, Lima, Pereira, & Alves, 2014; Bayer, Nehring, Bolte, & von Kries, 2013; Denney-Wilson, Robinson, Laws, & Harris, 2014). Most of the resources allocated to encouraging healthy habits are spent in campaigns including the promotion of favorable attitudes toward those behaviors (Magallanes & Morales, 2014; Vartanian, Spanos, Herman, & Polivy, 2015).

Despite the efforts designed to promote these healthy attitudes and behaviors, there is no clear evidence of sustained effectiveness producing positive effects, at least not in all cases. In fact, sometimes health campaigns are associated with null or even adverse effects. Therefore, there is a variety of potential outcomes that can be summarized next.

First, some communication campaigns are effective in achieving the desired outcome (Flynn et al., 2007; Pettigrew & Pescud, 2012; Rodgers et al., 2016; Sacks, Swinburn, & Lawrence, 2009). For instance, Epstein et al. (2001) found that family-based interventions with the goal of increasing the intake of fruits and vegetables produced effective behavioral changes.

Second, other campaigns are not so successful in promoting healthy attitudes and behaviors. In some instances, research has concluded that particular intervention strategies are ineffective, producing virtually no changes in important outcomes (Derzon & Lipsey, 2002; Noar, 2006; Snyder & Hamilton, 2002). As an example of this category, Jones, Sinclair, Rhodes, and Courneya (2004) examined the effectiveness of a persuasive message on exercise in college students and could not find significant effects in any of the psychological (i.e., attitudes and intentions) or behavioral variables assessed.

Finally, some campaigns have been shown to have unexpected adverse effects. That is, some health communication campaigns backfire increasing (rather than decreasing) the number of undesirable health-related attitudes and behaviors (Lorenz & Oliver, 2013). These reverse effects of health campaigns can be explained via several mechanisms (boomerang effect), such as an unwanted exaggeration of the social desirability of thinness (Puhl & Heuer, 2010) and psychological reactance (Puhl, Luedicke, & Peterson, 2013).

Faced with such disparate results and interpretations, it is difficult to anticipate whether, when, and for whom food-related health campaigns will be effective, ineffective or even detrimental. Even when health communications produce the desired outcomes in the short-term, it is still challenging to make predictions regarding the resistance and stability of the induced changes in the long-term. In fact, Gill, King and Catterson (2005) reviewed a large number of health campaigns and found that interventions aimed at preventing obesity could sometimes produce changes in the short-term but rarely produced long-term effects. In one of the exceptions, Huhman et al. (2007) found that the more children saw a campaign that encouraged physical activity, the more positive were their attitudes toward physical activity, and that those effects remained stable even two-years after the intervention (see also Epstein et al., 2001).

### 1.1. Immediate and long-term consequences of health communication

Understanding when (and when not) health communication leads to long-term consequences depends in part on the consideration of the psychological processes that are relevant for the effects of public communication campaigns (Salovey & Wegener,

2003). One of the psychological mechanisms that can be used to understand these effects is elaboration of the received information.

Elaboration is a core construct in the Elaboration Likelihood Model of persuasion (ELM; Petty & Cacioppo, 1986; Petty & Briñol, 2007, 2012), one of the earliest dual process theories that distinguishes thoughtful from non-thoughtful determinants of judgment. The term “elaboration” is used in social psychology to describe the action of people adding something of their own to the specific information provided, for example, in a persuasive communication (Petty & Briñol, 2009).

This term of elaboration as a determinant of persuasion was introduced to overcome the previous persuasion models that relied both on the equivalence between learning and persuasion and the passive view of the message’s recipient. For instance, one of the earliest assumptions of theories of persuasion was that effective influence required a sequence of steps. According to McGuire’s (1985) persuasion matrix model, attitude change required a sequence of steps, such as exposure, attention, interest, comprehension, acquisition, yielding, memory, retrieval, decision, action, reinforcement, and consolidation. According to this view, attention played a critical role, and the recipient must attend to the information presented for persuasion to occur. Although this is an intuitive model, it is now clear that some of the steps postulated in the sequence might be completely independent from each other, rather than sequential. For example, although a person’s attention was often thought to be an important causal determinant of and prerequisite to persuasion, subsequent evidence has accumulated to support the view that message attention and message learning is not a necessary step (Greenwald, 1968). Rather, the existing evidence shows that message attention and learning can occur in the absence of attitude change, and that a person’s attitudes can change without attending and learning the specific information in the communication. That is, a person might be able to attend and to comprehend all the intended information perfectly, but not be persuaded either because the information is counter-argued or seen as personally irrelevant. For example, a message using erotic images and violence would presumably get attention (Lull & Bushman, 2015) but people might not be necessarily persuaded if they find them threatening or if they perceive the arguments contained in the message to be weak. On the other hand, a person might not attend the information (reporting zero attention) or might get the information all wrong (scoring zero on a knowledge test) but think about the attitudinal object in a manner that produces the intended change. Therefore, attention is not the same as persuasion.

