Consumer Persuasion: Indirect Change and Implicit Balance

Javier Horcajo and Pablo Briñol
Universidad Autónoma de Madrid

Richard E. Petty
The Ohio State University

ABSTRACT

The present research examines two main issues relevant to consumer persuasion: (1) whether automatic evaluations can change (both directly and indirectly) in response to verbal ads that engage deliberative information processing activity, and (2) whether such messages can result in spreading activation of implicit change that is consistent with balance principles. The first study showed that automatic evaluations of vegetables were more favorable after people read a health ad than a control message. The results of Study 2 showed that automatic associations toward Heineken (a brand associated with the color green) were also more favorable as a result of processing a message advocating the color green than a neutral control message. Consistent with the idea that automatic changes can be consequential not only for brands but also for consumer identity, participants of Study 3 showed more automatic self–vegetable associations after thinking about the benefits (rather than the negative consequences) of consuming vegetables. A final study revealed that false feedback increasing (vs. decreasing) self–product identity led to more favorable automatic attitudes toward the product, but only for those with relatively high scores on the implicit measure of self-esteem. Taken together, this series of studies suggests that automatic changes that result from consumer persuasion are consequential in terms of spreading activation and that they seem to respond to balance principles. © 2010 Wiley Periodicals, Inc.

Attitudes refer to the general and relatively enduring evaluations people have of all kinds of objects, including products, brands, ads, and ideas. These evaluations traditionally have been assessed with explicit measures in which the respondent is asked to report directly about his or her preferences. Thus, explicit measures are those that directly ask people to report what their evaluations are, such as "Is Diet Coke good or bad?" Although most research on attitude change has relied on explicit measures, recently a good deal of research interest has been generated by implicit measures (Gawronski & Payne, 2010; Petty, Fazio, & Briñol, 2009a; Wittenbrink & Schwarz, 2007). Indeed, such measures have been shown to be useful in generating insight into consumer behavior processes (Perkins et al., 2008). For example, Brunel, Tietje, and Greenwald (2004) found that implicit measures can be useful in predicting brand recognition and preference, as well as product usage, above and beyond traditional explicit measures. Similarly, Maison, Greenwald, and Bruin (2004) showed that implicit measures can successfully discriminate consumers' preferences for different competing brands.

Petty, Fazio, and Briñol (2009b) articulated three different meanings that have been applied to defining implicit attitude measures: indirect, automatic, and unconscious. In the first meaning, implicit measures are indirect in that they do not ask the individual to report his or her attitude, as a direct measure does (Petty, Wheeler, & Tormala, 2003). In the second meaning, implicit measures are said to tap into automatic evaluative reactions—those that come to mind spontaneously upon the mere presentation of the attitude object—rather than a more deliberative assessment that comes to mind only upon some reflection (Fazio et al., 1995). In the third meaning, implicit measures are said to tap into an attitude of which the person is unaware—an unconscious evaluation—rather than a conscious one (Kihlstrom, 2004). Although these aspects are conceptually and empirically separable (De Houwer, 2009), we refer to implicit measures in this article as measures that are both indirect and that are designed to tap into automatic evaluative reactions, whereas explicit measures are characterized by requiring at least some deliberative self-report. We do not assume that implicit measures tap into unconscious reactions.[1]

The present research examines two main issues relevant to consumer persuasion as measured with implicit measures. First, we examine whether automatic evaluations can change (directly and indirectly) in response to ads that contain propositional information and that are processed deliberatively. Second, we study the extent to which deliberative messages can lead to spreading activation of implicit changes that follow the principles of psychological balance (Heider, 1958).

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[1] Assessing a person's automatic evaluative reactions is important because such measures can often bypass social desirability concerns and have been shown to have a pervasive influence on spontaneous information processing, judgment, and behavior (Fazio, 1995; see Petty, Fazio, & Briñol, 2009a, for a review). In contrast, deliberative attitudes are especially important in predicting behaviors that are undertaken with some degree of thought (Dovidio et al., 1997). Although implicit and explicit measures often yield the same outcome (e.g., both reveal that a person likes Diet Coke), sometimes these measures are discrepant. Because implicit and explicit measures of attitudes are useful in predicting behavior separately (Greenwald et al., 2009) and in combination (Briñol, Petty, & Wheeler, 2006), it is useful to understand how each is modified by various persuasion techniques.

AUTOMATIC CHANGE AS A FUNCTION OF ADVERTISEMENT

After a long tradition of assessing the impact of persuasion treatments on attitudes solely with deliberative self-reports (Eagly & Chaiken, 1993; Petty & Wegener, 1998), more recent work has assessed attitude change with implicit measures that are designed to tap more automatic evaluations (Petty & Briñol, 2010). Early assumptions about the nature of automatic evaluations suggested that such attitudes would be very difficult to change, in part because the underlying associations were assumed to be learned over a long period of time. For example, automatic evaluations reflecting prejudice have been viewed as resulting from long-term exposure to negative portrayals in the media (Devine, 1989) and long-standing status differences between groups. As a result of this view, researchers initially assumed that automatic evaluations are stable, enduring, and resistant to change (Bargh, 1999; Dovidio et al., 1997; Fazio et al., 1995; Greenwald, McGhee, & Schwartz, 1998). In addition, based on their origin and nature, measures of automatic evaluation have often been thought to be insensitive to changes in conscious thought processes.

Indeed, the growing research on the malleability of implicit measures of attitudes has demonstrated that simple associative processes requiring little thinking can sometimes affect automatic evaluations when there is no impact on an explicit measure. Some researchers have even suggested that implicit measures are influenced *only* by simple associative processes (Banaji, 2004; Gawronski & Bodenhausen, 2006; Rydell & McConnel, 2006; Rydell et al., 2007). For example, classical conditioning and mere exposure are two relatively automatic processes that require little elaboration and rely on multiple exposures. Consistent with the idea that automatic attitudes can be changed with these mechanisms, Olson and Fazio (2001) showed that automatic evaluations were sensitive to classical conditioning procedures that used 20 pairings of the target attitude objects and the unconditional stimuli. Using a similar paradigm, Dijksterhuis (2004) found that automatic evaluations of the self were affected by subliminal evaluative conditioning trials (15 pairings) in which the word "I" was repeatedly associated with positive or negative trait terms (see also Petty et al., 2006; Walther, 2002). Also consistent with this approach, research on automatic prejudice has shown that implicit measures can be changed using paradigms that involve exposing individuals repeatedly to either positive or negative examples of out-group members (for reviews, see Blair, 2002; Fazio & Olson, 2003; Gawronski & Bodenhausen, 2006).

