GRUPO EDITORIAL DE PSICOFUNDACIÓN

Psicothema (2024) 36(1) 46-54

Psicothema

https://www.psicothema.com/es • ISSN 0214–9915

Colegio Oficial de Psicólogos del Principado de Asturias

Psicothema

Article

Changing Attitudes About a Pro-Environmental Proposal Concerning Solar Power: The Self-Validating Role of Ingroup Versus Outgroup Sources

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ARTICLE INFO

Received: December 07, 2022
Accepted: March 03, 2023

Keywords:
Ingroup-outgroup
Environmental protection
Attitudes
Metacognition
Validation

ABSTRACT

Background: In this study, we examined whether a persuasive message in favor of a pro-environmental proposal could influence attitude change through a self-validation process when individuals were told that the source of the proposal belonged to their ingroup (vs. their outgroup). **Method:** Participants read a message that advocated for the use of solar power. Immediately following the message, participants were asked to list their thoughts regarding the persuasive proposal. A thought favorability index was created for each participant. Following the thought-listing task, participants received the experimental manipulation (i.e., ingroup vs. outgroup source) based on the minimal group paradigm, after which they reported their attitudes towards the proposal. **Results:** A regression analysis showed the predicted interaction between thought favorability and type of source (i.e., ingroup vs. outgroup) on attitudes towards the solar power proposal. According to our expectations, thought favorability was a better predictor of attitudes for participants in the ingroup (vs. outgroup) source condition. **Conclusions:** Attitudes can be polarized as a function of ingroup versus outgroup differentiation through a self-validation process.

Cambio de Actitudes Hacia una Propuesta Pro-ambiental Sobre Energía Solar: el Rol de Auto-Validación de Emisores del Endogrupo Versus Exogrupo

Palabras clave:
Endogrupo-exogrupo
Protección ambiental
Actitudes
Metacognición
Validación

RESUMEN

Antecedentes: En la presente investigación, examinamos si un mensaje persuasivo a favor de una propuesta pro-ambiental puede influir en el cambio de actitudes a través de un proceso de auto-validación cuando a los participantes se les dice que el emisor de la propuesta pertenece a su endogrupo (vs. su exogrupo). **Método:** Los participantes leyeron un mensaje que abogaba por el uso de la energía solar. Inmediatamente después del mensaje, se pidió a los participantes que listaran sus pensamientos con respecto a la propuesta persuasiva. Se creó un índice de favorabilidad de los pensamientos para cada participante. Después de esta tarea, los participantes recibieron la manipulación experimental (i.e., emisor del endogrupo vs. exogrupo) basada en el paradigma del grupo mínimo. Finalmente, informaron de sus actitudes hacia la propuesta. **Resultados:** Un análisis de regresión mostró la interacción esperada entre la favorabilidad del pensamiento y el tipo de emisor (endogrupo vs. exogrupo) sobre las actitudes hacia el uso de energía solar. Como se hipotetizó, la favorabilidad del pensamiento fue un mejor predictor de las actitudes para los participantes en la condición de endogrupo (vs. exogrupo). **Conclusiones:** Las actitudes pueden polarizarse en función de la diferenciación entre endogrupo y exogrupo mediante un proceso de auto-validación.

Cite as: Santos, D., Horcajo, J., Gil, R., & Guyer, J. J. (2024). Changing attitudes about a pro-environmental proposal concerning solar power: The self-validating role of ingroup versus outgroup sources. *Psicothema, 36*(1), 46-54. https://doi.org/10.7334/psicothema2022.502
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To successfully address social issues as important and controversial as climate change, researchers have suggested that people's attitudes and behaviors regarding the issue must change (Chen, 2016; Rode et al., 2021; Stanley & Wilson, 2019). Obviously, identifying potential solutions to climate change, such as the use of renewable energies, can be especially difficult when access to the technology and infrastructure required to implement these solutions is not readily available. This issue is particularly important given that renewable energy solutions have been shown to be an effective means by which people can reduce their environmental footprint (Kelsey & Meckling, 2018). However, even in countries where access to the necessary technology and infrastructure does not prevent the implementation of renewable energy solutions, the proportion of the population actively using renewable energy is extremely low. As an illustration, consider the case of solar power. For example, according to Statista Research Department (2020, 2022), solar power represented 3.5% of the total power generated within Spain in 2019, yet only 1.8% of the population used photovoltaic panels in their homes in 2021. This figure is similar to that of other countries within the European Union (EU), whose average use of solar power accounted for 3.1% of the total power output in 2021 (Solar Power Europe, 2021). By comparison, in the United States, solar power accounted for only 2.3% of the total power output in 2021, and roughly 4% of homes used this type of energy in 2020 (U.S. Energy Information Administration, 2021).