The cognitive response theory (Greenwald, 1968; Petty, Ostrom, & Brock, 1981) and the ELM (Petty & Cacioppo, 1986) were developed originally to account for the low correlation between message attention (a step of learning) and persuasion observed in many studies, and for the processes responsible for yielding to message. In contrast to the traditional view that acceptance of a message depended upon learning the message content, the cognitive response approach contends that persuasion depends on the extent to which individual articulate and rehearse their own idiosyncratic thoughts to the information presented. The cognitive response perspective maintains that individuals are active participants in the persuasion process relating message elements to their existing repertoires of information. According to this framework, an appeal that elicits issue-relevant thoughts that are primarily favorable toward a particular recommendation would be expected to produce agreement, whereas an appeal that elicits issue-relevant thoughts that are predominantly unfavorable toward the recommendation would be expected to be ineffective in achieving attitude change.

Unlike previous models of persuasion, the ELM proposes an active view of the message’s recipient. According to that view, attitudes, as well as other judgments, can be modified by processes

that involve relatively high or low amounts of object-relevant thinking, but the processes and consequences of persuasion are different depending on the amount of elaboration involved. Regarding the processes, the ELM holds that there are numerous specific mechanisms of attitude change that operate along the elaboration continuum. For example, classical conditioning (Staats & Staats, 1958) requires relatively little thought and operates at the low end of the elaboration continuum, but expectancy-value models of attitudes (e.g., Fishbein & Ajzen, 1975) require high degrees of thought and operate along the upper end of the elaboration continuum. The mental processes that occur along the low end of the elaboration continuum are collectively referred to as following the peripheral route to persuasion whereas the operation of processes along the high end of the continuum are collectively referred to as following the central route to persuasion. Whether attitude change occurs as the result of relatively high or low amounts of thinking matters not only for determining what attitude is formed, but it also determines how consequential or strong that attitude is (see Petty & Krosnick, 1995, for a review of attitude strength research).

Specifically, when a persuasive message influences attitudes through low-elaboration processes (e.g., use of a variable as a simple peripheral cue), the attitudes formed tend to be less persistent, resistant to change, and predictive of subsequent behaviors than when the same message produces the same amount of change through a high elaboration process (e.g., biasing the thoughts generated; Petty, Haugtvedt, & Smith, 1995). Prior research clearly indicates that attitudes based on high thought predict behavioral intentions and behavior better than attitudes based on little thought (e.g., Barden & Petty, 2008; Brown, 1974; Cacioppo, Petty, Kao, & Rodriguez, 1986; Leippe & Elkin, 1987; Petty, Cacioppo, & Schumann, 1983). Put simply, the more an attitude change is based on extensive elaboration, the stronger that attitude is. Thus, even if high and low thinking processes resulted in the same degree of attitude change, the consequences of this influence in terms of stability and further impact on behavior can be different. Taking those two principles into consideration, we argue that identifying the processes by which particular persuasive messages foster health-promoting attitudes can be informative about the immediate and long-term consequences of the intervention. Previous research has either manipulated or measured elaboration in order to examine the impact of argument quality of a message on attitudes, and subsequent changes in attitude strength.