Thus, the accumulated research is generally consistent with the idea that implicit measures of attitudes can be affected by processes that require low elaborated thinking. This is similar to classic findings that explicit attitudes are changed by such low elaborated processes when situational or individual factors conspire to make the likelihood of thinking low (Petty & Cacioppo, 1986). In other words, just as automatic attitudes have been postulated to predict more automatic behaviors than controlled attitudes (Dovidio, Kawakami, & Beach, 2000), so too has it been assumed by some theorists that automatic attitudes should be changed by more automatic processes than deliberative attitudes (e.g., Rydell & McConnell, 2006). For example, relevant to the consumer domain, Plessner et al. (2004) looked at the effect of time pressure on product choice of recycled versus non-recycled writing pads and found that implicit attitudes predicted product choice only when subjects were required to make the product

choice within a 5-second response window. In contrast, explicit measures predicted product choice when there was no response window limitation.

The general notion of the need to match particular attitude change processes with particular attitude measures has received considerable theoretical attention and some empirical support. Based on some of the literature to date, some theorists have argued that automatic and controlled attitudes respond to very different change techniques. On the other hand, a variety of other findings from the attitude change literature call into question imposing a sharp boundary between automatic and conscious processes and consequences. For example, previous research has shown that low effort (relatively non-thoughtful) processes such as classical conditioning and mere exposure can influence both controlled (Staats & Staats, 1958; Zajonc, 1968) and automatic (Olson & Fazio, 2001) attitudes. In addition, explicit attitudes changed as a result of elaborating persuasive arguments have been found to have consequences for attitude accessibility (Bizer & Krosnick, 2001; Petty, Haugtvedt, & Smith, 1995), a dimension that operates outside conscious awareness (Fazio, 1995). And, just as extensive thinking can influence attitude accessibility, so too can the mere rehearsal and repetition of an attitude without thinking (Brauer & Judd, 1996; Fazio, 1995). These findings suggest that automatic processes can influence controlled attitude outcomes and that controlled processes can influence automatic attitude outcomes. Given that such findings appear to contradict a clear separation of automatic and controlled processes with respect to attitude change, it is critical to more clearly explore these cases in order to understand how automatic and controlled aspects of mental life are related.

OVERVIEW OF THE PRESENT RESEARCH

The primary goal of the present research was to examine whether automatic evaluations can be affected by traditional rhetorical persuasive arguments and to explore the extent to which those changes are consequential and can lead to further indirect automatic changes. In the first study, participants received a persuasive message composed of relevant versus irrelevant arguments. In this experiment we assessed automatic evaluations related to the proposal of the advertising. It is already well established that individuals who engage processing of ads tend to change their explicit attitudes in the direction of the arguments contained in the message if those arguments are strong (Petty & Cacioppo, 1986; Petty & Wegener, 1998). Our aim here was to examine if extensive message processing would produce the same outcome on a measure of automatic evaluation. After assessing whether automatic evaluations can be influenced by traditional persuasive messages, we examined whether those changes would be consequential in terms of spreading activation to related constructs. Participants in Study 2 were exposed to a compelling message in favor of the color green. Instead of measuring automatic evaluations of the color green in this study, we examined indirect automatic change by using an IAT toward the brand Heineken—a brand associated with the color green.

Studies 3 and 4 were designed to examine implicit balance in consumer persuasion (Greenwald et al., 2002). Specifically, our third study examined whether automatic change would spread to the self. Participants were asked to generate arguments in favor of or against including more vegetables in their diet, and then

completed an implicit measure designed to assess the automatic link between vegetables and the self. Consistent with the idea that spreading activation responds to principles of psychological balance (Heider, 1958), we predicted that spreading activation to the self would only occur for those with high (but not low) implicit self-esteem. That is, in balance theory, if people associate vegetables with good (due to the persuasive treatment) and think that they are also good (i.e., high self-esteem), they should come to associate themselves with vegetables. If they do not have high self-esteem, however, it would be imbalanced to associate themselves with something (vegetables) that is seen as good. A final study examined the dynamic implicit balance between the three concepts examined previously (self, vegetables, and valence). Participants in this study received false feedback about their self-concept to increase or decrease the perceived self–product linkage, and the impact of that treatment was assessed on an implicit measure of consumer attitudes (i.e., the link between the product and its valence), controlling for the scores on implicit self-esteem (i.e., the link between the self and its valence). This design allowed us to examine whether changes in self-perceptions could subsequently influence automatic evaluations in a manner consistent with implicit balance. Taken together, this series of studies systematically examined the extent to which automatic changes that result from consumer persuasion are consequential in terms of spreading activation and whether this spreading activation followed principles of psychological balance.

STUDY 1: AUTOMATIC CHANGE AS A FUNCTION OF ADVERTISEMENT

Study 1 was designed to provide an initial exploration of whether processing consumer persuasive messages could influence automatic evaluations. As noted earlier, previous studies have produced changes in automatic evaluations with inductions that did not require issue-relevant thinking, such as classical conditioning (Olson & Fazio, 2001). In our first study, participants read an advertisement composed of compelling arguments in favor of consuming vegetables or they read a neutral message. Participants were asked to think carefully about the message and to complete an apparently unrelated IAT that was designed to assess automatic evaluations relevant to the proposal of the message. We expected automatic evaluations toward vegetables to change as a result of the advertisement.

Method

Participants. Seventy-nine undergraduate psychology students (75.9% females, 24.1% males) enrolled at the Universidad Autónoma de Madrid participated in partial fulfilment of a course requirement. Participants were randomly assigned to read the consumer persuasive or the neutral message.

Procedure. Upon arrival, participants were seated at individual computer stations and were randomly assigned to read either a neutral message or an advertisement in favor of vegetable consumption. After reading the message, all participants were told that it was important to complete an apparently unrelated word categorization task.

Independent Variable: Message vs. Control. Participants were asked to read an advertisement with strong arguments in favor of vegetable consumption, or to read an irrelevant message about a neutral topic. The quality of these arguments was tested in prior research (Tormala, Briñol, & Petty, 2004). An example of argument in favor of vegetable consumption was that vegetables have more vitamins than most supplements on the market, making them particularly beneficial during exam and workout periods. The neutral topic was an editorial related to interior design in which the word vegetable was also mentioned explicitly to control for the accessibility of the attitude object itself. All participants were asked to think carefully about the message.

Dependent Measures: Automatic Attitudes Toward Vegetables. Automatic attitudes were assessed using the IAT (Greenwald, McGhee, & Schwartz, 1998). Participants classified target concepts (represented by "vegetable" or "animal") and attributes (represented by "good" and "bad") using two designated keys on the computer keyboard. "Vegetable" category words were represented by the words *lettuce*, *plant*, *vegetable*, *growing*, and *garden*; the "animal" category was represented by the words *meat*, *fauna*, *cow*, *mammalian*, and *cattle*. "Good" category words included *positive*, *success*, *happiness*, *joy*, and *pleasure*; "bad" category words included *negative*, *failure*, *pain*, *illness*, and *sadness*. All stimuli were presented in Spanish.