Given the comparatively small segment of the population that has adopted solar power, a relevant societal goal might be to improve the attitudes people have towards the adoption of renewable energies (e.g., solar power) as a mean to promote pro-environmental behaviors. Importantly, social psychological research has identified a broad range of determinants that influence attitude change (e.g., see Petty & Wegener, 1998). Most relevant to the present research, a wealth of data has accumulated regarding the study of how one's group membership and other group variables can differentially influence attitude change toward a persuasive proposal (see Hogg, 2016; Papastamou et al., 2017; for a review). Thus, the aim of the present research was to understand how and why a proposal perceived as coming from the ingroup (vs. the outgroup) can produce changes in attitudes related to solar power. This goal is relevant both from a scientific and applied perspective because a better understanding of this process can help us address important contemporary issues related to preserving the environment.

Drawing on the self-validation theory (SVT, Briñol & Petty, 2022), in the current study we propose that ingroup identification will serve to magnify the impact of whatever mental content is currently available in individuals' minds after they were exposed to a persuasive proposal. The SVT holds that the extent of reliance on one's thoughts can affect attitude change (see Petty et al., 2002). Thought reliance can originate from both cognitive (i.e., thought confidence: "I'm sure that my favorable thoughts towards solar power are true") or affective (i.e., thought liking: "I like my favorable thoughts towards solar power") validation. Thus, thought validation implies thinking about thinking (i.e., metacognition). In fact, the SVT proposes that simply generating thoughts in one direction or the other (i.e., favorable or unfavorable thoughts) in response to a persuasive proposal is not sufficient for those thoughts to affect attitude change. Crucially, the extent to which thoughts affect attitude change (and the downstream consequences of thoughts on behaviors) is based on whether people rely on their thoughts when forming (or changing) attitudes and making decisions. That is, thoughts have a greater impact on attitudes to the extent that people are confident in (or like) their thoughts. For instance, when individuals have confidence in (or like) their favorable thoughts in response to a persuasive proposal, they will form more favorable attitudes towards that proposal than when they doubt (or do not like) their favorable thoughts. In contrast, when individuals have confidence in (or like) their unfavorable thoughts in response to a persuasive proposal, they will form more unfavorable attitudes than when they doubt (or do not like) their unfavorable thoughts. Furthermore, because prior research has supported the finding that attitudes formed or changed via thoughtful (i.e., high elaboration) processes are stronger (i.e., more persistent, resistant to subsequent change, and predictive of behavior) than attitudes formed or changed by non-thoughtful (i.e., low elaboration) processes (e.g., Cárdaba et al., 2013, 2014; Horcajo & De la Vega, 2014; Horcajo & Luttrell, 2016; see Petty & Cacioppo, 1986), thought validation is expected to produce strong attitudes which predict behavior (see Briñol & Petty, 2022, for a review). This finding may be especially important in the context of a persuasive proposal aimed to change individuals' behavior regarding the use of renewable energies (e.g., solar power), as a mean of environmental protection against climate change.

Previous studies guided by the SVT have often required participants to carefully read a proposal (usually in the form of a persuasive message advocating in favor of a topic), after which they are randomly assigned to list their favorable or unfavorable thoughts in response to that proposal. Next, participants are randomly assigned to either a high or low validation condition (see Briñol & Petty, 2022). Participants assigned to the high validation condition typically report more confidence (or liking) in the validity of their thoughts about the proposal compared to those who are assigned to the low validation condition. The rationale is that inducing validation of one's thoughts should increase the subsequent impact of thought favorability (usually manipulated with different message conditions, such as strong vs. weak arguments) on target-relevant attitudes compared to when inducing invalidating (or less validating) information that suggests one's thoughts are less valid. In other words, by increasing confidence in (or liking of) one's thoughts, thought favorability can predict attitudes to a greater extent than decreasing confidence in (or liking of) thoughts.

In a seminal illustration of the SVT (Petty et al., 2002; Study 3), participants' thought validation was manipulated by asking them to think about past situations in which they experienced either confidence or doubt. In concert with the SVT, results indicated that, among participants who reported high elaboration, their thoughts previously generated in response to a message had a greater effect on attitudes when individuals recalled instances of confidence (vs. doubt). Contemporary research guided by the SVT has manipulated thought validation using a variety of inductions, ranging from those linked to the recipient, such as emotional states (Briñol et al., 2007, 2018), the perceived origin of one's thoughts (Gascó et al., 2018), or in even more subtle ways, such as embodiment manipulations (e.g., head movements, Briñol & Petty, 2003; Horcajo et al., 2019a), to inductions linked to the source, such as source credibility (e.g., Briñol, et al., 2004), to name just a few (see Briñol & Petty, 2009, 2022, for a review).