### 1.2. Attitude change and strength as a function of manipulated elaboration

Among other possible variations, previous research has successfully manipulated elaboration by varying either the personal relevance (Maheswaran & Meyers-Levy, 1990; Meyers-Levy & Maheswaran, 2004; Petty & Cacioppo, 1990), the responsibility (Gandarillas, Requero, Briñol, & Rojo, 2014), or the ambivalence (Briñol et al., 2004) of the recipients of persuasive communications. For example, Rothman, Salovey, Turvey, and Fishkin (1993) demonstrated that a persuasive communication emphasizing a woman's own responsibility for getting a mammogram had more impact on the use of screening mammography than a communication emphasizing external responsibility for detecting breast cancer. They found after 12 months of the communication that women in the high (vs. low and control) personal relevance condition were significantly more likely to obtain a mammogram. Notably, by increasing the personal relevance of a message, people scrutinize the evidence more carefully such that if the evidence is found to be strong, more persuasion results, but if the evidence is found to be weak, less persuasion occurs (Petty & Cacioppo, 1990). Therefore, increasing elaboration does not translate directly into more persuasion. Instead, the impact of elaboration on

persuasion depends on argument quality. One of the most efficient techniques for determining the extent of elaboration people are engaged in is to vary the quality of the arguments in a persuasive proposal (Petty, Wells, & Brock, 1976). This technique is based on the comparison between the persuasive outcome of a weak argument message and a strong argument message both in favor of a proposal. Specifically, the greater the attitude change difference between a strong argument and a weak argument message, the greater the extent of elaboration people are engaged in. Put simply, people who are scrutinizing the message carefully are more likely to detect and be influenced by differences in argument quality.

Consistent with this point, Updegraff, Sherman, Luyster, and Mann (2007) used a tailoring strategy to increase the tendency to carefully evaluate the content of a communication promoting regular dental flossing after meals (see also Broc et al., 2015). Tailoring typically refers to those instances in which the arguments contained in a communication are altered to match the particular concerns or characteristics of the message recipient. The results suggested that when health-messages contain strong arguments, increasing the recipient's scrutiny through tailoring can increase persuasion. However, when messages contain relatively weak evidence, tailoring reduces persuasion because people detect the flaws in the merits of the arguments. As was the case for other variables increasing processing, matching can increase elaboration and elaboration leads to more persuasion for strong arguments but to less persuasion for weak arguments (Salovey & Wegener, 2003; Petty, Wheeler, & Bizer, 2000).

### 1.3. Attitude change and strength as a function of measured elaboration

In addition to manipulating elaboration, various studies used the Need for Cognition Scale (NC; Cacioppo, Petty, & Kao, 1984) to assess the degree to which participants were likely to engage in thoughtful elaboration. The NC scale measures people's motivation to engage in and enjoy effortful thought, indicating that high NC individuals are more likely to pay attention to and to elaborate the content of the message than low NC ones (for a review, see Petty, Briñol, Loersch, & McCaslin, 2009). For example, Ruitter, Verplanken, Cremer, and Kok (2004) found that need for cognition can moderate the impact of messages promoting breast self-examination. Across different domains, studies have measured elaboration using different indicators regarding perceived cognitive effort (instead of the NC), obtaining the same pattern of results (e.g., more argument quality for participants reporting high thinking, Briñol & Petty, 2003; Darke & Chaiken, 2005). As an illustration, Briñol and Petty (2003) induced participants to listen to a persuasive message about university security system with strong or weak arguments. Then, participants reported their perceived elaboration measured with two self-reported items (i.e., extent of thinking and perceived attention) and finally they reported their attitudes toward the proposal of the message. As expected, argument quality had a larger impact on attitudes as perceived elaboration increased. This measure of perceived attention has also been used in other domains, including prejudice (Cárdaba, Briñol, Horcajo, & Petty, 2014) and academic proposals (Barden & Petty, 2008; Petty, Briñol, & Tormala, 2002).

Furthermore, as noted earlier, the higher the level of elaboration, the stronger the attitudes created. A number of studies provide evidence that attitudes resulting from more effortful thinking better predict behavioral intentions and guide actions than do attitudes resulting from little thinking. For instance, Brown (1974) assessed the attitudes of high school students toward various health-related behaviors such as using drugs, obeying traffic safety laws, and so forth. He asked participants how often they thought

about their health-related behaviors and the laws around them, and divided respondents into low, medium and high relevance groups depending on the extent of elaboration they informed. Brown found that the correlations between attitudes and behavioral intentions increased as the level of thinking increased. Students who reported giving issues greater (vs. little) thought exhibited greater attitude-behavior consistency. Conceptually similar, Royne, Levy, and Martinez (2011) found that greater perceived importance was associated with more willingness to pay for ecological foods.

