

Promoting healthy eating by enhancing the correspondence between attitudes and behavioral intentions

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Abstract

Background: Healthy eating campaigns are not always successful in changing food-related attitudes. Even when interventions produce the desired outcomes in attitudes, it is often challenging to translate those psychological changes into subsequent behaviors. Previous research has shown that elaboration (amount of thinking) is a critical construct for understanding the ability of attitudes to guide behavior. Instead of looking directly at objective elaboration, this study examined attitude-behavior correspondence as a function of subjective elaboration. **Method:** Participants were first randomly assigned to generate positive or negative arguments with regard to taxing junk food. After this experimental manipulation, participants reported their subjective elaboration (as an additional predictor), and their attitudes and behavioral intentions regarding the proposal (as dependent measures). **Results:** As hypothesized, the results showed that the greater perceived elaboration, the larger the ability of attitudes to guide behavioral intentions. That is, attitudes were more predictive of behavioral intentions in participants with higher levels of perceived elaboration compared to those with relatively lower levels of subjective thinking. **Conclusion:** Health initiatives can benefit from considering the extent to which participants perceive thinking about persuasive proposals.

Keywords: Healthy eating, elaboration, attitudes, behavioral intentions, persuasion.

Resumen

Promocionando la alimentación saludable a través de la mejora en la relación entre actitudes e intenciones conductuales. Antecedentes: las campañas que promueven una alimentación saludable no siempre consiguen cambiar las actitudes de las personas. Incluso cuando se cambian las actitudes, a menudo esos cambios no se traducen en los correspondientes comportamientos saludables. La investigación llevada a cabo hasta este momento demuestra que la cantidad de elaboración sobre una propuesta persuasiva constituye un constructo esencial a la hora de entender la relación entre actitudes e intenciones conductuales. En la presente investigación se estudia el papel de la elaboración subjetiva en la relación entre actitudes e intenciones conductuales dentro del contexto de la evaluación de la comida saludable. **Método:** los participantes del estudio fueron asignados aleatoriamente a generar pensamientos positivos o negativos sobre la posibilidad de aumentar los impuestos a la comida basura. Después de esta manipulación experimental, se midió la elaboración subjetiva (predictor) y las actitudes e intenciones conductuales con respecto a la propuesta persuasiva (medidas dependientes). **Resultados:** se encontró que cuanto mayor fue la elaboración percibida, mayor resultó la capacidad de las actitudes para guiar las intenciones conductuales. **Conclusión:** las iniciativas de salud pueden beneficiarse de forma significativa al incluir una medida sencilla de la elaboración percibida.

Palabras clave: alimentación saludable, elaboración, actitudes, intenciones conductuales, persuasión.

Unhealthy eating habits are related to the main causes of death in modern society (Micha, 2017; Murphy, Xu, & Kochanek, 2013; World Health Organization [WHO], 2009). For example, obesity (e.g., Body Mass Index ≥ 30 kg/m²) plays a role in cardiovascular diseases (CVD), some cancers, chronic obstructive pulmonary disease (COPD), and diabetes mellitus (Guh et al., 2009), undermining people's quality of life and well-being (Flegal, Carroll, Kit, & Ogden, 2012).

Although many initiatives have been developed to deal with the obesity problem, such as the Federal Agency-led 'Healthy

People 2020,' the prognosis is that obesity levels will increase in the United States, Mexico and England, where 47%, 39% and 35% of the population respectively are expected to be obese by 2030 (OECD, 2017). Other countries are expected to have reduced but still problematic rates. For example, in Italy, obesity rates are projected to be 13% in 2030. Even more concerning, in the case of Spain, obesity levels in the general population are projected to be 21% in 2030. Specifically, among Spaniards between the ages of 2 - 17, obesity rates are increasing at an alarming pace, with more than 10% of people currently considered obese (Aranceta-Bartrina, & Pérez-Rodrigo, 2018; INE, 2018).

