

## RESEARCH ARTICLE

# The effects of perceived COVID-19 threat on compensatory conviction, thought reliance, and attitudes

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## Abstract

This research examines how people can defend themselves from the threat associated with the COVID-19 pandemic by relying more on their recently generated thoughts (unrelated to the threat), thus leading those thoughts to have a greater impact on judgement through a meta-cognitive process of thought validation. Study 1 revealed that the impact of the favourability of self-related thoughts on self-esteem was greater for those feeling relatively more (vs. less) threatened by COVID-19. Study 2 manipulated (rather than measured) the favourability of thoughts and assessed the perceived COVID-19 threat. Results also showed that the impact of thoughts on subsequent self-evaluations was greater for those feeling more threatened by COVID-19. Study 3 conceptually replicated the results using a full experimental design by manipulating both thought favourability and the perceived COVID-19 threat, moving from the self to a social perception paradigm, and providing mediational evidence for the proposed mechanism of compensatory thought validation. A final study addressed some alternative explanations by testing whether the induction of threat used in Study 3 affected perceptions of threat while not having an impact on other features.

## KEYWORDS

attitude, compensation, COVID-19, perceived threat, validation

## 1 | INTRODUCTION

The COVID-19 pandemic has been a global threat to millions of individuals around the world. Many social psychological approaches can help in understanding how people respond to threats in general (e.g., Greenberg et al., 1986; Heine et al., 2006; Kay et al., 2009; McGregor, 2006; Proulx, 2012; van den Bos, 2009; see also Hart, 2014; Jonas et al., 2014; Reiss et al., 2021; for reviews), as well as threats associated with the pandemic in particular (e.g., Ackerman et al., 2021; Simchon et al., 2021). The present research focuses on COVID-19 as a current existential threat, analysing how individuals can respond to this threat

through a meta-cognitive process of thought validation in accord with the principles of Self-Validation Theory (SVT; Briñol & Petty, 2022). That is, the present studies examine the extent to which making the threat of COVID-19 salient can produce compensatory confidence, and this confidence can be misattributed to any thoughts people have in mind at the time, including thoughts completely unrelated to the threat. In short, the perceived threat of COVID-19 is expected to enhance the use of threat-irrelevant thoughts that are accessible in a specific context, thereby polarizing thought-relevant attitudes.

We argue that, when faced with a threat from the possibility of being infected by COVID-19 (and the corresponding uncertainty, anxiety,

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and fear of infection or death), people defensively look for ways to alleviate the associated unpleasantness, sometimes in domains unrelated to the perceived threat. In line with other paradigms of psychological defence (e.g., Landau et al., 2015; Proulx et al., 2012; van den Bos, 2009), research has shown that one way people respond to perceived threats is by either seeking or expressing compensatory *confidence* when such opportunities are available (see McGregor et al., 2001). Recently, Simchon et al. (2021) demonstrated that people respond to threats related to COVID-19 by utilizing psychological compensation mechanisms that give rise to greater expressions of *certainty*. Specifically, these authors measured linguistic certainty in more than 3 million tweets, covering different psychologically threatening contexts related to the COVID-19 pandemic. Consistent with the idea that people can defend themselves from threats by increasing their confidence, the results showed that levels of expressed certainty *increased* following reminders of COVID-19 (see also, Randles et al., 2017). These findings are consistent with prior research on compensatory conviction and psychological models of compensation from threat, such as the Meaning Maintenance Model (Heine et al., 2006), the Uncertainty Management Model (van den Bos & Lind, 2002), and the General Process Model of Threat and Defence (Jonas et al., 2014).

Although prior research has shown how threat can lead individuals to express confidence in their current attitudes and beliefs (e.g., McGregor et al., 2001), the current set of studies examines how compensatory processes stemming from threat can increase confidence in *any* accessible thought, thereby affecting use of those thoughts and ultimately impacting judgements based on those thoughts. Next, we discuss how that threat can lead people to become more confident in, and thus rely more on, the thoughts they have in mind, even if those thoughts are previously generated and are not directly related to the threat.<sup>1</sup>

## 1.1 | Meta-cognitive framework

Self-Validation Theory (SVT, Briñol & Petty, 2022) is a framework that focuses on perceived thought validity. People have initial thoughts, and they can further assess the perceived validity of those primary cognitions when they are motivated and able to do so. Thinking about thinking is a form of secondary cognition or metacognition (see Briñol & DeMarree, 2012; Jost et al., 1998). Research on SVT has shown

that when being deliberative, the confidence that people have in their thoughts (i.e., perceived thought validity) is a critical determinant of whether those thoughts guide judgements and action. The key notion of SVT is that thoughts will become more consequential (i.e., will be relied upon more for making judgements and engaging in behaviour) as their perceived validity increases.