Most relevant for the present study, prior research has demonstrated that other variables related to the source, such as majority versus minority source status, can also influence persuasion via the metacognitive process of thought validation (Horcajo et al., 2010, 2014, 2017). Specifically, when information about the numerical (majority vs. minority) source status is introduced after exposure to a persuasive proposal, source status can influence attitude change by affecting how confident recipients are in their proposal-relevant thoughts. In a study by Horcajo and colleagues (2010; Study 1), participants first read a message about a new company that was composed of either strong or weak arguments. This induction was designed to manipulate thought favorability, whereby the strong message produced more favorable message-relevant thoughts than the weak message. In contrast, the weak message produced more unfavorable message-relevant thoughts than the strong message. Immediately after the message, participants listed their thoughts regarding the new company (i.e., thought-listing task). Next, source status was manipulated by attributing the message to a source in the numerical minority or majority. Specifically, participants were led to believe that a recent survey of students who visited the company revealed that either a majority or a minority of them liked and supported the company (i.e., 86% vs. 14% of their fellow students supported the company). The results showed that majority source status led participants to rely on their thoughts more than minority source status. As a consequence, majority (vs. minority) source status magnified the effects of thoughts on attitudes, leading to more positive (or negative) attitudes in response to more favorable (or unfavorable) thoughts, and this attitude change was mediated by thought confidence.

In another study relevant to the present research, participants listed their thoughts in response to a persuasive proposal, after which they were told that their thoughts were going to be analyzed by the computer and compared with a pool of thoughts generated by two thousand students from their own university (Petty et al., 2002). Importantly, half of the participants were told that their thoughts were rejected because they were very different to the thoughts listed by other students from their university (i.e., only 8% of their thoughts were similar). The other half of the participants were told that their thoughts had been accepted because they were very similar to the thoughts listed by other students from their university (i.e., 87% of their thoughts were similar). The results showed that the perceived validity that emerged from the similarity between participants' thoughts and those of other students from their university polarized their attitudes. That is, more (vs. less) persuasion occurred when participants generated favorable (vs. unfavorable) thoughts toward the proposal and were told that their thoughts were similar to other students from their university. On the contrary, when participants were told that their thoughts were dissimilar to other students from their university, the influence of those thoughts on their attitudes was not as impactful.

In the present study, we aimed to extend prior research by examining the self-validating role of ingroup (vs. outgroup) sources. Specifically, based on the minimal group paradigm (see Tajfel, 1970), we explored whether a source produced persuasion, through a thought validation process, to a greater extent when individuals were told that the source belonged to their ingroup than when the source belonged to their outgroup. That is, our main goal was to explore the self-validating role of a different source characteristic because, as noted, prior research has demonstrated that some characteristics of the source (e.g., majority status, high credibility) are associated with greater perceived validity than others (e.g., minority status, low credibility). We propose that if the source of the message is perceived as ingroup (rather than outgroup), then this can enhance thought validity, thereby increasing the subsequent effect of thoughts on attitudes. There are reasons to believe that receiving a message from an ingroup might validate individuals' thoughts compared to an outgroup. Some of the reasons that led to this theorizing came from social identity theory (SIT; see Hogg, 2016; Tajfel & Turner, 1979). At a basic level, SIT seeks to explain the processes and outcomes around the idea that a person's self-concept is, at least in part, derived from their real or perceived membership in social groups. For instance, research has shown that socially categorizing a person into a group typically produces a pattern of responses that favor the ingroup and disfavor the outgroup (Tajfel et al., 1971). Thus, the ingroup is valued more than the outgroup; which carries downstream consequences for both attitudes and behaviors. This is also true regarding attitudes related to the environmental domain. Prior research has shown that attitudes held by the ingroup sources influence pro-environmental attitudes and actions of those within the group (e.g., Schultz & Fielding, 2014; see Fielding & Hornsey, 2016, for a review), and individuals do so for a number of reasons, including because they perceive ingroup members as more knowledgeable, credible, trustworthy, and likable than outgroup members (e.g., Foddy et al., 2009; Tanis & Postmes, 2005). This raises the possibility that messages coming from the ingroup (vs. outgroup) may lead recipients to rely more on their thoughts. In line with this possibility, previous research on self-validation has demonstrated that thoughts that have an internal (rather than external) perceived origin are seen as more valid (Gascó et al., 2018). Thus, given that an ingroup is more likely to be considered as an extension of the self, compared to an outgroup, we expected that messages originating from an ingroup would produce thought reliance to a greater extent than messages originating from an outgroup. To test our assumptions, we designed the present study.