Obesity also results in billions of dollars in healthcare costs and increased rates of chronic diseases because a significant portion of time and resources must be allocated to treating obesity-related diseases. For example, the total medical costs recorded for adults aged 18 and older in the US in 2013 were \$342.2 billion, of which

28.2% (\$95.82 billion) was devoted to treating obesity related illnesses – an increase of 7.6% since 2005 (Biener, Cawley, & Meyerhoefer, 2017). Similarly, the European Union has provided estimates for the combined direct and indirect costs of obesity, which in 2012 was roughly €81 billion per year (Cuschieri & Mamo, 2016).

In an attempt to combat this growing problem, researchers and practitioners have strongly advocated for the study and development of consumer programs that foster a more positive relationship with healthy foods and more negative evaluations of unhealthy food, and unhealthy food-industries and practices (e.g., Bayer, Nehring, Bolte, & Von Kries, 2014; Teixeira et al., 2015; Yoder et al., 2014). Despite the efforts aimed at promoting healthy attitudes and punishing unhealthy-related attitudes, there is limited evidence of their sustained effectiveness (Bonell, Jamal, Melendez-Torres, & Cummins, 2014; Rekhy & McConchie, 2014). Indeed, even when health communications produce the desired outcomes in attitudes, predicting the impact of the induced changes in behavior remains a challenge. In line with other researchers (Lowe, Fraser, & Souza-Monteiro, 2015; Salovey & Wegener, 2003), we propose that by examining the variables involved in the attitude change process, researchers and practitioners can understand and predict further changes in behavior and maximize the chances of designing effective research and interventions.

Attitudes regarding healthy eating and unhealthy practices are a key part of most psychological models that aim to predict healthy behaviors. As recent meta-analyses suggest, the causal influence of attitudes on intentions and behavior is very strong (McDermott et al., 2015; McEachan, Conner, Taylor, & Lawton, 2011; Sheeran et al., 2016). In this sense, although the attitude change process is critical for understanding behavior change, it is important to recognize that behavior is determined by more than individuals' attitudes, even if those attitudes are based on high elaboration. Elaboration is defined in this context as a particular kind of thinking in which people add something of their own to the specific information provided in a persuasive communication or even when no particular information is provided externally (Petty & Briñol, 2012).

Different models used by persuasive campaigns promoting healthy eating have focused on other relevant features such as social norms (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007; Tarrant & Butler, 2011), self-efficacy (Armitage, Norman, & Conner, 2002; Brug, 2008), motivational factors (e.g., theory of planned behavior, Ajzen & Fishbein, 2005; socio-cognitive theory; Bandura, 2001), or goal setting and goal pursuit (e.g., health action process approach; Schwarzer, Lippke, & Luszczynska, 2011). Thus, healthy eating is clearly a complex phenomenon shaped by multiple factors (Mata, Dallacker, Vogel, & Hertwig, 2018; Spiteri-Cornish, 2016). In order to contribute to this picture, the present work offers the science of attitude change as a foundation so that practitioners can understand and improve the efficacy of their persuasive attempts.

Therefore, because attitudes are one of the most important (though not only) determinants of behavioral intentions, exploring the variables that influence attitude change can be useful for those interested in bringing about behavioral intentions that contribute to healthy habits (see Sheeran, 2002, for a review of the intention-behavior relationship). The goal of the current work is to present evidence of the importance of considering perceived elaboration as a new variable that can be used to understand the impact of attitude change in the domain of promoting healthy eating behavior.

Elaboration is a core construct in the Elaboration Likelihood Model of persuasion (ELM; Petty & Briñol, 2012; Petty & Cacioppo, 1986), one of the earliest dual process theories that distinguished thoughtful from non-thoughtful determinants of judgment (see Sherman, Gawronski, & Trope, 2014). Briefly described, the ELM proposes that attitudes can be modified by processes that involve relatively high or low amounts of issue or object-relevant thinking or elaboration. The processes involved in changing attitudes, however, and the consequences that occur, differ depending on the amount of elaboration involved.