Although the notion that thought validity is consequential might seem plausible, what might be surprising is that this perceived validity can emerge from factors that are completely incidental to the initial thoughts, such as one's current mood or the recall of past episodes of confidence. Therefore, two people might have the very same initial thought become accessible (i.e., the same mental content), but one person might believe that this thought is more valid or appropriate to use than the other person (e.g., because the person is feeling good at the time) and would thus be more likely to form a judgement based on that thought and act upon it. A remarkably wide range of variables that are incidental to the mental content itself can affect perceived thought validity, determining how much those thoughts are relied upon (see Briñol & Petty, 2022).

In an early example illustrating how the direct induction of confidence can affect evaluation (Petty et al., 2002, Experiment 3), undergraduate students were asked to list the thoughts that went through their minds as they read a proposal about the implementation of comprehensive exams at their university. Then, as part of an ostensibly unrelated study, they were randomly assigned to recall and describe personal experiences when they felt either confidence or doubt. Finally, participants provided their attitudes towards the initial exams' proposal. The predicted interaction between valence of thoughts and thought validity on attitudes towards the proposal emerged. This interaction showed that the valence of participants' thoughts towards the exams had a larger impact on attitudes towards the exams in the confidence rather than the doubt condition.

Beyond asking people to recall past episodes of confidence, other incidental inductions can impact confidence. For example, Briñol et al. (2012) showed that the confidence that emerges from feeling powerful can be misattributed to whatever mental content is activated at the time, and thus validates thoughts leading them to be more consequential. Participants in this study were first asked to read the curriculum vitae of a potential job candidate. The résumé was composed of either strong or weak credentials to produce primarily positive or negative thoughts about the candidate, respectively. After receiving the résumé, but before reporting their evaluation of the candidate, participants were induced to feel either powerful or powerless using an episodic recall task (Galinsky et al., 2003). Finally, participants rated the candidate on general evaluative dimensions (i.e., bad-good). In accord with SVT, participants induced to feel powerful relied more on their initial thoughts compared with participants who felt powerless. That is, recalling feeling powerful in the past led to a sense of confidence in the present and that confidence was misattributed to thoughts just generated about the job candidate. As a consequence, for those who generated positive thoughts, confidence from feeling powerful led to more positive evaluations of the job candidate than feeling powerless. For those who generated negative thoughts, confidence led to more

<sup>1</sup> In general, one could expect threats to be associated with initial doubt rather than confidence. For example, threats are often associated with anxiety and anxiety is an affective state associated with uncertainty (Lazarus, 1991; Lerner & Keltner, 2001). If individuals respond to threats with uncertainty, then threats would be expected to attenuate the use of thoughts. However, instead of attenuating the use of thoughts, we hypothesize that thought use could be *enhanced* relative to a control when the doubt is highly threatening to the person as is likely to be the case for the threats related to COVID-19 (Simchon et al., 2021). When experiencing a threatening uncertainty, individuals can be motivated to behave in ways that restore their sense of confidence (to mitigate the threat), such as by adopting more extreme and confidently held attitudes (*compensatory conviction*; McGregor et al., 2001) or using one's thoughts more (as examined in the current research). The idea of compensating for one's doubt by becoming more confident or acting more confidently suggests that people sometimes try to correct for the doubts they do not want to have by engaging in actions associated with confidence. Under these conditions, inductions of doubt can result in an increased (rather decreased) impact of current thoughts (Hart, 2014).

negative evaluations about the job candidate. In other words, the confidence that emerged from feeling powerful magnified the impact of initial thought valence on attitudes.

These illustrative studies revealed that incidental inductions (recalling past episodes of feeling confident or powerful) following thinking can affect the perceived validity of whatever mental content is readily available at the time, including thoughts that are completely irrelevant to the nature of the validation induction. In the two examples just described, the mental content validated referred to thoughts about a persuasive proposal regarding exams and thoughts about a job candidate—thoughts that had nothing to do with the confidence induction (for additional recent examples, see Horcajo, Santos, & Higuero, 2022; Moreno et al., 2021; Paredes et al., 2021, 2022; see also, Briñol & Petty, 2022, for a review).