In this study, participants were required to read and think carefully about a message coming from a group advocating for the use of solar power. The message was composed of arguments in favor of using solar power and the development of solar plants. Because the arguments could be perceived as varying in quality, immediately following the message, participants were asked to list up to five thoughts generated while reading the message. After the study was finished, two independent judges coded the valence of participants' thoughts, assessing each thought as favorable, unfavorable, or neutral regarding the proposal. That is, each participant received a score indicating their thought favorability. Following the thought-listing task, participants received the experimental manipulation (i.e., ingroup source vs. outgroup source). The message source was manipulated based on the minimal group paradigm. Importantly, participants were randomly assigned to read a description stating that the message they just read about solar power was written by people from either their ingroup or their outgroup (i.e., Kandinsky/Klee). That is, when they were assigned to the ingroup condition, the message came from people who preferred the same painting

as participants preferred, whereas when they were assigned to the outgroup condition, the message came from people who preferred the other painting. Finally, participants reported their attitudes (assessed by semantic differential scales), then completed several socio-demographic variables.

According to the SVT and previous research, we hypothesized the following:

Hypothesis 1: We predicted a main effect of thought favorability on attitudes towards the use of solar power. Thus, we expected an association between thought favorability and attitudes, whereby more favorable thoughts would be associated with more positive attitudes, and more unfavorable thoughts with more negative attitudes.

Hypothesis 2: One way to examine the influence of thought validation on attitude change is to analyse the relationship between thought favorability and attitudes as a function of the validating variable (in this study, ingroup vs. outgroup source). In line with prior self-validation research, we predicted a significant interaction between thought favorability and type of source (i.e., ingroup vs. outgroup) on attitudes towards the solar power proposal. Specifically, we hypothesized that thought favorability would better predict attitudes for participants in the ingroup (vs. outgroup) source condition, thus suggesting that participants in the ingroup condition relied on their thoughts to a greater extent than participants in the outgroup condition when subsequently reporting their attitudes to the persuasive proposal. Described differently, for participants receiving the proposal from the ingroup source, we predicted more favorable thoughts would be associated with more positive attitudes, and more unfavorable thoughts would be associated with more negative attitudes. However, for participants receiving the proposal from the outgroup source, we expected that the thought-attitude relationship would be attenuated or even eliminated.

Method

Participants

Given that no prior research has specifically analyzed our hypothesized interaction (i.e., hypothesis 2), we conducted an a priori power analysis using G*Power (Faul et al., 2009), which assumed a generic medium value for the interaction effect size (Cohen's f = 0.25). Results of this analysis suggested that the desired sample size for a two-tailed test (α = .05) with 0.80 power was N = 128. Our final sample (N = 134) was slightly above that number. Thus, one hundred and thirty-four (87 who identified as females, 64.9%; 47 who identified as males, 35.1%) undergraduate psychology students from IE University (Spain) voluntarily participated in this study. The age of the participants ranged from 17 to 24 years old (M_{age} = 19.25, SD = 1.60).

Participants were randomly assigned to a 2 (source: ingroup vs. outgroup) between-subjects factor, with thought favorability as an additional predictor variable, and attitudes toward the use of solar power as the dependent variable.

Instruments

Independent/Predictor Variables

Thought Favorability. Participants were provided with five boxes in which to list their thoughts generated in response to the message (Petty & Cacioppo, 1986). Each participant read the following instructions: "Please think about the message you just read and list as many thoughts as you had when you were reading the message. Write for three minutes using the timer below. Try to fill out all the spaces if possible. Do not move on to the next page until you have finished listing your thoughts." After the experiment finished, two independent judges coded the valence of participants' cognitive responses while blind to condition by coding each thought as favorable, unfavorable, or neutral regarding the proposal in favor of using solar power and developing new solar power plants. The use of codes assigned by independent raters is a well-established practice when employing thought-listing task and ratings measures (e.g., Cacioppo & Petty, 1979; Petty & Cacioppo, 1984). Judges agreed on 82.82% of the thoughts coded, and disagreements (17.18%) were resolved by discussion with a senior researcher. Based on the coding assigned by these independent judges, a thought valence index was created for each participant using the following formula: Thought favorability = (Number of favorable thoughts – Number of unfavorable thoughts) / (Number of favorable thoughts + Number of unfavorable thoughts). Scores on this index ranged from -1 (i.e., all thoughts were unfavorable) to 1 (i.e., all thoughts were favorable) (M = .68; SD = .50).