The test was similar to the original IATs used by Greenwald, McGhee, and Schwartz (1998), and included seven blocks of trials. Blocks 1, 2, and 5 were practice blocks for which participants made single categorizations (*vegetable* vs. *animal*, *good* vs. *bad*). In the remaining blocks, participants discriminated *good* versus *bad* words and *vegetable* versus *animal* words on separate trials within the same block. In Block 4, participants used one response key to indicate if a word belonged to the *animal* or *bad* categories and the other key if the word belonged to the *vegetable* or *good* categories. In Block 7, participants used one response key to indicate if a word belonged to the *animal* or *good* categories and the other key if the word belonged to the *vegetable* or *bad* categories. Blocks 3 and 6 were combined blocks that served as practice for Blocks 4 and 7. Only data from Blocks 4 and 7 were used to compute IAT scores. The main dependent variable (IAT score) was computed by subtracting participants' average response latencies during Block 4 from their average response latencies during Block 7. Higher scores on this IAT measure represented more favorable automatic evaluations of vegetables (i.e., stronger automatic associations between vegetable and good).

Following typical procedures, stimuli used in the IAT task appeared within a centered white window on the computer monitor. Reminder labels were positioned on top of the stimuli on the left and right side. Summary feedback was provided at the end of each practice block informing participants about their average response latency and percentage of errors for that block. All practice trials in the IAT were administered in five blocks. Data-collection trials, consisting of combined target + attribute classifications, were collected in two blocks. Within each block, stimuli were randomly selected without replacement, and no more than two consecutively presented stimuli belonged to the same category. To correct for anticipatory responses and momentary inattention, latencies shorter than 300 ms and longer than 3000 ms were recorded as 300 ms and 3000 ms, respectively. Response latencies were then log transformed to normalize the

distribution. Further details about the IAT procedure are provided by Greenwald, McGhee, and Schwartz (1998).

Although IAT scores are not immune to faking, there is substantial evidence concerning psychometric properties of IAT measures (Egloff & Schmukle, 2002; Greenwald & Farnham, 2000; Greenwald & Nosek, 2001; Lane et al., 2007; Nosek, Greenwald, & Banaji, 2007). IAT measures have typically displayed good internal consistency (Bosson, Swann, & Pennebaker, 2000; Dasgupta & Greenwald, 2001; Greenwald & Farnham, 2000; Greenwald & Nosek, 2001); IAT measures are not influenced by wide variations in subjects' familiarity with IAT stimuli (Dasgupta et al., 2000; Ottaway, Hayden, & Oakes, 2001); and IAT measures are relatively insensitive to procedural variations such as the number of trials, the number of exemplars per concept, and the time interval between trials (Greenwald, McGhee, & Schwartz, 1998; Nosek, Greenwald, & Banaji, 2005). Test–retest reliability of IAT measures was recently reported to have a median value of $r = 0.56$ across nine available reports (Nosek, Greenwald, & Banaji, 2007). Finally, Greenwald et al. (2009) have recently reviewed 122 research reports (184 independent samples, 14,900 subjects), and found predictive validity for IAT measures. In this extensive review, both IAT and self-report measures displayed incremental validity, with each measure predicting criterion variance beyond that predicted by the other.

Results and Discussion

Scores on the implicit measure of attitudes toward vegetables were submitted to an analysis of variance. As expected, participants showed relatively more favorable attitudes toward vegetables after reading the relevant persuasive message ($M = 0.84, SD = 0.12$) than after reading a neutral control message [$M = 0.60, SD = 0.21, F(1,77) = 40.26, p < 0.001$]. This finding is consistent with the idea that automatic evaluations can change as a result of receiving consumer persuasive messages. Reading strong arguments in favor of eating vegetables, relative to reading neutral arguments, led participants to more favorable automatic evaluations of vegetables. Thus, the preference for vegetables over meat significantly increased after receiving the advertisement.

Consistent with the idea that asking participants to read an ad can influence implicit measures, we found automatic evaluations toward vegetables to change as a result of the persuasive message. These findings are consistent with some prior research suggesting that automatic evaluations as measured by the IAT can sometimes change in response to advertisements (Czyzewska & Ginsburg, 2007; Maio et al., 2009; Park, Felix, & Lee, 2007) and other treatments involving verbal information (e.g., Petty et al., 2006; Teachman & Woody, 2003; see Gawronski & Bodenhausen, 2006, for a review). Although this research demonstrates that automatic evaluations can be influenced by traditional persuasive messages, it is unclear what the psychological processes were underlying the obtained effects, and whether those changes were consequential.

In the present study, since we asked participants to read the content of the arguments, we presume that the observed changes on automatic evaluations were likely due to the careful consideration of the merits of the strong arguments. However, it is also plausible that participants just counted and relied on the number of arguments presented in favor of the proposal (Petty & Cacioppo,

1984) or may have followed another low-effort process such as mere exposure or classical conditioning. For example, just by looking at the message superficially (i.e., without reading the content of the arguments) a person might have developed a simple association between vegetables and good (Olson & Fazio, 2001). Or they might have simply attended to the position of the message and reasoned that the culture favors vegetables (Olson & Fazio, 2004). As was the case with explicit measures (Petty, Haugtvedt, & Smith, 1995), we argue that understanding the processes by which consumer messages impact automatic evaluations can be informative about the consequences of implicit persuasion.

Consequences of Implicit Persuasion. Contemporary theories of persuasion such as the Elaboration Likelihood (ELM; Petty & Cacioppo, 1981, 1986; Petty & Wegener, 1999) and Heuristic-Systematic (HSM; Chaiken, Liberman, & Eagly, 1989) models hold that although persuasion can occur when thinking is relatively high or low, the consequences of the attitude change induced are different in each situation. In particular, the ELM holds that the process by which an attitude is formed or changed is consequential in a number of ways (Petty, Haugtvedt, & Smith, 1995). According to the ELM, attitudes formed or changed through processes that require highly elaborated thinking tend to be more persistent, resistant to change, and predictive of behavior than attitudes changed via less elaborated processes. This is because elaboration of persuasive messages typically involves accessing relevant information from both external and internal sources, making inferences, generating new arguments, and drawing new conclusions about the merits of the attitude object that result in both structural changes and enhanced attitude certainty (Petty & Cacioppo, 1986). These mental activities involve people adding something of their own to the information available and are likely to lead to the integration of all relevant information into the underlying structure for the attitude object, therefore making the adopted evaluation not only stable, but also coherent and resistant.

Although considerable research has demonstrated that extensive thinking enhances the strength of explicit attitudes (see Petty, Haugtvedt, & Smith, 1995, for a review), it is less clear that the same consequences would hold for automatic attitudes. Thus, just as understanding the nature of the processes by which explicit measures of attitudes change has been essential because it is informative about the immediate and long-term consequences of these changes, so too might it also be relevant for understanding the consequences associated with changes in implicit measures of attitudes. An important question to explore would be the extent to which the automatic changes obtained as a result of deliberative thinking about advertisements show evidence of strength. As noted, attitude strength can be demonstrated in many different ways, ranging from enhanced accessibility to influence on related thought processes and behavior.