A common feature of all this previous research guided by SVT is that thought reliance and judgement polarization were affected by variables that influence confidence directly. That is, the implications of the validating variable are congruent with the typical associations of that variable with confidence. Unlike these direct sources of confidence typically studied so far, in the present research we propose that thought validation can also result from compensatory (rather than direct) confidence that emerges from the perceived threat of COVID-19 (see Burke et al., 2013; Canetti-Nisim et al., 2009; Jong et al., 2012; Proulx, 2012). This prediction is in line with research conducted in the domain of more extreme origins of threats examined before the pandemic, such as the threat that comes from reminders of death (e.g., Hart, 2014; Jonas et al., 2014). That is, explicit reminders of death (unrelated to COVID-19) have been found to be associated with compensatory conviction (McGregor, 2006), confidence (Jong et al., 2012), and with more attitude polarization (Canetti-Nisim et al., 2009; Horcajo, Briñol et al., 2022). Beyond these effects of mortality salience (Greenberg et al., 1986) examined in prior research, an important goal of the current work is to examine the extent to which more familiar and prevalent threats to one's health such as those related to the COVID-19 pandemic also have the potential to produce similar polarization effects and, most importantly, do so by a meta-cognitive mechanism of thought validation. Using this logic, we argue that the presence of COVID-19-related threats can lead people to operate in ways that aim to restore a sense of confidence resulting in an increased impact of current thoughts on evaluation, even if those thoughts are irrelevant to COVID-19.

## 2 | OVERVIEW

The present research examines the extent to which the perceived threat from COVID-19 can lead people to defend themselves psychologically via a meta-cognitive process of thought validation. Given that validation processes are more likely to occur when people have accessible thoughts to be confident in and they are motivated and able to think about those thoughts, all participants in the present studies were placed in relatively high thinking conditions and were first asked to generate some thoughts to then be validated. The thoughts validated in these studies were thoughts about themselves (Studies 1 and 2)

or about other people (Study 3). We used different thoughts for generalization purposes and to ensure that the content of the thoughts was unrelated to the threat. These initial thoughts were coded for favourability (Study 1) or directly manipulated to be positive versus negative (Studies 2 and 3). After measuring or manipulating the valence of thoughts, we introduced the second independent variable, a measure (Studies 1 and 2) or a manipulation (Study 3) of the perceived threat from COVID-19. Finally, a fourth study addressed some alternative explanations by testing whether the induction of threat used in Study 3 affected perceptions of threat while not having an impact on other features.

In each of these studies, we expected that perceived COVID-19 threat would moderate the impact of previously generated thoughts on subsequent evaluations. Specifically, we hypothesized that the perceived threat from COVID-19 would result in a greater effect of thought valence on evaluation. Furthermore, this effect was expected to be independent of whether thoughts were about the self (Studies 1 and 2) or about others (Study 3), and the effects of threat on evaluation were expected to be mediated by thought confidence (Study 3), while not affecting other potential variables beyond perceived threat (Study 4).<sup>2</sup>

## 3 | STUDY 1

The goal of this study was to provide an initial examination of the possibility that people increase their reliance on current thoughts as a potential mechanism to defend from perceived COVID-19 threat, even if those initial thoughts are unrelated to the threat. Undergraduate students were first asked to list any thoughts they had about themselves as potential public speakers, and then they were asked to rate the favourability of those thoughts. The more favourable individuals' thoughts were about themselves as public speakers, the higher their self-esteem was expected to be. Next, as part of an ostensibly unrelated control measure, participants' perceptions of how threatened they felt due to the COVID-19 pandemic were also assessed. Responding to this question would presumably lead some people to feel threat from COVID whereas others would not. Finally, self-esteem was measured as the dependent variable. As noted, we expected a main effect of thought valence on self-esteem, such as the more favourable people's thoughts, the greater the self-esteem. Most relevant for the present research, it was predicted that individuals perceiving COVID-19 as more threatening would show a greater effect of thought favourability on self-esteem.

### 3.1 | Method

#### 3.1.1 | Participants and design

One hundred and eighty-seven undergraduate psychology students (85% women,  $mean_{age} = 19.601$ ,  $SD = 1.603$ ) at the Universidad

<sup>2</sup> Data is available at the OSF platform (<https://osf.io/m9tru/>).