Source Condition: Ingroup versus Outgroup. In line with SVT (Briñol & Petty, 2022), the validating variable was completely independent to the position advocated in the message. That is, the message source was manipulated based on the minimal group paradigm (Tajfel 1970; Tajfel et al., 1971; see also Santos et al., 2023, for a recent example). Participants first viewed paintings from Kandinsky or Klee, then were asked to indicate their preference for one of the two artists. Next, they were reminded of their preference for either Kandinsky or Klee, after which they were randomly assigned to one of two experimental conditions: ingroup versus outgroup condition. Specifically, participants were randomly assigned to read a description stating that the message they just read about solar power was written by people from either their ingroup or their outgroup based on their reported preference for either Kandinsky or Klee. That is, after participants were assigned to the ingroup condition, they were told that the message came from people who preferred the same painting they preferred, whereas when they were assigned to the outgroup condition, they were told that the message came from people who preferred the other painting. Specifically, in the ingroup condition, participants were told "You have preferred *Kandinsky* [*Klee*]. The message about solar power that you previously read was written by people from the group who like [*we inserted here the painter each participant preferred*]." By contrast, in the outgroup condition, participants were told that the message was written by people from the group who like the painter each participant did not prefer.

Dependent Variable

Attitudes towards the solar power proposal were assessed using nine 9-point (1-9) semantic differential scales taken from prior research (e.g., Horcajo et al., 2020): *bad* vs. *good*, *negative* vs. *positive*, *unfavorable* vs. *favorable*, *against* vs. *in favor*, *harmful* vs. *beneficial, useless* vs. *useful*, *not at all practical* vs. *very practical, not recommended* vs. *recommended*, and *not interesting at all* vs. *very interesting*. Item-ratings were highly correlated (α = .88), thus averaged to create a composite attitude index. Responses to these items were scored so that higher values represented more favorable attitudes towards the solar power proposal (*M* = 7.94; *SD* = 0.93).

Procedure

Participants completed the study using an online questionnaire. They were expected to think carefully about the message regarding the use of solar power because environmental protection is an issue of high personal relevance for them (e.g., Hickman et al., 2021). Moreover, because metacognitive processes (such as self-validation) require a high degree of elaboration (Briñol & Petty, 2022), they were encouraged to think carefully about the message. The message was composed of arguments in favor of using solar power and the development of solar plants. Immediately following the message, participants were asked to list up to five thoughts generated while reading the message. After the study was finished, two independent judges coded the valence of participants' thoughts, and each participant received a score indicating their thought favorability (this variable constituted one predictor). Following the thought-listing task, participants received the experimental manipulation (i.e., ingroup source vs. outgroup source) based on the minimal group paradigm. Finally, participants reported their attitudes assessed by semantic differential scales, then completed several socio-demographic variables, and were thanked and debriefed.