Although many studies have demonstrated the benefits of enhancing elaboration of the merits of compelling messages for producing attitude change, elaboration is important not only because it determines the extent of attitude change, but also because persuasion that occurs as a result of more thoughtful processes tends to be more consequential (Briñol & Petty, 2006). That is, the ELM holds that the process by which an attitude is formed or changed is a determinant of the *strength* of the resulting attitude (see Petty & Krosnick, 1995). In a classic persuasion paradigm, 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 further change, and predictive of subsequent behaviors than when the same message produces the same amount of change through a high elaboration process (e.g., enhancing thinking about the arguments presented). Thus, identifying the processes by which particular health messages foster health-promoting attitudes can be informative about not only the immediate but also the long-term consequences of the intervention.

In an early demonstration of this, Petty, Cacioppo, and Schumann (1983) manipulated participant's extent of elaboration to be high or low while they were exposed to a product advertisement. Subsequently, participants reported their attitudes and behavioral intentions to purchase the product. Results showed that attitudes were a better predictor of purchase intentions under high rather than low elaboration conditions. In addition to manipulating elaboration, the Need for Cognition Scale (NC; Cacioppo, Petty, Kao, & Rodríguez, 1986) has also been used to assess the degree to which participants were likely to engage in thoughtful elaboration. For example, a study about political attitudes showed that attitudes of individuals high in need for cognition were more predictive of voting intentions compared to individuals low in need for cognition.

In fact, social psychological research has found empirical evidence supporting how elaboration processes moderate the relation between individuals' attitudes and their intentions on several topics, ranging from political attitudes to doping substances (see Horcajo & Luttrell, 2016). Specifically, the more an attitude is based on thoughtful consideration of relevant information about an issue or topic, the more it tends to influence intentions and behaviors. However, to the best of our knowledge, these effects regarding attitude-intention correspondence have not been studied in the domain of healthy eating. Unlike attitude-behavior correspondence, other indicators of attitude strength such as attitude extremity, stability, and resistance have received more attention on this topic (see Briñol et al., 2004; Briñol, Horcajo, Becerra, Valle, & Gallardo, 2004; Clark, Wegener, & Fabrigar, 2008; Horcajo, Briñol, & Petty, 2010).

Furthermore, although attitudes tend to be consequential when they are the result of careful thinking, it has been shown

that perceived elaboration can be also important (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 careful in processing the merits of the information systematically whereas the other might believe that he or she was not that thoughtful. This difference in perceived elaboration is important for producing the effects on attitude consequences. For instance, Barden and Petty (2008) found that when people merely believed that they diligently thought about an issue such as Wi-Fi technology, their attitude on the issue better predicted their behavior even if the perception of deep thought was created experimentally without any substantive basis to it.

The present study examined the role of perceived elaboration in attitude-behavioral intention correspondence in a healthy eating context. Specifically, we examined the hypothesis that forming attitudes related to healthy eating associated with high subjective elaboration would make the attitudes more predictive of relevant behavioral intentions compared to a relatively lower subjective elaboration. In order to assess subjective elaboration we relied on a self-reported, single-item measure in which participants reported how much they thought about the proposal. This measure has the benefit of being a costless, ecological and pragmatic method to measure elaboration (rather than use a costly, large scale as NC; see also Bergkvist, 2015; for recommendations on the use of a single-item for concrete constructs). Consistent with the ELM, we expected an interaction between attitudes and elaboration on behavioral intentions such that the greater the perceived amount of thinking, the larger the correspondence between attitudes and behavioral intentions. In other words, perceived higher elaboration would affect how strongly behavioral intentions follow from participants' attitudes.

Method

Participants

Two hundred and sixty-five undergraduates (218 women, 47 men, $M_{age} = 20.48$; $SD = 3.48$) from the Universidad Autónoma de Madrid (Spain) were randomly assigned to conditions in a 2 (Thought Valence: Against vs. In Favor of junk food taxation) \times Extent of Perceived Elaboration (continuous variable) design, with Attitudes and Behavioral Intentions toward the proposal (continuous variables) serving as the dependent measures. A power analysis was conducted using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009). We could not look at prior work to obtain an estimated effect size for the predicted interaction because no prior research in the domain of healthy eating has examined the role of perceived elaboration in attitude-behavioral intention correspondence. Thus, we planned for a generic relatively small effect in multiple regression (Cohen's $f^2 = .03$; Cohen, 1988). Results indicated that the desired sample size for a two-tailed test ($\alpha = .05$) with .80 power was $N = 264$ participants. Our final sample contained $N = 265$ participants.