The purpose of the present study was to examine the role of thinking in increasing favorable attitudes toward healthy behavior (i.e., vegetable consumption) using a self-reported, single-item measure which represents a costless, more ecological and more pragmatic method to measure elaboration (rather than employed a costly, large scale as NC; see also Bergkvist, 2015; Bergkvist & Rossiter, 2007; for recommendations on the use of a single-item for concrete constructs). Specifically, the self-reported item evaluated how much attention participants had paid to the message. This item has been used in previous studies as part of a composite index to measure perceived elaboration (Cárdaba et al., 2014; Briñol & Petty, 2003; Barden & Petty, 2008; Petty et al., 2002). In the current study, we exclusively relied on this particular item of perceived attention in order to have a simplified, quick, and easy to administer measure.

This goal is important because it has the potential to contribute to understanding when some health communication campaigns are effective in achieving the desired outcomes of changing attitudes and the perceived durability and resistance of those changes, when the campaigns are not so successful in leading to those goals, and even when they have unexpected boomerang effects. We aimed to extend the applicability of this psychological mechanism to a new area as health psychology: attitudes toward healthy eating habits. In fact, other research has previously employed similar efficient self-reported measures of elaboration in applied settings such as social issue interventions (Cárdaba et al., 2014).

In the short-term, the specific goal was to examine that, under perceived high attention conditions, participants would show more favorable attitudes toward vegetables after reading a message composed of strong arguments. In contrast, participants who read the weak arguments would show more negative attitudes towards the vegetables under high perceived attention conditions, resulting in a reverse effect of the pro-vegetable consumption campaign. In addition, for those in the low perceived attention condition, the differences between strong and weak arguments would be reduced. With regard to the perceptions of a more stable and resistant change, the specific goal was testing that the strength of health-relevant attitudes would depend on how much attention people paid about the persuasive message such that attitudes changed under high perceived attention conditions would be perceived to be more stable and resistant than those formed under low perceived attention conditions. The effectiveness of the persuasive messages was assessed in terms of the resulting attitudes and the perceived strength of those attitudes.

## 2. Method

### 2.1. Participants

Participants were 77 undergraduate students in a public university in Madrid, Spain (52 women, 21 men and four who did not report their gender;  $M = 20.24$ ;  $SD = 4.84$ ). These students were randomly assigned to the conditions of a 2 (argument quality: strong vs. weak)  $\times$  extent of perceived attention (continuous measured variable) design. Two participants who did not complete the extent of perceived attention measure were excluded from the

analysis. The local ethic panel (i.e., Red de Comités de Ética de las Universidades Españolas) approved the viability of the study.

### 2.2. Procedure

After obtaining their consent, all participants received written instructions asking them to complete several tasks. Participants were told that their responses were completely anonymous. As part of the first task, each participant was randomly assigned to read a strong or weak message arguing in favor of vegetable consumption. After reading the message, participants reported their attitudes toward vegetable consumption and the strength of these attitudes. Participants also completed a questionnaire that included the perceived attention measure. Finally, they were debriefed, thanked, and dismissed.

### 2.3. Instruments

#### 2.3.1. Argument quality

Participants were asked to read a message arguing in favor of vegetable consumption contained four strong or weak arguments. The gist of strong arguments in favor of vegetable consumption were that vegetables have higher benefits than fruits to facilitate digestion, that eating vegetables improve the resistance and the smoothness of skin and hair, that vegetables have more fiber than any other foods, that our organism absorbs better nutrients of other foods mixed with vegetables, and that they are specially appropriate for periods of high physical and mental activity. On the other hand, the gist of weak arguments were that vegetables can be more popular than other foods according to a survey, that one waiter said that vegetables are in a lot of weddings, that vegetables are bright and vary in colors, making some dishes attractive, that a food seller says that he sells vegetables faster than other foods, and that vegetable patches are more eye-catching than others. The quality of these arguments was tested in prior research (Briñol et al., 2004; Briñol, Petty, & Wheeler, 2006; Tormala, Briñol, & Petty, 2004). It is important to note that both the strong and weak arguments argued in favor of eating more vegetable, but the strong arguments provided more compelling reasons than did the weak arguments. This manipulation should be clearly distinguished from other forms of message variations, such arguing either in favor of or against the proposal. Because the argument manipulation is used to assess how much thinking people are doing about the message, all arguments need to argue for the same position – but only with high or low convincingness. Since both sets of arguments are in favor of the issue, they may be equally persuasive if people do not think about their implications. Also importantly, both messages were equivalent in length (415 words for the strong message; 448 words for the weak message).