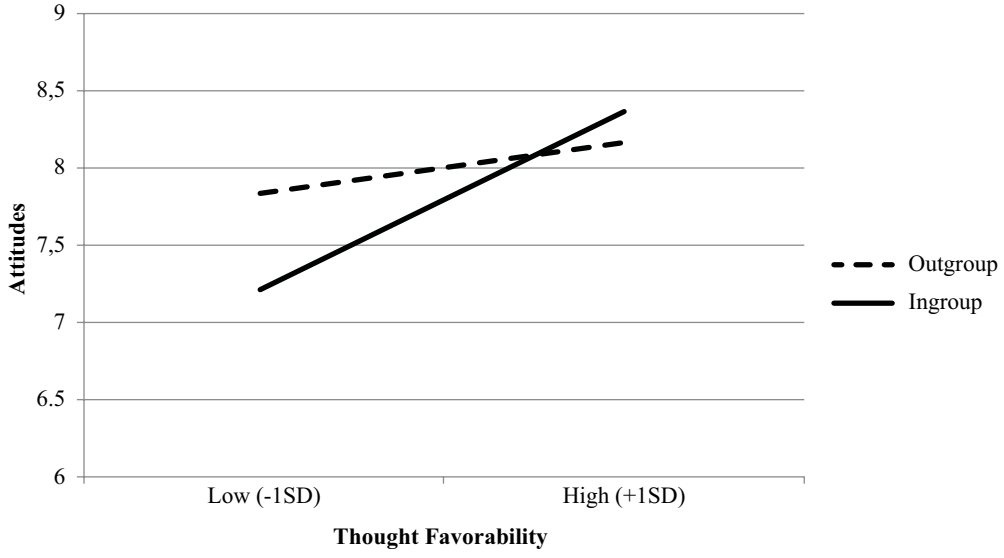
Data Analysis

Attitudes were regressed onto the predictors, including thought favorability (mean centered) and source (contrast coded: 0.5 = ingroup, and -0.5 = outgroup), as well as their interaction term (i.e., *thought favorability* × *source*), using a regression analysis which included thought favorability and source in the first step, followed by the two-way interaction in the second step. As recommended by Cohen and Cohen (1983), the main effects and the interaction were interpreted in the first step in which they appeared in the regression analysis. In addition, the critical two-way interaction was tested using the PROCESS add-on for SPSS (model 1; see Hayes, 2022). This procedure enabled us to compute the simple slopes to plot the Figure 1. This model is a moderation analysis in which thought favorability was treated as the independent variable, attitudes as the dependent variable, and source (ingroup vs. outgroup) as a moderator of the relationship between thought favorability and attitudes.

Results

As expected (H1), thought favorability was positively associated with attitudes, $B = 0.93$, $t(131) = 6.60$, $p < .001$, 95% CI [0.648, 1.202]. There was no significant main effect of source on attitudes, $B = -0.11$, $t(131) = -0.81$, $p = .417$, 95% CI [-0.392, 0.164]. Most importantly, we found the predicted significant interaction between thought favorability and source on attitudes (H2), $B = 0.98$, $t(130) = 3.65$, $p < .001$, 95% CI [0.451, 1.517] (see Figure 1). Results from conditional effects are consistent with the self-validation process. That is, the interaction pattern showed that thought favorability was a better predictor of attitudes for participants who were assigned to the ingroup source condition, $B = 1.36$, $t(130) = 7.58$, $p < .001$, 95% CI [1.008, 1.721], than for participants who were assigned to the outgroup source condition, $B = 0.38$, $t(130) = 1.90$, $p = .060$, 95% CI [-0.016, 0.777].

Figure 1
Attitudes as a Function of Thought Favorability and Source (i.e., Ingroup vs. Outgroup)



Discussion

In the present study, we predicted and found that when a source was perceived as the ingroup (vs. outgroup), participants' thoughts in response to the proposal were a better predictor of their subsequent attitudes towards that proposal (i.e., the use of solar power). Consistent with the self-validation theory (SVT, Briñol & Petty, 2022), our findings suggested that participants showed a greater reliance on their thoughts when evaluating a message perceived as coming from the ingroup (vs. outgroup), which better predicted their subsequent attitudes. Importantly, regardless of the direction of participant's thoughts (favorable vs. unfavorable), the data revealed a stronger relationship between thought favorability and subsequent attitudes for those participants in the ingroup (vs. outgroup) condition. This pattern of effects provided "indirect evidence" that participants in the ingroup condition relied on their thoughts to a significantly greater extent when reporting their attitudes than participants in the outgroup condition. That is, as suggested by prior theory and research (e.g., Horcajo et al., 2019a, 2020; see Briñol & Petty, 2022, for a review), a way to examine the influence of the self-validation mechanism on attitude change is to analyze the relationship between thought favorability and attitudes as a function of the proposed validating variable. Thus, we hypothesized and found that thought favorability better predicted attitudes for those participants in the ingroup (i.e., validating) condition than for those participants in the out-group (i.e., invalidating) condition. In other words, we based our approach on a paradigm that is well-established in self-validation research: thoughts generated in response to a message result in attitudes (i.e., global evaluations), but the relationship between those thoughts and attitudes is moderated by the self-validating variable (in this case, ingroup vs. outgroup). This result is hard to explain based on other psychological process specified in prior persuasion research because the ingroup versus outgroup manipulation was introduced after message processing occurred.

To the best of our knowledge, this is the first time that ingroup versus outgroup differentiation has been examined using a self-validation logic. These findings add value not only to the persuasion literature on self-validation, but also to the literature on group identification by illustrating a previously unknown condition under which a message can be more persuasive. Likewise, these results contribute to social identity theory by identifying an additional context and process under which one's perceived membership in an ingroup can lead to attitude polarization through a self-validation process. In contrast, recall that the same outcome did not occur when the proposal was perceived as coming from the outgroup; rather, less attitude polarization occurred. That is, in line with the SVT, the effect of thought favorability on attitudes was greater for those individuals assigned to the ingroup (vs. outgroup) condition. Presumably, this occurred because those individuals assigned to the ingroup held their thoughts with relatively higher (vs. lower) confidence, or liked their thoughts more (vs. less), than individuals assigned to the outgroup. This finding suggests that reliance on thoughts is an important determinant of judgment in the domain of pro-environmental attitudes.