Autónoma de Madrid participated in this study by completing an online survey via Qualtrics in exchange for course credit. Thought favourability and perceived COVID-19 threat were measured as continuous predictor variables. Self-esteem was the key dependent variable. Sample size was determined based on the number of participants whom we were able to collect during the week in which the study was posted with the assumption that at least 160 would be available based on prior experience. The study was available for one week during September 2021 to keep equivalent conditions for all participants in terms of the pandemic. The final sample size obtained ( $N = 187$ ) provided .80 power to detect an interaction effect size of  $f^2 = 0.042$ , traditionally considered a medium-sized effect (Cohen, 1962).

### 3.1.2 | Procedure

Participants were told that the study was about understanding public speaking. First, participants were asked to list any thoughts they had about themselves as potential public speakers. Then, they were asked to report the favourability of those thoughts. Next, as part of an ostensibly separate control measure, participants were asked to report how threatening they perceived the COVID-19 pandemic to be at the time of the study. This self-report measure served to classify participants according to their perceptions of threat. Then, participants completed a measure of self-esteem that served as the key dependent variable. Finally, participants were thanked, debriefed, and dismissed.

### 3.1.3 | Predictor variables

#### *Thought favourability*

After listing their thoughts about themselves as potential public speakers, participants were asked to rate the extent to which those thoughts were positive or negative. Specifically, responses were measured on three 9-point scales (1 = *not at all favourable/positive/negative* to 9 = *very favourable/positive/negative*). A composite index of thought favourability was formed by reverse coding the negative rating item and then averaging responses to these three measures ( $M = 4.804$ ,  $SD = 2.112$ ;  $\alpha = .853$ ). This measure of thought favourability has been adapted from prior research in the domain of attitudes and persuasion (e.g., Clark et al., 2013; Moreno et al., 2021; Paredes et al., 2013), and similar measures have been shown to be reliable predictors of self-esteem (e.g., Briñol & Petty, 2003; Briñol et al., 2010; Tice, 1992). Examples of thoughts participants generated included '*I get very nervous when talking in public*,' and '*I am good at gaining the attention of others when I have to speak in public*.'

#### *Perceived COVID-19 threat*

Participants were asked, on a 7-point scale, to report how threatening they felt the COVID-19 pandemic was to them (1 = *not at all threatening* to 7 = *completely threatening*;  $M = 4.722$ ,  $SD = 1.498$ ).

### 3.1.4 | Dependent variable: Self-esteem

Participants' self-esteem was assessed using the Martín-Albo et al. (2007) validated Spanish version of the Rosenberg Self-Esteem Scale (RSES, Rosenberg, 1965). The Spanish RSES is composed of 10 items (i.e., '*I take a positive attitude towards myself*'), ranging from 1 to 9 (1 = *totally disagree* and 9 = *totally agree*;  $M = 6.121$ ,  $SD = 1.565$ ). All the items were averaged into one overall measure of self-esteem ( $\alpha = .915$ ).

## 3.2 | Results

The self-esteem measure was submitted to a hierarchical regression analysis, with thought favourability (continuous variable), perceived COVID-19 threat (continuous variable), and the interaction term (i.e., Thought Favourability  $\times$  Perceived COVID-19 Threat) as the predictor variables. The continuous predictors were mean centred before being entered in the regression. Main effects were interpreted in the first step of the regression and the two-way interaction in the second step (Cohen & Cohen, 1983). Results showed a main effect of thought favourability,  $B = 0.252$ ,  $t(184) = 4.929$ ,  $p < .001$ , 95% CI [0.151, 0.353], such that participants who reported having more favourable thoughts also reported having higher self-esteem. The main effect of COVID-19 threat did not reach significance,  $B = -0.104$ ,  $t(184) = -1.439$ ,  $p = .152$ , 95% CI [-0.246, 0.038].