Instruments

Independent/predictor variables

Thought valence. Participants were randomly assigned to list either positive or negative thoughts about junk food taxation. In

the positive (negative) thoughts condition, participants were told to list as many positive (negative) aspects about junk food taxation as they could. Participants could take as long as they needed and stop whenever they wanted. This manipulation has been successful in other studies (Briñol, Gascó, Petty, & Horcajo, 2013; Gascó, Briñol, Santos, Petty, & Horcajo, 2018; Requero, Cancela, Santos, Díaz, & Briñol, 2015).

Extent of perceived elaboration. To assess the extent of perceived elaboration, we used a single-item measure that asked participants to rate the extent to which they had thought about junk food taxation. Perceived elaboration was rated on a 9-point semantic differential scale, anchored with *low thinking* (1) and *high thinking* (9). This item has been successfully used in previous research to classify participants according to their perceived elaboration in domains unrelated to health (see Barden & Petty, 2008; Cancela, Requero, Santos, Stavarakis, & Briñol, 2016; Cárdbaba, Briñol, Horcajo, & Petty, 2014; Petty, Briñol, & Tormala, 2002). Scores on perceived elaboration were not affected by thought valence manipulation, $t(263) = 0.070$; $p = .94$, [-0.286, 0.307], leading to equivalent responses for positive ($M = 7.59$, $SD = 1.19$) and negative ($M = 7.60$, $SD = 1.26$) thought conditions.

Dependent variables

Attitudes. Participants reported their attitude towards junk food taxation on four 9-point (1 - 9) semantic differential scales (i.e., negative-positive, harmful-beneficial, undesirable-desirable, bad-good). Item ratings were highly intercorrelated ($\alpha = .90$), thus were averaged to form an overall attitude index towards the proposal. Responses were scored such that higher numbers reflect a more favorable attitude whereas lower numbers reflect a less favourable attitude. These specific items were taken from previous research using the same topic in a research unrelated to subjective elaboration (Clark et al., 2008).

Behavioral intentions. To measure participants' behavioral intentions toward supporting junk food taxation, three questions were asked: (1) "To what extent would you be willing to participate in a campaign designed to promote junk food taxation?", (2) "How likely is it that you would defend junk food taxation instead of other proposal aimed at tackling the same problem?" and (3) "How likely is it that you would sign a petition in favor of junk food taxation?" (for similar items, see Briñol et al., 2013; Gascó et al., 2018; Horcajo & Luttrell, 2016). Participants responded to these items using 9-point scales ranging from 1 = *low likelihood I will do it*, to 9 = *high likelihood I will do it*. These items were averaged to form a single index ($\alpha = .81$). Higher values on this index indicated more favorable behavioral intentions to support the proposal to tax junk food.

Procedure

Participants were told that the study was about eating habits. Specifically, they were asked to think about and list either positive or negative aspects of a proposal regarding junk food taxation. After listing their thoughts, participants reported their attitudes and behavioral intentions regarding the proposal. These two variables served as our dependent measures. Finally, participants were asked to report the extent of their thinking about the proposal (predictor variable). When all measures were completed, participants were thanked and debriefed.

Data analysis

To test whether perceived elaboration moderate the mediational impact of attitudes on behavioral intentions, we conducted a bootstrapping test (n boots = 10,000) using Model 14 of the PROCESS SPSS macro provided by Hayes (2013). Correlations between variables can be found in Table 1.

Results

Results showed a significant main effect of thought valence on attitudes such that those who listed positive thoughts about taxing junk food reported significantly more favorable attitudes toward the proposal, $B = 0.710, t(263) = 3.139, p < .002, 95\% \text{ CI: } [0.264, 1.154]$. Of critical importance, the expected moderated mediation emerged between attitudes and perceived elaboration on behavioral intentions, $B = 0.108, SE = 0.041, 95\% \text{ CI: } [0.027, 0.188]$ (see Table 1). That is, this pattern revealed the indirect effect that participants' attitudes predicted intentions more strongly for participants high in perceived elaboration, $B = 0.674, SE = .217, 95\% \text{ CI: } [0.254, 1.111]$, than for participants low in perceived elaboration, $B = 0.487, SE = 0.170, 95\% \text{ CI: } [0.183, 0.850]$ (see Figure 1).