We conducted a second study to test whether automatic attitudes might show some properties associated with strength when changed through processes that involve highly elaborated thinking processes. For example, attitude change processes that require thinking deeply about the attitude object are likely to result in attitude representations that are well integrated and connected with other relevant material in memory (McGuire, 1981; Tesser, 1978). Because of the strong linkage among constructs associated with more highly elaborated thinking processes, activating one mental representation should activate related cognitive elements easily. Indeed, within the literature on explicitly assessed

attitudes, there is some suggestive evidence that it is easier to activate related constructs for high than low need for cognition individuals (Petty et al., 2008; Smith, Haugtvedt, & Petty, 1994). That is, highly elaborated processes of thinking appear to result in spreading activation from one changed concept to a related concept. An important question to examine would be to what extent this argument holds for automatic attitudes. As a very first step in examining this possibility, we tested whether changes resulting from elaborated processes on an attitude object assessed with an automatic measure show evidence of spreading change to another related construct also assessed with an automatic measure.

STUDY 2: SPREADING AUTOMATIC ACTIVATION TO BRANDS

The main goal of this study was to test whether asking people to think about persuasive messages would be consequential in terms of spreading activation when assessed with measures of automatic evaluation. Participants were told that they were helping out with research designed to assess possible changes in the institutional color of their university. Half of the participants were randomly assigned to receive a persuasive message containing strong arguments in favor of using green as the institutional color for their university. The other half of the participants, who composed the control group, received an irrelevant message (also containing the word "green," but not advocating it). Then, instead of assessing the impact of this persuasive induction directly on automatic evaluations of the direct, relevant object (the color green), we assessed the impact of the treatment on an automatic measure that was only indirectly related to that concept.

Specifically, to assess indirect change, we constructed an IAT on the brand *Heineken* since the logo of that brand is green and uses the slogan "think in green" in many of their marketing campaigns. We predicted that implicitly measured attitudes toward Heineken would be significantly affected by the message. Thus, participants presumably would not only change their automatic responses toward the focal attitude object (as suggested by the first study), but also their automatic responses to other objects related to the focal one. That is, we expected more favorable automatic evaluations of Heineken for the group that received the arguments in favor of the color green than for the control group. These findings would provide preliminary evidence suggesting that for implicit measures, asking people to think about persuasive messages can lead to associated changes on automatic measures through a process of spreading activation (from green to Heineken).

Method

Participants. Sixty-nine undergraduate psychology students (82.6% females, 17.4% males) enrolled at the Universidad Autónoma de Madrid participated in partial fulfillment of a course requirement. Participants were randomly assigned to read a persuasive message or a neutral message.

Procedure. Participants began this study by reading a cover story that led them to believe they were taking part in a study designed to examine potential

changes at their university. Specifically, participants were told that they were helping out with research designed to assess possible changes in the institutional color of their university (i.e., the color green). Unlike typical U.S. universities, university colors in Spain are an unfamiliar topic for most students. In fact, most students do not know their institutional color and have no prior opinion about it. First, participants in the treatment condition were told that they were going to receive a message on a campus issue regarding the color that the university should adopt. Half of the participants were randomly assigned to receive a persuasive message containing strong arguments in favor of using green as the institutional color for the university; the other half received a control, neutral message. In order to increase the motivation to read the messages, participants were told that they were part of a very small sample of students that would have the opportunity to provide their reactions toward the proposal. After reading the persuasive message or the control message, all participants were asked to complete an apparently unrelated IAT that was designed to assess automatic evaluations toward Heineken.

Independent Variable: Message vs. Control.

Participants were asked to read a persuasive message with strong arguments in favor of the color green or read an irrelevant message about a neutral topic. The strong arguments in favor of the institutional color highlighted the following: Research found that the performance and satisfaction of everybody would improve if green was the color adopted by the university; recent research revealed that green is associated with more creativity in students, and it induces higher levels of mental concentration; and several studies have found that people exposed to green report lower levels of stress, which leads to an improvement in a number of mental and physical tasks. The neutral message was an editorial related to interior design and decoration in which the word green was also mentioned explicitly several times to control for mere exposure to the word green. Previous research has revealed that when people are requested to think about this persuasive message composed of compelling arguments, they generate mostly favorable thoughts about the green proposal (Horcajo, Petty, & Briñol, in press).[2]

Dependent Measures: Automatic Attitudes Toward Heineken.

An IAT was administered in which participants classified target concepts (represented by "Heineken" or "Coronita") and attributes (represented by "good" and

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[2] Although our previous research has clearly shown that this message is efficient in producing favorable thoughts and explicit attitudes toward green, we decided to conduct a pilot test to examine whether it would also produce more positive responses on an implicit measure. Specifically, 62 participants (80.6% females, 19.4% males) received either the persuasive message about green or the control message. Automatic attitudes toward the color green were assessed using the IAT (Greenwald, McGhee, & Schwartz, 1998). Participants classified target concepts (represented by "green" or "others") and attributes (represented by "good" and "bad") using two designated keys. "Green" category words were represented by the words *grass, lettuce, cucumber, pea,* and *fern;* the "others" category was represented by the words *mandarin, cloud, blood, chocolate,* and *sun*. "Good" and "bad" categories words included the same words used in the previous study. The dependent variable (IAT score) was computed such that higher scores represented more favorable automatic evaluations of the color green (i.e., relatively stronger automatic associations between green and good). As expected, the results showed that participants' automatic attitudes measured with IAT were more favorable toward green after reading the relevant persuasive message ($M = 0.43$, $SD = 0.19$) than after reading the neutral control message [$M = 0.32$, $SD = 0.23$, $F(1,60) = 4.78$, $p < 0.05$]. Given these results obtained in the pilot study, in this study we focused on whether there would be subsequent differences in the automatic attitudes toward Heineken (i.e., indirect implicit attitude change).

"bad") using two designated keys. Heineken brand category words were represented by the words *Heineken*, *Dutch*, *European*, *Amsterdam*, and *Regular*. In this IAT we used the Coronita beer brand as the contrast category, and this category was represented by the words *Mexican*, *Lemon*, *Coronita*, *Mexico*, and *Mild*. "Good" and "bad" categories words included the same words used in Studies 1 and 2 (pilot study). Higher scores on this IAT measure represented more favorable automatic evaluations of Heineken.

Results and Discussion

Scores on the implicit attitudes toward Heineken were submitted to an analysis of variance. As expected, participants showed relatively more favorable automatic responses toward Heineken after reading the green persuasive message ($M = 0.06, SD = 0.25$) than after reading a neutral control message [$M = -0.06$, $SD = 0.25$, $F(1,67) = 4.38$, $p < 0.05$]. These findings revealed that implicitly measured attitudes toward Heineken were significantly affected by the persuasive message. Thus, participants in this study presumably changed not only their automatic responses toward green (as suggested by the pilot study), but also their automatic responses to other objects related to green. These findings provide preliminary evidence that suggests that for implicit measures, thinking about persuasive messages can lead to associated changes on automatic measures through a process of spreading activation (from green to Heineken). As noted earlier, it seems plausible that the generation of thoughts allowed participants to rehearse their evaluative links to green repeatedly, leading to changes in evaluation of this color that spread to related constructs such as Heineken. Although we did not measure thoughts to examine this assumption, it is important to note that both messages repeatedly exposed participants to the word green, so the mere accessibility of the green concept is not likely to account for the differences obtained toward the consumer brand.