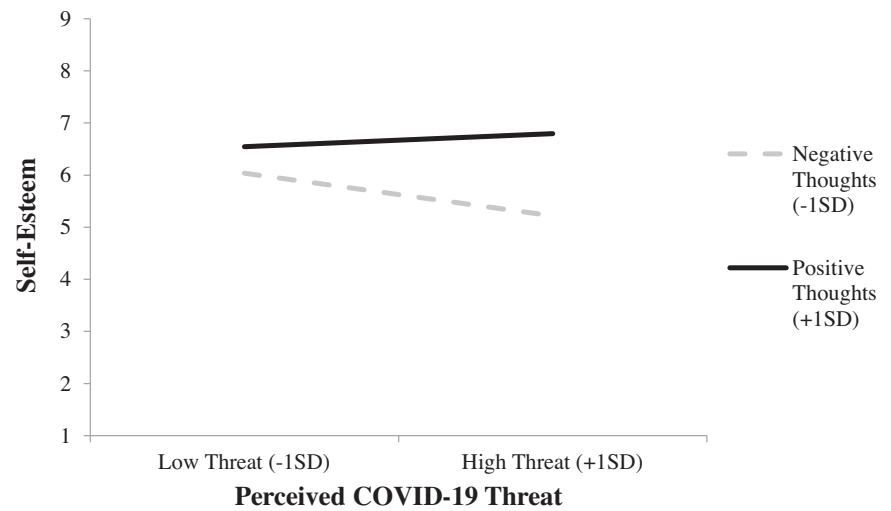
Critically, results showed a significant interaction between thought favourability and perceived COVID-19 threat on participants' self-esteem,  $B = 0.085$ ,  $t(183) = 2.387$ ,  $p = .018$ , 95% CI [0.015, 0.154], Cohen's  $f^2 = 0.031$ . This interaction demonstrated that the relationship between thought favourability and self-esteem was stronger as the perceived threat from COVID-19 increased. As illustrated in Figure 1, participants' thought favourability predicted their self-esteem to a greater extent when they perceived that the COVID-19 pandemic was relatively more threatening. More specifically, when threat was perceived to be relatively high (+1SD), thought favourability significantly predicted self-esteem,  $B = 0.374$ ,  $t(183) = 5.210$ ,  $p < .001$ , 95% CI [0.232, 0.515]. For participants who perceived that the COVID-19 pandemic was relatively less threatening (-1SD), the effect of thought favourability on self-esteem was not significant,  $B = 0.120$ ,  $t(183) = 1.609$ ,  $p = .109$ , 95% CI [-0.027, 0.268].<sup>3</sup>

## 3.3 | Discussion

The results of this first study showed that the extent to which people perceived the COVID-19 pandemic as threatening affected reliance on their thoughts in forming attitudes, even though their thoughts

<sup>3</sup> Among participants with relatively more initial negative thoughts (-1SD), those indicating higher levels of perceived threat from COVID-19 (+1SD) reported more negative self-evaluations than those indicating lower levels of perceived threat (-1SD),  $B = -0.274$ ,  $t(183) = -2.718$ ,  $p = .007$ , 95% CI [-0.472, -0.075]. For participants who generated relatively more favourable thoughts to begin with (+1SD), subsequent perceived threat from COVID-19 was in the positive direction but not significant,  $B = 0.084$ ,  $t(183) = 0.789$ ,  $p = .431$ , 95% CI [-0.126, 0.293].

**FIGURE 1** Self-esteem as a function of thought favourability and perceived COVID-19 threat.



were unrelated to the pandemic. The greater the perceived threat from COVID-19, the more likely it was for participants to use the favourability of their self-relevant thoughts in guiding their self-evaluations. This result is important because individuals likely have different naturally occurring thoughts about the self, as well as different perceptions of the COVID-19 threat. The natural variability in each of those two variables interacted to predict individuals' self-esteem. However, given the correlational nature of this design, we could not establish a causal role for either variable in affecting self-esteem. For example, because the valence of participants' thoughts was measured, it is possible that other, unmeasured factors (e.g., knowledge, experience, etc.) may have been confounded with the thoughts. Alternatively, it could also be that both thought favourability and self-esteem depended on a third (unmeasured) variable present in the situation (e.g., positive mood). Therefore, in the next study, thought valence was manipulated experimentally to isolate its causal role.