There are both situational and individual variables that can further moderate the effect uncovered in the present study. For instance, previous research on self-validation has shown that thought validation is more likely to happen when the likelihood of elaboration is high (e.g., Horcajo et al., 2022). This is the case because the same factors that have been shown to motivate high amounts of elaboration of a persuasive message (e.g., high personal importance of the issue, accountability, need for cognition; see Petty & Cacioppo, 1986) are also likely to motivate people to scrutinize and think about the validity of their own thoughts. Thus, the impact of confidence in (or the liking of) one's thoughts on judgment and action is greater under high elaboration conditions. This level of elaboration can be either measured (e.g., need for cognition, Horcajo et al., 2019b) or manipulated (e.g., via personal involvement, Horcajo & De la Vega, 2014; Petty et al., 1981). As this applies to our research, we predict a three-way interaction with measured or manipulated elaboration in which the two-way interaction between source condition (ingroup vs. outgroup) and thought favorability on attitudes would emerge for high elaboration conditions, but not for low elaboration conditions (e.g., Horcajo et al., 2014; Petty et al., 2002; see Briñol & Petty, 2022, for a review).

Furthermore, future research should explore other roles for ingroup-outgroup differentiation. For example, based on the elaboration likelihood model (ELM; Petty & Cacioppo, 1986; see Petty & Briñol, 2012, for a review), future studies should examine whether ingroup identification can influence persuasion through multiple processes. These processes range from very thoughtful to non-thoughtful mechanisms based on the extent of elaboration individuals exert when exposed to a persuasive communication. That is, when elaboration is constrained to be low, ingroup identification might influence persuasion (1) by serving as a simple cue leading to attitude change. When elaboration is neither high nor low, ingroup identification might influence persuasion (2) by affecting the amount of processing one actually exerts. Finally, when elaboration is constrained to be high, ingroup identification might influence persuasion (3) by affecting the direction of thoughts in a positive way; (4) by serving as an argument itself; and (5) by validating the thoughts that people generate toward the proposal (e.g., affecting the reliance on one's thoughts), as predicted and found in the present study.

As previously described, the self-validation process occurs when the validating variable, in our case ingroup (vs. outgroup) condition, follows (or at least is presented to participants during) thought generation rather than before thought generation. In line with this, a large body of research has revealed that the self-validation process (i.e., thought confidence/liking) is especially likely to be activated when thoughts are generated before a validating variable (e.g., an expert source) is presented to the message recipient. Importantly, although a variable (e.g., an expert source) might affect the *amount* or *valence* of thinking when it is presented before thoughts about an attitude object are generated, the very same variable can affect confidence in one's thoughts when it is presented after generating thoughts about an attitude object (for the importance of timing, see Horcajo et al., 2010). In the case of the current research, because the induction of ingroup versus outgroup followed (rather than preceded) thought generation (and the listing of one's thoughts), it is implausible that participants' thoughts regarding the solar power proposal could have been affected by the ingroup versus outgroup manipulation. In fact, when thought favorability was analyzed as a function of the ingroup versus outgroup manipulation, there was not a

significant difference. However, future research should include manipulations of timing, varying the placement (i.e., prior to vs. after thought generation) of the ingroup (vs. outgroup) information. This is a very relevant point because different placements can trigger different psychological processes leading to different outcomes in persuasion.

The present research is not without its limitations. First, given that no measures were included to identify a potential mediator of the obtained results, this constitutes a clear limitation of the present research. Although we presume that thought validation (i.e., confidence in/liking of thoughts) is the driving mechanism behind this effect, as previously mentioned, we did not provide mediational evidence for this metacognitive process of self-validation. Thus, future research should include measures of thought validation (both cognitive and affective) to test the hypothesized mediational mechanism underlying the effect. Nevertheless, as previously argued, our study design provided a way to indirectly examine that mechanism by analyzing the relationship between thought favorability and attitudes as a function of the ingroup (vs. outgroup) source.