In other words, the expected interaction emerged between attitudes and perceived elaboration on behavioral intentions revealed that among participants with more positive attitudes,

Variables	1	2
1. Subjective elaboration		
2. Attitudes	.124	
3. Behavioral intentions	.135*	.760**

Note: * $p < .05$; ** $p < .001$

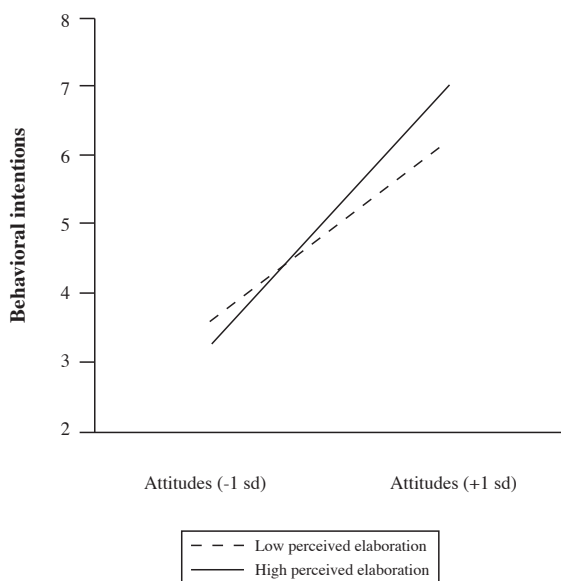


Figure 1. Behavioral Intentions as a function of Perceived Elaboration (Low vs. High) and Attitudes toward taxing junk food (graphed at +1 and -1 SD). Behavioral Intentions ranged from 1 to 9

Effects	B	SE	p
<i>Direct effect</i>			
Thought valence on Behavioral intentions	0.007	0.167	.969
<i>Indirect effect</i>			
Thought valence on Attitudes	0.709	0.226	.002
Attitudes × Perceived elaboration on Behavioral intentions	0.108	0.041	.009

those who reported relatively high levels of perceived elaboration reported greater behavioral intentions than those who reported relatively low levels of perceived elaboration, $B = 0.285, SE = .095, 95\% \text{ CI: } [0.099, 0.472]$. However, for participants who reported less favorable attitudes, no difference in behavioral intentions emerged between those who reported low vs. high levels of perceived elaboration, $B = -0.118, SE = 0.109, 95\% \text{ CI: } [-0.331, 0.096]$. Statistics of the moderated mediation can be found in Table 2.

Discussion

As predicted, participants who reported higher levels of perceived elaboration showed greater attitude–intention correspondence than those who reported lower levels of perceived elaboration. In the domain of healthy eating, this study provides the first evidence that the perceived extent of elaboration is an important determinant of the relationship between attitudes and behavioral intentions. Additionally, these data are in line with prior theory and research (Cacioppo et al., 1986; Horcajo & Luttrell, 2016; Petty et al., 1993), which shows that attitude change derived from high objective elaboration is stronger than the same attitude change produced via low objective elaboration. Importantly, the current work extends previous research on subjective elaboration (instead of actual elaboration) by demonstrating the applied utility of this construct in a relevant context such as healthy eating.

The present work also contributes to previous research designed to change food-related attitudes. Whereas previous evidence has shown that perceived elaboration can lead people to think that their attitudes will last over time (perceived stability, Cancela et al., 2016), the present research focuses on improving a different outcome: attitude-behavior correspondance. Among other things, this is important because some subjective indicators of strength (perceived stability, resistance; e.g., Luttrell, Petty, & Briñol, 2016) can sometimes change while others that are assessed more objectively (calculating attitude-behavior correspondance) can remain unchanged.