These findings are also consistent with research in persuasion suggesting that persuasive messages can sometimes produce not only direct but also indirect changes in explicit measures. For example, in the classic minority influence paradigm, participants receive persuasive information that is endorsed by either a numerical minority or a majority source. The traditional result for this paradigm is that although minorities produce little change on explicit measures directly linked to the attitude object, they can sometimes produce change on explicit measures indirectly related to the proposal (e.g., changing on birth control when the message is on abortion; Mugny & Perez, 1991). This finding can be interpreted in terms of elaboration differences with minority sources leading to more deliberative processing of the information compared to majority sources (Baker & Petty, 1994; Moscovici, Mucchi-Faina, & Maass, 1994). If participants exposed to minority sources engage in greater message processing, then change on indirect topics becomes more likely as the implications of the information on the direct topic percolate through the cognitive system and impact related beliefs (e.g., see McGuire, 1981). Thus, prior research on explicit persuasion supports the current findings with respect to indirect explicit change.

Study 2 showed that attitudes toward Heineken can become more favorable as a result of thinking about a persuasive message advocating the color green. If our instructions fostered elaboration of the arguments contained in the

message, these findings provide some evidence suggesting that for implicit measures, deliberative processes can lead to changes on automatic measures through a process of spreading activation (i.e., from green to Heineken). The next study examined whether this spreading activation can also produce indirect implicit changes in the self.

STUDY 3: SPREADING AUTOMATIC ACTIVATION TO THE SELF

After showing that spreading activation can occur at the implicit level, the next studies examined the principles that regulate those effects. Specifically, we examined the extent to which balance principles (Abelson et al., 1968; Festinger, 1957; Heider, 1958) apply to this domain of consumer persuasion. Heider proposed that three elements in a cognitive system (self, other, object) could either be in an evaluatively balanced state (i.e., a person agreeing about the value of some object with another person who was liked, or disagreeing about the value of some object with another person who was disliked) or in an imbalanced state (e.g., a person disagreeing about the value of some object with another person who was liked, or agreeing about the value of some objects with another person who was disliked). Importantly, Heider held that imbalanced systems were unpleasant and unstable and tended to move toward balance.

Recently, Greenwald et al. (2002) proposed a Unified Theory of Implicit Social Cognition in which the essential ingredients of Heider's theory of psychological balance were applied to automatically activated cognition. The elements in the Unified Theory are self, group or attribute, and valence. In this framework, the self can be automatically associated with one or more (nonvalenced) group or attribute concepts (e.g., female), and the self and group can be automatically associated with a particular valenced node (e.g., positive/negative). Greenwald et al. (2002) examined the coherence among these three constructs. For example, in one study conducted with female students on gender identity, the authors measured three types of associations: self–gender (gender identity), self–valence (self-esteem), and gender–valence (gender attitude). In line with the predictions of balance theory, they found that in-group attitude was the result of a multiplicative function of the strengths of in-group identity and self-esteem (Greenwald et al., 2002). That is, the stronger the automatic associations between the self and female and the self and good, the stronger the automatic linkage between female and good. Also consistent with the implicit balance notion, subsequent work by Brunel, Tietje, and Greenwald (2004) revealed that Macintosh computer users showed stronger automatic evaluative associations for that brand relative to PC users, as revealed both in positivity and in self associations. Indeed, objects, products, and brands can be part of the self-concept and contribute to defining one's identity (e.g., Aaker, 1999; Belk, 1988; James, 1890; Kleine, Kleine, & Kernan, 1993; Wicklund & Gollwitzer, 1982).

Taken together, this work suggests that just as there is a need for consistency (balance) at the explicit level, so too might there be a need for consistency at the implicit level. Importantly, whereas most previous research has focused mainly on the examination of implicitly measured constructs (e.g., the self, an object or a group, and valence), the present research examines the possibility of a more dynamic approach to balance by manipulating the relationship between

two concepts and assessing their consequences for the relationship with the third concept.

Specifically, in Study 3, rather than asking participants to think while reading a persuasive message, they were asked to generate only pro arguments in favor of a specific issue or only counterarguments against it. Specifically, participants were asked to generate arguments in favor of or against including more vegetables in their diet. Previous research has shown that participants are able to comply with this instruction, and that this is an effective way to create different profiles of thoughts regarding an issue (Killeya & Johnson, 1998; Rucker & Petty, 2004). The benefit of this procedure is that it more directly biases the valence of participants' thoughts.

Following the argument generation task, we measured automatic attitudes toward vegetables, and then we measured the automatic link between vegetables and the self. Consistent with the idea that generating arguments can lead to consequential automatic changes, participants in this study were expected to show more automatic self–vegetable associations after thinking about the benefits (rather than the negative consequences) of consuming vegetables, but only if they held positive automatic attitudes about themselves. People who do not like themselves would not be expected to show a greater self-linkage with vegetables if vegetables are good. If anything, people who hold negative attitudes about themselves would be expected to show a stronger self-linkage with vegetables when vegetables were disliked rather than liked. These results would be consistent with the idea that automatic spreading activation responds to balance principles (Gawronski, Bodenhausen, & Becker, 2007; Greenwald et al., 2002; Walther & Trasselli, 2003). Implicit self-esteem was measured using an IAT (Greenwald & Farnham, 2000; Greenwald et al., 2002).

Method

Participants. Forty-eight students (83.3% females, 16.7% males) enrolled at the Universidad Autónoma de Madrid participated in the study in exchange for extra credit in their introductory psychology course. Participants were randomly assigned to think in favor of (or against) including more vegetables in their diet.

Procedure. All participants were told that the study was designed to evaluate a bunch of new measures related to personality. Under this framework, participants were first asked to complete a self-esteem IAT. Then, as part of an unrelated task, participants were asked to generate arguments in favor of or against including more vegetables in their diet. Following the argument generation task, participants were asked to complete two implicit measures: the IAT measures to evaluate automatic attitudes toward vegetables, and the automatic link between vegetables and the self.

Independent Variables. *Direction of Thoughts*. Participants were instructed to think about either pro arguments in favor of including more vegetables in their diet or counterarguments against including more vegetables in their diet. In the pro argument condition, participants were told to list as many favorable thoughts toward including more vegetables in their diet as possible (i.e., positive thoughts toward the vegetables), whereas in the unfavorable thoughts condition they were told to list as many unfavorable thoughts toward including

more vegetables in their diet as possible (i.e., counterarguments toward vegetables). Instructions were adapted from those used by Killeya and Johnson (1998).