## 4 | STUDY 2

Study 2 aimed to conceptually replicate the findings of Study 1 using a manipulation of the valence of thoughts. To vary the valence of initial thoughts, undergraduates were asked to think about their own best or worst qualities as potential job candidates. This manipulation of thought valence has been used successfully in previous research showing that it can affect subsequent self-evaluations (e.g., Briñol & Petty, 2003; Briñol et al., 2017; Moreno et al., 2021). Following this induction designed to create groups with either positive or negative thoughts about themselves, and as part of an ostensibly unrelated control measure, participants reported how threatened they felt by the COVID-19 pandemic. Finally, self-esteem was once again measured as the dependent variable. In this study, we used a different measure of self-esteem consisting of a single direct question of self-evaluation. This measure allowed testing predictions to be more efficient and to gain generalization across different instruments (Robins et al., 2001). Despite these variations, we predicted that the impact of induced thought valence on

self-esteem would be greater for individuals perceiving COVID-19 as relatively more threatening.

## 4.1 | Method

### 4.1.1 | Participants and design

Two hundred and four undergraduate psychology students (94% women,  $\text{mean}_{\text{age}} = 19.708$ ,  $SD = 1.296$ ) at Universidad Autónoma de Madrid participated in this study by completing an online survey via Qualtrics in exchange for course credit. This study was conducted in October 2021. Participants were randomly assigned to conditions in a two-cell design (thought valence: positive vs. negative self-relevant thoughts) with the perceived COVID-19 threat as an additional continuous predictor. Self-esteem was the key dependent variable. Sample size was determined based on the number of participants we were able to collect during the week in which the study was posted, again, with the assumption that at least 160 would be available. The final sample obtained ( $N = 204$ ) provided .80 power to detect an interaction effect size of Cohen's  $f^2 = 0.038$ .

### 4.1.2 | Procedure

Participants were told that the study was about self-evaluation. First, participants were asked to think about either their best or their worst qualities as potential job candidates. Following this thought valence induction, participants were asked to report how threatening they perceived the COVID-19 pandemic to be. This would make the degree of threat from COVID (whether high or low) salient for all participants. This self-report measure was presented as part of control measures and served to classify participants according to their perceptions of threat. Then, participants were asked to complete a self-esteem measure. Finally, they were thanked, debriefed, and dismissed.

### 4.1.3 | Independent/Predictor variables

#### Thought valence

Participants were asked to list either three positive or three negative personal characteristics they possessed as potential job candidates. In the positive thought condition, they were asked to list the strengths, skills, and abilities they expected to have in facing the job market. Examples of positive thoughts listed included 'I am very creative', and 'It is easy for me to work in groups.' In the negative thought condition, they were asked to list the weaknesses, flaws, and limitations they anticipated having when facing the job market. Examples of negative thoughts listed included 'When something goes wrong in a task, it is really difficult for me to continue', and 'I am not very responsible.' All participants were told that this was an important task and were asked to think carefully as they listed their characteristics. An assessment of the thoughts that participants generated showed that all of them complied with the instructions and wrote the appropriate positive or negative thoughts. As noted, previous research has shown that self-evaluations can vary as a consequence of thinking about one's strengths or weaknesses (e.g., Tice, 1992; Vohs et al., 2005), and this particular manipulation has been used successfully in previous self-validation studies to influence self-evaluations (e.g., Briñol & Petty, 2003; Briñol et al., 2009; Moreno et al., 2021).

#### Perceived COVID-19 threat

Participants were asked to report how threatening they felt the COVID-19 pandemic was to them using the same item used in Study 1 ( $M = 4.211$ ,  $SD = 1.784$ ). Importantly, this measure of the perceived COVID-19 threat was not affected by the initial thought-valence manipulation,  $F(1, 202) = 1.477$ ,  $p = .226$ ,  $\eta_p^2 = .007$ . Those assigned to the negative thought condition ( $M = 4.355$ ,  $SD = 1.197$ , 95% CI [4.011, 4.700]) did not perceive COVID-19 as more or less threatening than those assigned to the positive thought condition ( $M = 4.052$ ,  $SD = 1.764$ ; 95% CI [3.696, 4.407]).

### 4.1.4 | Dependent variable: Self-esteem

Participants' self-esteem was assessed with one item 'I have high self-esteem' (1 = not very true of me to 5 = very true of me;  $M = 3.015$ ,  $SD = 1.176$ ). This item had been previously used by Robins et al. (2001) showing significant convergence with longer instruments designed to assess self-esteem (see Bleidorn et al., 2016, for additional examples).