Important implications for attitude change in healthy eating and its applications for intervention programs can be derived from our findings. We argue that public health initiatives can be designed taking into consideration the construct of subjective elaboration so that the degree of attitude change and the strength of the resulting attitudes are maximally influenced. This work showed that attitudes based on high subjective elaboration predicted behavioral intentions better than attitudes based on low subjective elaboration

(e.g., Barden & Petty, 2008; Cacioppo et al., 1986). Thus, assessing subjective elaboration with a self-report single-item measure can be helpful in predicting and understanding which people are more likely to use their attitudes to guide their subsequent behavioral intentions (i.e., those relatively high in their reported subjective elaboration).

Consequently, understanding attitude change processes is critical to predicting health behaviors (McDermott et al., 2015; McEachan et al., 2011; Sheeran et al., 2016), although it is important to recognize that behavior can also be determined by factors other than individuals' attitudes, even if those attitudes are based on high elaboration. For example, the theory of reasoned action (Ajzen & Fishbein, 2005) highlights social norms (what others think you should do) as an important additional determinant of behavior. Building on this framework, the theory of planned behavior highlights the importance of a person's sense of self-efficacy, or competence to perform the behavior, in addition to one's personal attitudes and social norms.

Furthermore, as people tend to do what they have done in the past, prior behavioral habits are also an important determinant of both current and future behavior. Therefore, in some cases it can be difficult for newly-formed attitudes to overcome these established patterns of behavior (Wood, 2017). Taken together, it is clear that although attitude change can be an important first step to improving healthy eating behaviors, it might still be insufficient to produce the desired behavioral responses even if appropriate new attitudes are formed under high levels of thinking (Petty & Briñol, 2012).

In addition to these models, other factors also make an important contribution to the prediction of eating behavior. For example, social factors, such as eating in the company of others and the modeling effect (Herman, 2015), or environmental factors, such as the consumption of snacks to the detriment of meals (Bellisle, 2014), and the easy accessibility of energy-dense and highly palatable foods (Hill & Peters, 1998).

In sum, although all these other factors are relevant in this domain, this work highlights the important role of subjective elaboration, which is critical for predicting attitude change in the desired direction, and also relevant in specifying how consequential the attitude is in guiding behavioral intentions. The success of public policies designed to encourage healthier behavior (e.g., eating more vegetables, avoiding fast food diets), depends in part on the extent to which public service messages are effective in changing attitudes and subsequent behavior. Developments in the science of persuasion over the past few decades have provided

guidance on these matters. For example, despite lay beliefs that all one needs is an educational campaign, psychological research clearly demonstrates that an individual's idiosyncratic reactions to an advertising message are more important than learning its content (Petty & Cacioppo, 1986). Furthermore, based on the current results, we also have evidence regarding how the amount of perceived thinking about a healthy proposal plays a critical role in determining whether attitude changes translate into new behaviors (e.g., starting a new diet).

The current study provides valuable insights regarding the moderating role of subjective elaboration in the relationship between attitudes and behavioral intentions. There are some caveats worth mentioning. A limitation of the current work is that the subjective elaboration is measured but not manipulated. Therefore, the direction of the relationship between elaboration and attitude-behavior correspondence is not entirely clear. That is, a person might be aware of the greater predictive value of their attitudes and infer that they might have thought more in forming them (Bem, 1972; Chaiken & Baldwin, 1981). Furthermore, because it is not possible to establish a causal link between subjective elaboration and the attitude-behavior intention link, it might be that both variables are related to a third unknown factor that could be responsible for the obtained results. Even it would be possible that greater perceived elaboration might emerge precisely from engaging in little actual thinking. Future research should manipulate objective and subjective elaboration to address this limitation.

Finally, there are situational and individual variables that could further modify the effects uncovered in these results. Perceiving that one has done more or less thinking can mean different things for different people as a function of the situation, and people's naïve theories about objective and subjective elaboration can moderate the subsequent impact on attitude strength. For example, elaboration can be associated with difficulty, depletion or lack of motivation depending on the circumstances, thus reducing both attitude certainty and the subsequent impact on behavior (e.g., Job, Dweck, & Walton 2010; Labroo & Kim 2009; Wan, Rucker, Tormala, & Clarkson 2010). Therefore, people who engage in equivalent levels of perceived elaboration may have very noticeable differences in attitude strength as a function of their lay theories linking their experiences with meanings of high and low validity.

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