Implicit Self-Esteem (Self–Good Association). Before the argument generation task, implicit self-esteem was measured using an IAT task (Greenwald et al., 2002). The experimenter told participants that the task measured some dimensions of the self. In this IAT, participants classified target concepts (represented by "me" or "other") and attributes (represented by "good" and "bad") using two designated keys. The "me" category was represented by the words *I*, *self*, *my*, *me*, and *own*; the "other" category was represented by the words *they*, *them*, *your*, *you*, and *other*. The "good" and "bad" categories words included the same words used in previous studies. The difference in response latencies for *me + bad* and *other + good* trials versus *other + bad* and *me + good* trials provided a measure of relative automatic self-esteem. Higher scores showed higher implicit self-esteem.

Dependent Measures. *Automatic Attitudes Toward Vegetables (Vegetable–Good Association).* This implicit measure was identical to the one used in Study 1 to assess the impact of persuasive messages. Higher scores on this implicit measure indicated more positive automatic evaluations toward vegetables.

Automatic Self–Vegetable Association. At the end of the experimental session, participants were asked to complete a final IAT measure. The self–vegetable IAT used the same Self versus Other contrast that was used for the self-esteem IAT. For the vegetable (vegetable vs. animal) contrast, vegetable was represented by the same words used in Study 1. The difference score for the self–vegetable IAT measure was computed such that higher scores represented greater association of self with vegetable.

Results and Discussion

Scores on the implicit measure of attitudes toward vegetables and scores on the self–vegetable association were submitted to a hierarchical regression analysis with thought direction (dummy coded) and implicitly measured self-esteem (continuously scored) as the predictors. Scores on implicit self-esteem were centered by subtracting the mean from each person's score (Aiken & West, 1991). Main effects were interpreted in the first step of the regression, and the two-way interaction in the second step (Cohen & Cohen, 1983).

Automatic Attitudes Toward Vegetables. A main effect of thought direction emerged [$\beta = 0.29$, $t(45) = 2.03$, $p < 0.05$], revealing that the automatic evaluations of vegetables were more favorable after thinking in favor of ($M = 0.22$, $SD = 0.23$) than after thinking against consuming vegetables ($M = 0.09$, $SD = 0.19$). Thus, the manipulation was successful in producing a relative difference in attitudes, though it was not successful in producing automatic negative evaluations (in absolute terms) of vegetables in the unfavorable thoughts condition.

Automatic Self-Vegetable Association. Of greatest interest, the two-way interaction between the thought direction and implicit self-esteem was marginally significant [$\beta = 0.31$, $t(44) = 1.68$, $p < 0.10$]. This interaction reveals that there was a significant difference between high and low self-esteem individuals

for the condition in which participants' thoughts were in favor of the vegetables [$\beta = 0.41$; $t(20) = 2.02$; $p = 0.05$], but not for the condition in which participants' thoughts were against the topic. A reversal of the results was not obtained, most likely because generating negative thoughts about vegetables, though successful in rendering attitudes less favorable than generating positive thoughts, was unsuccessful in producing negative automatic evaluations toward vegetables.[3]

The studies conducted so far revealed that being asked to think about persuasive messages not only can change automatic responses toward the advocated attitude object (Study 1), but can also change automatic evaluations of other objects related to that object (Study 2), including subsequent changes in connections to the self (Study 3). These findings suggest that for implicit measures, asking people to process persuasive arguments can lead to associated changes on automatic measures through a process of spreading activation that seem to respond to implicit balance principles. After providing supportive evidence for implicit balance between the self, vegetables, and attitudes (valence), we conducted a final experiment to further examine the implications associated with implicit balance.

STUDY 4: CHANGING AUTOMATIC EVALUATIONS BY PERCEIVED IDENTITY IN THE SELF

The main goal of this study was to test the equilibrium between the three concepts (self, vegetable, and valence) by experimentally manipulating a different relationship. Specifically, we manipulated the link between the self and the consumer product (vegetables) by providing participants with false feedback about their self-concept. For some participants, we increased the self–vegetable linkage; for others, we decreased the self–vegetable linkage. After this manipulation, we assessed its effect on the implicit measure of consumer attitudes toward vegetables (i.e., the link between the product and its valence), controlling for the scores on implicit self-esteem (i.e., the link between the self and its valence). We predicted that the false feedback increasing the self–product linkage would lead to more favorable implicit attitudes toward the product, but only for individuals with high implicit self-esteem. For those with low self-esteem, increasing the link between self and vegetables should lead vegetables to be viewed less positively. Hence, our prediction was for a false feedback × self-esteem interaction on implicit attitudes toward vegetables.

Method

Participants. Fifty-four students (74.1% females, 25.9% males) enrolled at the Universidad Autónoma de Madrid participated in the study in exchange for extra credit in their introductory psychology course. Participants were randomly assigned to conditions of a false feedback increasing or decreasing the self–product linkage.

Procedure. All participants were told that the study involved the self-concept and personality. They were instructed that a reaction time task would assess the

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[3] The difference between the two manipulated conditions was not statistically different as a function of implicit self-esteem.

association between their self-concept and vegetables. They then completed the self–vegetable IAT and received feedback on their scores. Regardless of their actual scores on the IAT, participants were randomly assigned to receive false feedback about their personality. Specifically, participants were randomly assigned to receive feedback that their self is (or is not) highly associated with vegetables (vs. animals). Then participants were asked to complete two other IAT measures to evaluate the association between self and good (implicit self-esteem), and the association between vegetables and good (the main dependent variable).

Independent Variables. *False Feedback (Implicit Self–Vegetable Association).* We developed an experimental procedure to manipulate the extent to which participants would associate the concept vegetable (or animal) with their self-concept. All participants were first asked to complete the self–vegetable IAT described in Study 3 as an ostensible study on personality self-concept research. Following this IAT task, and regardless of their scores on the implicit measure, participants received the false feedback induction. Specifically, they were told that their responses were being analyzed by the computer. After a few seconds, a new computer screen appeared with the ostensible outcome of this comparison. Specifically, participants were randomly assigned either to the condition in which they were told that their self was associated with vegetables or to the condition in which they were told that their self was associated with animals. More concretely, participants were exposed to a computer outcome and were told either that "you are strongly associated with vegetables" or that "you are strongly associated with animals." This kind of manipulation based on a false self-concept feedback has worked successfully in the past to influence people's beliefs about themselves (Briñol et al., 2004; Petty, Briñol, & Tormala, 2002). Research using implicit measures has also revealed that changes in categorization can influence automatic responses relevant to the self (see Gawronski & Sritharan, 2010 for a review).

Implicit Self-Esteem (Self–Good Association). After the false feedback, implicit self-esteem was measured with an IAT task (Greenwald et al., 2002). The experimenter told participants that the task measured other dimensions of the self. The IAT used to measure implicit self-esteem included the categories Self, Other, Good, and Bad. Words were the same as used in previous studies.

Dependent Measures: Implicit Attitudes Toward Vegetables (Vegetable–Good Association). At the end of the experimental session, participants were asked to complete one more IAT measure, which was used as a criterion measure of attitude change toward the product (i.e., vegetables). This implicit measure was the same as described in Studies 1 and 3. An index of automatic associations between vegetable versus animal and good versus bad was created based on participants' responses latencies. Higher scores on this automatic measure indicated more positive evaluations of vegetables.