#### 2.3.2. Extent of perceived attention

Attention was assessed by asking participants to report their perceived attentiveness. Participants indicated the extent of their thinking about the proposal by responding to the question, “How much attention did you pay during the course of this survey?” Responses were provided a 9-point scale anchored at “low attention paid” (1) and “high attention paid” (9). Although this measure is composed by just one single-item, previous research has shown that such brief self-reports can be effective in discriminating participants who had engaged in relatively high and low thinking in particular contexts (Cárdaba et al., 2014; Briñol & Petty, 2003; Barden & Petty, 2008; Petty et al., 2002). The average and the distribution of the scores on this item were  $M = 6.77$ ,  $SD = 1.50$ . Scores on the extent of perceived attention item were not affected by the argument quality manipulation,  $F(1, 73) = .19$ ,  $p = .67$ , leading

to equivalent responses for strong ( $M = 6.85$ ,  $SD = 1.33$ ) and weak ( $M = 6.69$ ,  $SD = 1.69$ ) conditions.

### 2.3.3. Attitudes toward vegetables

Participants' attitudes toward vegetables were assessed with four 9-point semantic differential scales (dislikeable–likeable, not recommendable–recommendable, not at all tasteful–very much tasteful, not appealing–appealing). Ratings were highly intercorrelated ( $\alpha = .85$ ), so they were averaged to create a composite attitude index. The attitude index was scored such that higher numbers indicate more favorable attitudes toward eating vegetables.

### 2.3.4. Attitude strength

Participants were asked to evaluate their attitude strength by responding to a series of 9-point scales, anchored from “not at all” (1) to “very much” (9). Specifically, participants responded to the following questions: “How certain are you about your attitude toward eating more vegetables?”, “How important is your attitude toward eating more vegetables for you?”, “How stable is your attitude toward eating more vegetables?” and “How resistant to change is your attitude toward eating more vegetables?” Ratings on these four items were highly intercorrelated ( $\alpha = .82$ ), so they were averaged to form one overall attitude strength index in which higher values indicated stronger attitudes. That is, higher values indicated that participants considered their attitudes to be important, held with confidence, stable over time, and resistant to change. Similar measures have been used in previous research to illustrate attitude strength (for a review, see Rucker, Petty, & Priester, 2007).

## 2.4. Statistical analyses

All dependent measures were submitted to a multiple regression analysis as recommended by Aiken and West (1991) with argument quality (strong vs. weak; dummy coded) and extent of perceived attention (continuous variable) as the independent variables. We tested the two-way interaction using a multiple regression approach by utilizing the PROCESS macro for SPSS (model 1) (Hayes, 2013).

## 3. Results

### 3.1. Attitudes toward vegetables

Results of the argument quality  $\times$  extent of perceived attention multiple regression analysis revealed a main effect of argument quality,  $b = 0.80$ ,  $t(72) = 2.98$ ,  $p < .01$ , but no effect for extent of perceived attention,  $b = 0.39$ ,  $t(72) = 0.44$ ,  $p = .66$ . The argument quality main effect was qualified by a significant two-way interaction between extent of perceived attention and argument quality condition,  $b = 0.47$ ,  $t(71) = 2.67$ ,  $p = .01$  (Fig. 1). At relatively high perceived attention (analyzed at 1 SD above the mean), participants showed more favorable attitudes toward vegetables in the strong than in the weak argument condition,  $b = 1.50$ ,  $t(71) = 4.08$ ,  $p < .001$ . On the other hand, at relatively low perceived attention (analyzed at 1 SD below the mean), there were no differences in attitudes between strong and weak argument conditions,  $b = .09$ ,  $t(71) = .23$ ,  $p = .82$ . Describing this interaction from another perspective, there was a significant positive relationship between self-reported attention and post-message attitudes in the strong arguments condition,  $b = .32$ ,  $t(71) = 2.36$ ,  $p = .02$ . However, perceived attention did not significantly predict attitudes in the weak arguments condition,  $b = -.15$ ,  $t(71) = -1.34$ ,  $p = .18$ .