Second, we manipulated whether the message source was perceived as an ingroup vs. outgroup by means of an artificial procedure. Although we used a well-validated form of inducing perceived ingroup-outgroup differences (Tajfel, 1970; Tajfel et al. 1971; for a recent example, see Santos et al., 2023), future studies should attempt to generalize the effect further by including different inductions of ingroup identification (e.g., through repeated cooperation between members; Dorrough et al., 2015). Having said that, it is important to note how easily one can create perceived differences between groups based on features that are not necessarily linked to one's identity in any meaningful way (e.g., Kandinsky vs. Klee painting), which in turn can result in real-world downstream consequences on one's attitudes and behavior. However, it is relevant to note that we are aware that there can be a gap between people's attitudes toward solar power and the real use of that energy in their daily lives. We believe that one important advantage of our conceptual framework (i.e., ELM) is that it allows researchers and practitioners to make more specific predictions regarding *when, why, and for whom* solar power-related attitude change is likely to be consequential for intentions and actual behavior. For instance, high elaboration processes are more likely to produce consequential attitude change. That is, attitudes formed or changed as a result of careful thinking are more likely to yield changes in behavioral intentions and actual behaviors than attitudes formed or changed as a result of less careful thinking (see Petty et al., 1995, for a review). This insight is extremely valuable because it allows us to predict when and why attitudes are more likely to guide intentions and behavior within the context of pro-environmental actions to prevent climate change, and more specifically, regarding the use of solar power. Thus, in line with the ELM, we suggest that attitude change through a metacognitive process (which requires high elaboration conditions) such as self-validation would be consequential for behavioral intentions and, potentially, for pro-environmental behavior. Furthermore, other situational or contextual factors can critically facilitate or impede whether attitudes predict behavior (e.g., price of the solar panels, availability of solar power, etc.).

Finally, there are a number of explanations that could help account for why the ingroup validated people's thoughts whereas the same effect did not occur in the case of the outgroup. For instance, one possibility is that the ingroup was associated with familiarity (Briñol et al., 2018), similarity (Gorenflo & Crano, 1989), credibility (Tormala et al., 2007), attractiveness (Evans & Clark, 2012), power (Briñol et al., 2007), or an attribution of a majority status (Horcajo et al., 2010). Although each account is plausible, the present research does not allow us to test whether any of these variables might play a role linking the persuasive effects of ingroup identification with a self-validation process. Presumably, the ingroup is perhaps by default associated with some real or perceived property linked to validity. Logically then, this would suggest that the pattern of effects found in the present research should also emerge if one was able to establish a link between an outgroup and a variable that is also perceived as associated with some property of validity. For instance, if the same properties of validity are associated with the outgroup (e.g., by experimentally making the outgroup more credible), we should expect results opposite to those found in this research. This idea was tested in a series of studies by Gascó and colleagues (2018) that used a self-validation framework to examine the persuasive effects linked to the perceived origin of one's thoughts. In study 3, participants first generated positive or negative thoughts toward a health policy, after which they were told that their thoughts either had an internal or external origin. Importantly, the validity of both internal and external thought origin was also orthogonally manipulated. For example, in the internal origin and high validity condition, one's intuitions were said to be accurate, certain, and useful, whereas in the internal origin and low validity condition, these same intuitions were said to include many biases. In the external origin and high validity condition, external sources were described as trustworthy, whereas in the external origin and low validity condition, these external sources were described as untrustworthy. The results showed that the internal origin condition only had a polarization effect on attitudes (as a function of initial thought direction) when it was associated with high validity properties. Importantly, the external origin condition produced similar results as the internal origin condition when the external sources were associated with high validity properties. Future research should examine the properties of validity associated with the ingroup (vs. outgroup).

This research also has a number of relevant implications for persuasion and social identity theory. First, we showed for the first time that ingroup versus outgroup differentiation is a source variable that might also influence the self-validation of recipients' thoughts in response to a persuasive message. Thus, practitioners might benefit from these findings when seeking to develop advocacy campaigns with sources coming from ingroup members. Second, group identification can also operate through metacognitive processes, such as self-validation, which can open the door to a number of future avenues for group psychology researchers. As supported by ample research, be-longing to a group is important for an individuals' identity for a number of reasons. For example, one of their functions is to satisfy individuals' epistemic needs (see Festinger, 1954). In line with this function, the present study has identified an additional reason why belonging to a group can be beneficial for the self: because it is associated with increased reliance (i.e., confidence and/or liking) on one's thoughts.

Funding

This research was supported in part by the Ministerio de Ciencia e Innovación (Spain, Grant number: PID2020-116651GB-C33 / AEI / 10.13039/501100011033). This funding was obtained by the corresponding author. In addition, this research was also supported by another grant from the Ministerio de Ciencia e Innovación (Spain, Programa de Formación de Profesorado Universitario, Grant number: FPU18/04053) to the third author.

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