## 4.2 | Results

The self-esteem measure was submitted to a hierarchical regression analysis, with thought valence ( $-1 =$  negative thought condition and  $1 =$  positive thought condition), perceived COVID-19 threat (continuous variable), and the interaction term (i.e., Thought Valence  $\times$  Perceived COVID-19 Threat) as the predictor variables. The continuous predictor

was mean centred before being entered in the regression. Main effects were interpreted in the first step of the regression and the two-way interaction in the second step (Cohen & Cohen, 1983). Neither thought valence,  $B = 0.100$ ,  $t(201) = 1.211$ ,  $p = .227$ , 95% CI [-0.063, 0.264], nor COVID-19 threat,  $B = -0.024$ ,  $t(201) = -0.517$ ,  $p = .605$ , 95% CI [-0.116, 0.068], revealed significant main effects.

Most relevant to the present research, results showed a significant interaction between thought valence and perceived COVID-19 threat on participants' self-esteem,  $B = 0.133$ ,  $t(200) = 2.916$ ,  $p = .004$ , 95% CI [0.043, 0.224], Cohen's  $f^2 = 0.042$ . This interaction revealed that the impact of induced thought valence on self-esteem was stronger as the perceived threat from COVID-19 increased. As illustrated in Figure 2, participants who generated positive thoughts had higher self-esteem than those who generated negative thoughts when they reported that the COVID-19 pandemic was relatively more threatening (+1SD),  $B = 0.341$ ,  $t(200) = 2.942$ ,  $p = .004$ , 95% CI [0.112, 0.569]. However, for participants who perceived that the COVID-19 pandemic was relatively less threatening (-1SD), the effect of thought valence on self-esteem was not significant,  $B = -0.135$ ,  $t(200) = -1.181$ ,  $p = .239$ , 95% CI [-0.361, 0.091].<sup>4</sup>

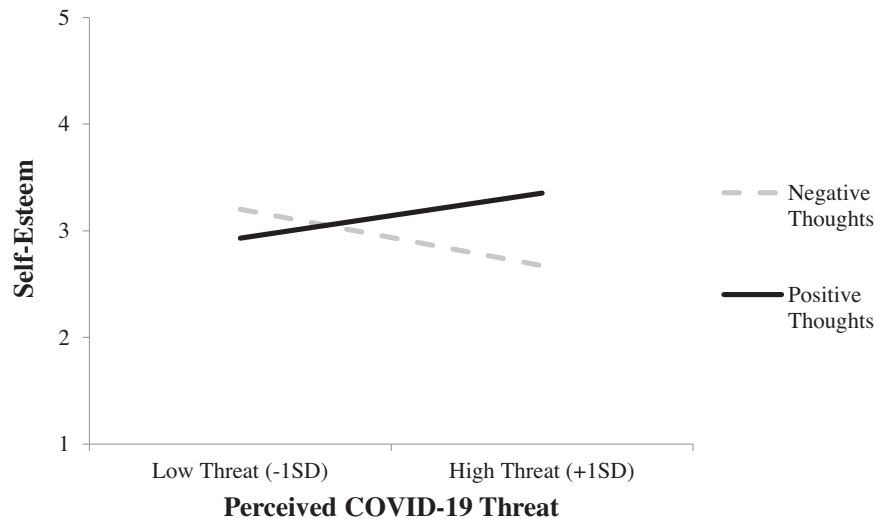
## 4.3 | Discussion

The results of this second study showed that the extent to which people perceived the COVID-19 pandemic as threatening affected the impact of induced thoughts unrelated to the pandemic on subsequent self-evaluation. In accord with SVT, the greater the perceived threat, the larger the impact of induced thoughts on self-esteem. This study conceptually replicated the findings of Study 1 by manipulating (rather than measuring) the valence of thoughts and by showing that measured perceived COVID-19 threat can lead to increased predictability of the valence of previously induced thoughts (unrelated to the pandemic) on self-esteem.