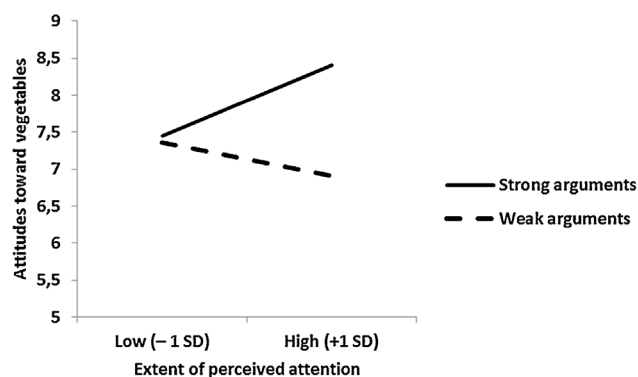


Fig. 1. Results for attitudes toward vegetables as a function of argument quality and perceived attention (graphed at +1 and -1 SD).

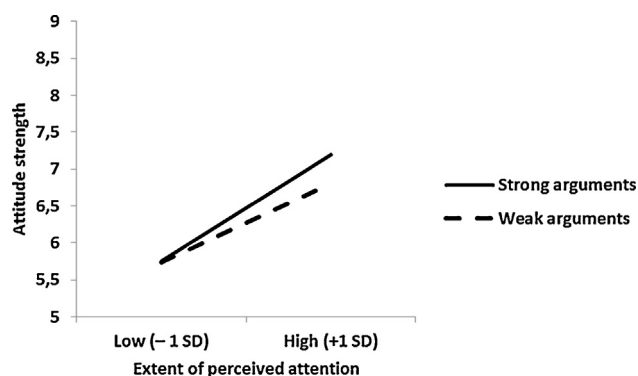


Fig. 2. Attitudes strength as a function of argument quality and perceived attention (graphed at +1 and -1 SD).

### 3.2. Attitude strength

As predicted, there was a significant main effect of the extent of perceived attention such that as participants reported paying more perceived attention to the message, they also reported stronger attitudes,  $b = .41$ ,  $t(72) = 4.00$ ,  $p < .001$  (Fig. 2). The main effect of argument quality was non-significant as was the 2-way interaction,  $ps > .54$ .

## 4. Discussion

The results of this study showed that attitudes toward vegetable consumption can be changed after reading a persuasive message. Most importantly, the present study revealed that perceived attention is a relevant variable in this domain since the results showed that the extent to which participants reported to have paid attention to the message moderated the subjective short and long-term success of the health communication. As noted, when participants reported relatively high perceived attention, an argument quality effect was observed whereby those who received the strong arguments had significantly more favorable attitudes toward eating vegetables than did those who received the weak arguments. This is consistent with the ELM that postulates that when people are thinking carefully about information, they should be affected by the merits of the proposal to a greater extent than when they are not thinking (Petty & Cacioppo, 1986, see also, Briñol & Petty, 2009).

Furthermore, the results revealed that individual differences in reported amount of perceived attention by participants predicted attitude strength. Thus, participants formed stronger attitudes toward vegetable consumption (e.g., attitudes held with more confidence) when they perceived engaging in greater attention of the persuasive message. This is consistent with the body of

research on attitude strength showing a linkage between elaboration and strength (Cárdaba, Briñol, Horcajo, & Petty, 2013; Rucker, Tormala, Petty, & Briñol, 2014). Among other things, this is important because it contributes to understand not only short-term persuasion, but also potentially long-term consequences of health communication in terms of perceived stability and resistance to change.

Attitude strength indicators have also been studied in the area of meta-cognition (for a review see Briñol & DeMarree, 2012). For example, attitude certainty has been defined as a subjective perception of validity concerning one's attitudes (Gross, Holtz, & Miller, 1995). Attitudes held with greater certainty are more resistant to change (e.g., Kiesler & Kiesler, 1969), persistent in the absence of a persuasive attack (Bassili, 1996), and more predictive of behavior. Another strength indicator that has been examined in a meta-cognitive level is importance, which refers to the extent to which people attach significance to their own attitude and care about it (Krosnick, 1988). Since importance is viewed as a psychological perception regarding one's opinion, it is frequently viewed as a thought about a thought, and therefore as a meta-cognitive element associated with the evaluation. Perceptions of the likelihood in which attitudes will be stable over time and resistant to change are also considered meta-cognitions and are conceptually and empirically different from other measures of object stability and change (Bassili, 1996). For example, a person might be sure that their attitudes will last intact for a long time while still those attitudes might fluctuate, and vice versa (see Briñol & Petty, 2012, for a review).