Results and Discussion

Scores on the implicit measure of attitudes toward vegetables were submitted to a hierarchical regression analysis with false feedback (dummy coded) and implicitly measured self-esteem (continuously scored) as the predictors. Scores on implicit self-esteem were centered by subtracting the mean from each person's

score (Aiken & West, 1991). Main effects were interpreted in the first step of the regression and the two-way interaction in the second step (Cohen & Cohen, 1983).

A main effect of false feedback emerged [$\beta = 0.41, t(50) = 3.15, p = 0.003$], revealing that the automatic evaluations of vegetables were more favorable after receiving the false feedback that their selves were associated with vegetables ($M = 0.19, SD = 0.19$) than after receiving the false feedback that their selves were associated with animals ($M = 0.005, SD = 0.24$). Of greatest interest, the two-way interaction between the false feedback and implicit self-esteem was significant [$\beta = 0.34, t(50) = 2.74, p = 0.009$]. To examine the basis of this interaction, the interaction was decomposed by using the re-centering procedure advocated by Aiken and West (1991). This procedure revealed that the effect of false feedback was restricted to high self-esteem participants (analyzed at $+1\,SD$ from the mean) [$\beta = 0.76, t(50) = 4.28, p < 0.001$]. In contrast, among low self-esteem participants (analyzed at $-1\,SD$), there was not a significant effect of false feedback [$\beta = 0.08, t(50) = 0.44, p = 0.66$]. This would be expected if the low self-esteem group was not sufficiently low in self-esteem to produce a reversal. Consistent with this possibility, automatic associations between self and negativity were not found for this sample when looking at the IAT scores in absolute terms. Of course, if low self-esteem individuals truly disliked themselves at an automatic level, they would be expected to show greater dislike for vegetables when the self was associated with vegetables than with animals.

In sum, the predicted interaction revealed that as the scores on the implicit measure of self-esteem increased, the implicitly measured attitudes toward vegetables tended to increase for the self–vegetable feedback condition [$\beta = 0.28, t(27) = 1.46, p = 0.15$], but decreased for the self–animal feedback condition [$\beta = -0.42, t(23) = -2.25, p = 0.03$]. Thus, scores on implicitly measured self-esteem moderated the effect of the false feedback on consumer product evaluations. That is, linking vegetables (vs. animals) to the self made attitudes toward vegetables more favorable primarily when people had high self-esteem. When self-esteem was low, no significant effects were obtained, although the effect tended to be reversed, as expected by balance theory.[4]

GENERAL DISCUSSION

Past research on persuasion has shown that persuasive messages can produce direct and indirect changes on explicit measures of attitudes. Several lines of research on consistency have also revealed that these changes are consistent with a balance model of spreading activation. The present research provides support for similar conclusions in the domain of implicit measures. Consistent with prior research conducted with explicit measures, the present studies provide preliminary evidence suggesting that for implicit measures, asking participants to think about persuasive messages can also lead to associated changes on automatic measures through a process of spreading activation guided by the attainment of psychological balance.

Our first study demonstrated that implicit attitude change can occur in response to verbal consumer persuasion. Specifically, participants were asked to read a communication composed of compelling arguments in favor of consuming

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[4]   The results remained significant when controlling for the initial scores in the self–vegetable IAT.

vegetables or to read a neutral message. After thinking about the message, participants had to complete an apparently unrelated task (an IAT) that was designed to assess automatic evaluations relevant to the proposal of the message. Consistent with the idea that persuasive messages processed under thoughtful conditions can influence implicit measures, we predicted and found that automatic evaluations of vegetables were more favorable in the persuasive message than in the control condition.

Although the first study demonstrates that automatic evaluations can be influenced by traditional persuasive messages, it did not clarify whether those changes were consequential. The second study revealed that the changes on automatic measures that result from asking participants to think about persuasive messages can be consequential in terms of spreading activation. Specifically, participants in this study were exposed to a compelling message in favor of the color green. We measured indirect automatic change by using an IAT toward the brand Heineken—a brand associated with the color green. The results showed that automatic associations toward Heineken became more favorable as a result of the message advocating the color green, suggesting that thinking about persuasive messages can lead to indirect changes on automatic measures through a process of spreading activation (i.e., from green to Heineken).

The third study of this series provided further evidence for this strength-related consequence by looking at the spreading activation of implicit changes to the self. Participants were asked to generate arguments in favor of or against including more vegetables in their diet, and completed an implicit measure designed to assess the automatic link between vegetables and the self. Consistent with the idea that automatic changes can be consequential, participants showed more automatic self–vegetable associations after thinking about the benefits (rather than the negative consequences) of consuming vegetables. Furthermore, consistent with the idea that this spreading activation responds to balance principles, we predicted and found that these effects were only apparent for those with high (but not low) implicit self-esteem (i.e., those who have stronger automatic associations between the self and good). For low implicit self-esteem individuals, there was a nonsignificant tendency for stronger associations between self and vegetable to be found after thinking about the negative consequences (rather than the benefits) of consuming vegetables.

After showing that thinking about persuasive messages can produce direct changes in the automatic responses toward the advocated attitude object and even further changes to other related objects (including brands and the self), a final study was conducted to extend those findings to other treatments. This study provided evidence for the dynamic balance between the three concepts under examination (self, vegetable, and valence). Specifically, participants received false feedback about their self-concept to increase or decrease the perceived linkage between self and vegetables, and the impact of that treatment was assessed on an implicit measure of consumer attitudes (i.e., the link between vegetables and its valence), as moderated by scores on implicit self-esteem (i.e., the link between the self and its valence). We predicted and found that the false feedback increasing the self–product linkage led to more favorable implicit attitudes toward the product, but only for those with relatively high scores on the implicit measure of self-esteem.

Taken together, these four studies shed light on the two issues outlined earlier relevant to consumer persuasion. On the one hand, it seems clear that automatic evaluations can change (directly and indirectly) in response to verbal ads.

On the other hand, the spreading activation of implicit changes not only affects brands related to the attitude object but also can be associated with automatic changes in the self. Consistent with the idea that implicit balance principles play a role in these subsequent changes, implicit self-esteem moderated some of the obtained results. In sum, this series of studies suggests that automatic changes that result from consumer persuasion are consequential in terms of spreading activation and that they seem to respond to balance principles.

Implications for Attitude Change

The present studies demonstrated that automatic evaluations as assessed with an IAT can be affected not only by relatively simple associative processes (as amply documented in prior research) but also by traditional elaborative forms of rhetorical persuasion. Across several different studies, manipulations, topics, and messages, we found automatic evaluations to be sensitive to the persuasive arguments contained in the message. These findings qualify some original views suggesting a need to match experimental treatments and measures such that automatic measures are only malleable to the extent to which the induction is also relatively unconscious or nonpropositional (e.g., Dasgupta & Greenwald, 2001).

In another illustration of this view, Gawronski, Strack, and Bodenhausen (2009) have argued that automatic evaluations are sensitive to associative processes that are fast and require little cognitive capacity but not to propositional thinking, which often requires a large amount of cognitive capacity. In contrast with low-effort associative processes, propositional thinking is assumed to require more extensive thinking since it implies an evaluation of declarative knowledge as true or false (see Gawronski & Bodenhausen, 2006, for a review). According to Gawronski and Strack (2004), for example, dissonance-related phenomena are inherently propositional, with inconsistency between two or more propositions being resolved either by explicitly rejecting one proposition as false or by finding an additional proposition that resolves the inconsistency (Kruglanski, 1989). Based on these considerations, Gawronski and Strack (2004) predicted and found that counter-attitudinal behavior under conditions of low situational pressure affected deliberative but not automatic attitudes. Although the null effect on automatic measures across conditions is open to multiple interpretations, this finding was explained as a matching effect between the extent (and type) of thinking in the attitude change induction and the nature of the measure. According to Gawronski and Strack (2004), controlled attitudes changed as a result of counter-attitudinal behavior because the process of dissonance reduction requires a thoughtful consideration of the propositional representation of cognitive elements. In contrast, automatic attitudes would not change as a function of counter-attitudinal behavior unless dissonance reduction processes were operating through a low-effort mechanism such as self-perception (Bem, 1972) or the activation of simple counter-attitudinal associations (e.g., Blair, Ma, & Lenton, 2001). In contrast with this strict matching assumption (between certain change strategies with attitude measures), the present studies revealed that asking people to think about persuasive messages containing propositional information can influence their (direct and indirect) automatic evaluations in response to those messages.

Furthermore, in reviewing the available evidence of context effects on automatic attitudes, a number of researchers have questioned whether the obtained variations on automatic measures reflected real or stable changes in automatic evaluations. Based on the results obtained in the present research, we argue that changes on automatic evaluations that result from elaborating the merits of the attitude object might be relatively stable over time and resistant to change. Consistent with the literature on traditional attitude change (e.g., Eagly & Chaiken, 1993; Petty & Cacioppo, 1986) and attitude strength (e.g., Petty & Krosnick, 1995), we surmise that stability and resistance of automatic evaluations are most likely to occur when people elaborate carefully on the relevant information. That is, although automatic evaluations seem to be sensitive to both low-effort processes (e.g., classical conditioning and mere exposure) and high-effort processes (e.g., elaboration of persuasive messages), we only expect automatic evaluations changed through more highly elaborated thinking processes to carry the consequences associated with attitude strength, at least in the context of changes induced in short-term laboratory studies. In other words, just as elaboration can determine the strength of controlled attitudes, so too might it determine the strength of automatic evaluations. Of course, simple associations over a longer period can potentially induce long-lasting changes, but these non-thoughtful changes, though persistent, may not be resistant to counter messages because people have a weak basis to defend their attitudes (Petty, Haugtvedt, & Smith, 1995). These issues await future research.

Finally, our studies might not only have implications for automatic attitudes, but might provide some potential insights for the study of explicit persuasion. For example, recent research has demonstrated that when people appear to have resisted persuasion on traditional measures, there might be some potentially important, yet previously hidden, persuasive effects on the confidence with which people hold those apparently unaffected attitudes (e.g., Rucker & Petty, 2004; Rucker, Petty, & Briñol, 2008; Tormala & Petty, 2002). It is plausible to imagine that under some circumstances, although participants were not influenced by persuasive messages on explicit self-report measures (e.g., as a result of demand characteristics, evaluation apprehension, impression management, social desirability, and self-awareness limitations), automatic evaluations might still be affected (e.g., Tormala, Briñol, & Petty, 2004). That is, when people appear to have resisted persuasion on explicit measures, there might still be some potentially hidden persuasive effects on the automatic evaluative associations that exist with respect to the attitude object (e.g., Forehand & Perkins, 2005). If so, then researchers might sometimes be able to use automatic measures in the same way that researchers have used attitude confidence—as a way of indicating that a message has had some hidden persuasive effect.

In closing this section, it is important to note that these implications should be taken in view of some potential limitations of the present research. For example, although our studies demonstrated that automatic evaluations can be influenced by persuasive messages, it is unclear what psychological processes were underlying the obtained effect. In Study 1, for instance, since participants were asked to read the content of the arguments, we argued that the observed changes on automatic evaluations were likely due to the careful consideration of the merits of the strong arguments. Furthermore, the results on indirect change in Study 2 suggest that the obtained changes were consequential in terms of spreading activation, an implication often associated with processes

that require elaborated thinking. However, it is plausible to speculate that the obtained effects resulted from relatively low-effort processes or the applications of heuristics (e.g., based on the position or the length of the message; Petty & Cacioppo, 1984). Since the findings of the present studies do not allow us to examine whether (and how much) participants elaborated the information received, future research should include measures (and experimental variations) in elaboration likelihood (see Briñol, Petty, & McCaslin, 2009, for an extended discussion on this point).

Implications for Implicit Balance

As noted earlier, Greenwald et al. (2002) proposed a Unified Theory of Implicit Social Cognition, in which the implicit self-concept is defined as the automatic association of the concept of self with one or more (nonvalenced) attribute concepts, and implicit self-esteem as the automatic connection of the self node to a valenced (positive/negative) node. Applying the implicit balance notion to the consumer domain, Brunel, Tietje, and Greenwald (2004) found that Macintosh users show more positive automatic evaluative associations for that brand relative to PC users. The present research has several advances over previous work on implicit balance. The most important of these extensions has to do with moving from static to more dynamic views of implicit balance in consumer persuasion (Gawronski, Walther, & Blank, 2005; Langer et al., 2009; Walther, 2002). That is, whereas most previous research has focused on the examination of implicitly measured constructs (e.g., the self, an object or a group, and valence), the present research took a more experimental approach to examine implicit balance. That is, our studies moved from what can be considered a relatively descriptive approach based on correlational evidence to a more dynamic approach by manipulating the relationship between two concepts and assessing their consequences for the relationship with the third concept. Our evidence suggests that regardless of whether one takes a relatively static description (as in past research) or a more dynamic approach of the balance between concepts (as in the present research), the results are highly consistent with the notion of implicit balance originally proposed by Greenwald et al. (2002). However, it is important to note that whereas we have argued that elaboration might play a critical role in the automatic spreading activation effects obtained in Study 2, it is less clear whether such extensive thinking is as critical in the spreading activation that results from implicit balance.

In closing, we argue that there might be potential implications from this work for designing applied interventions. As suggested by our studies, automatic associations can be affected by manipulating the automatic associations with other related constructs. For example, we manipulated attitudes toward a concept (e.g., green) and found changes in automatic associations toward a related object (i.e., the Heineken brand). Future research should examine whether similar inductions could also translate into indirect automatic changes in other objects related to green, such as ecologically friendly products (and identities), or toxic substances with this color (e.g., marijuana).

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Correspondence regarding this article should be sent to: Javier Horcajo, Department of Psychology, Universidad Autónoma de Madrid, Campus de Cantoblanco 28049, Madrid, Spain (javier.horcajo@uam.es).