As noted in the introduction, understanding the amount of perceived attention underlying attitudes change is essential because it can explain why some health communication campaigns are effective in achieving the desired outcomes, why other campaigns are not so successful, and why some campaigns have been shown to have unexpected adverse effects. Thus, the persuasive message was effective in changing attitudes for participants who reported paying relatively high levels of attention to the strong message favoring vegetable consumption. That is, these participants showed more positive attitudes than other groups. This is consistent with previous research showing assimilation effects of health campaigns (Epstein et al., 2001; Flynn et al., 2007; Pettigrew & Pescud, 2012; Rodgers et al., 2016; Sacks et al., 2009) and other type of interventions based on self-persuasion strategies (Requero, Cancela, Santos, Díaz, & Briñol, 2015). However, for participants who read the weak arguments there was no difference in attitudes towards the vegetables between high and low perceived attention conditions. One possible explanation for this lack of difference is that participants in high attention condition generate arguments to compensate for the absence of convincing arguments, since the message is about a pro-attitudinal topic. Put it differently, since people have a favorable position toward the consumption of vegetables, receiving weak arguments in high attention conditions might make them generate arguments on their own that correct, compensate or complete the message. This process is not the same in low attention conditions, where people may respond simply to the number of arguments presented, or their initial gut reaction to the proposal (e.g., Petty & Cacioppo, 1986). Importantly, the relative difference between strong and weak arguments was significantly different for the perceived attention conditions.

In addition, for those in the low perceived attention condition there were no effects of argument quality (Derzon & Lipsey, 2002; Jones et al., 2004; Noar, 2006; Snyder & Hamilton, 2002). Therefore, the concept of perceived attention along with argument quality can help to understand when a health communication is associated with persuasion, resistance, or even with boomerang effects.

There are, however, both situational and individual variables that could further modify the effects uncovered in these studies.

With regard to thinking, it has been shown that perceived elaboration can be independent of actual elaboration (Barden & Petty, 2008). That is, two individuals might engage in equivalent levels of actual thought about a proposal but one might believe that he or she was relatively thorough in processing the information whereas the other might believe that he or she was not very thorough. That difference in this perceived elaboration is critical for producing the effects on attitude strength. Furthermore, perceiving that one has done more or less thinking can mean different things for different people as a function of the situation, and those naïve theories about perceived elaboration can moderate the subsequent impact on attitude strength. For example, although most of the time elaboration is associated with strength, sometimes elaboration can also be associated with difficulty, reducing attitude certainty and subsequent impact on behavior (Wan, Rucker, Tormala, & Clarkson, 2010). We suggest that our results might be more likely to occur for people who value thinking and are particularly inclined to view the activity of paying perceived attention as a sign of truth and potential accuracy. Similar work has shown, for example, that greater perceived accessibility increases attitude certainty only when people have the lay theory that quick reactions are a sign that the reported attitude is one's "true" attitude (vs. thinking quick reactions imply thoughtlessness; Tormala, Clarkson, & Henderson, 2011; see also Briñol, Petty, & Tormala 2006). Therefore, in order to develop and select appropriate intervention strategies for health communication, practitioners need to consider the amount of perceived attention and elaboration, and also the idiosyncratic and situational meanings associated with that experience.

An important avenue for future research is the exploration of whether attitudes toward eating more vegetables and attitudes toward more healthy food in general might show some additional properties associated with strength when changes are accompanied by high degrees of perceived attention. For example, although the current study focused exclusively on the exploration of perceived stability as an indicator of attitude strength, future studies should explore the extent to which the obtained findings also hold for stability when it is assessed more objectively by comparing actual attitude change at different points of time. The available research is compatible with the view that when changes in attitudes are based on extensive thinking, they tend to endure more than when they are not (Cárdaba et al., 2013; Gascó, Briñol, & Horcajo, 2010; Haugtvedt & Petty, 1992; Luttrell, Petty, & Briñol, 2016; Wegener, Clark, & Petty, 2006). Furthermore, future research can benefit from examining other potential consequences of attitude strength dependent upon the extent of perceived attention. It seems plausible to argue that changes in attitudes toward healthy food for which people perceive they have thought extensively might also be particularly resistant (Cárdaba et al., 2014), impactful for information processing and behavior (Rucker, Petty, & Briñol, 2008), and even capable of generalizing to other health-relevant attitudes (Briñol, Horcajo, Becerra, Falces, & Sierra, 2003; Horcajo, Briñol, & Petty, 2010).

### Disclosure of interest

The authors declare that they have no competing interest.

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