Because participants' perceptions of threat were measured in the first two studies, it is possible that other unmeasured factors could have been confounded with reported threat (e.g., individual differences in confidence, uncertainty tolerance, etc.). Therefore, in the third study, we manipulated both thought valence and the perceived COVID-19 threat within the same experimental design to examine the causal role of both variables. Additionally, in the next study we decided to extend our findings by changing the object of thought and the dependent measure so that they were not related to the self. This change is important to examine to what extent the perceived COVID-19 threat can influence the use of any accessible thoughts, including thoughts about external stimuli not linked to the self. Also, although the COVID-19 threat is not directly related to self-esteem, both COVID-19 threat

<sup>4</sup> For participants in the negative thought condition, higher levels of perceived threat from COVID-19 (+1SD) were associated with significantly lower self-esteem,  $B = -0.148$ ,  $t(200) = -2.376$ ,  $p = .019$ , 95% CI [-0.271, -0.025]. In contrast, for participants in the positive thought condition, higher levels of perceived COVID-19 threat (-1SD) tended to be associated with higher self-esteem, but this effect did not reach significance,  $B = 0.118$ ,  $t(200) = 1.772$ ,  $p = .078$ , 95% CI [-0.013, 0.250].

**FIGURE 2** Self-esteem as a function of thought favourability and perceived COVID-19 threat.



and self-esteem relate to the self, so there is some indirect connection. In Study 3, however, although the COVID-19 threat is still related to the self, the dependent variable involved evaluations of others, and thus the two inductions were completely different. Finally, Study 3 also included measures of the proposed mediator (i.e., perceived confidence in one's thoughts), and therefore explored the proposed mechanism underlying the perceived COVID-19 threat effects.

## 5 | STUDY 3

The goal of Study 3 was to replicate and extend the findings of the prior studies, examining the causal role of initial induced thoughts unrelated to the self and the impact of induced COVID-19 threat. Thus, Study 3 used a full experimental design by manipulating both thought valence as well as the perceived COVID-19 threat. Furthermore, this study aimed to provide evidence of the proposed underlying mechanism (i.e., thought validation by enhanced compensatory confidence from the threat). Thus, this study introduced several additional modifications. First, we changed the object of the thoughts from the self to others. This change was designed to generalize the hypothesized findings across objects and to test the extent to which the effects found in prior studies could be replicated and extended to thoughts for which the mental content is totally irrelevant to the threat. Second, we manipulated the valence of initial thoughts by a different procedure. Specifically, we used a strong (vs. weak) résumé quality manipulation rather than the positive (vs. negative) self-relevant thoughts induction used in Study 2. That is, participants in this study were asked to read either a strong or a weak version of the curriculum vitae of a job candidate and list their thoughts in response to the curriculum vitae. Third, instead of measuring perceptions of threat, in this study participants were randomly assigned to complete a task designed to increase the salience of the COVID-19 pandemic (vs. a low threat induction). Therefore, the third change was manipulating rather than measuring threat. Fourth, connected to the first point about changing the object of thoughts from the self to others, as the main dependent

variable, instead of reporting their self-evaluation (as in previous studies), participants were asked to evaluate the job candidate. Fifth, a measure of the proposed mediator (i.e., thought confidence) was also included.

Thus, the present study sought to demonstrate the self-validation mechanism by showing that threat can lead to increased thought confidence, and that this thought confidence is a plausible mediating variable affecting polarized evaluation even of an object not related to the self. Thought confidence is the most commonly examined mediator in research on thought validation processes (Briñol & Petty, 2009, 2022) and it is in line with the proposed explanation of threat effects in the current context. In sum, we argue that reminders of the COVID-19 pandemic will lead to feelings of threat. Importantly, one way to mitigate the threatening doubt from COVID-19 and restore certainty is to become confident in one's currently accessible thoughts. Then, the more confidence in one's thoughts, the more they should be used in forming relevant judgements. Therefore, we expected that individuals in the high (vs. low) perceived COVID-19 threat condition would show a greater effect of the valence of thoughts on attitudes towards the job candidate, and that this effect would be mediated by thought confidence.

## 5.1 | Method

### 5.1.1 | Participants and design

One hundred and forty-eight undergraduate psychology students at the Universidad Autónoma de Madrid participated in partial fulfillment of a course requirement. Participants were randomly assigned to the conditions in a 2 Résumé Quality (Strong vs. Weak)  $\times$  2 Perceived COVID-19 Threat (High vs. Low) between-participants factorial design. Sample size was determined based on the number of participants that we were able to collect during the week in which the study was posted anticipating that we would obtain at least 160. The study was available for just one week during May 2020, and the final

sample (N = 148) provided .80 power to detect an interaction effect size of Cohen's  $f^2 = 0.053$ .

### 5.1.2 | Procedure

Participants were introduced to a study that they were told was designed to explore their personnel selection skills. Participants read the résumé of a job candidate, listed their thoughts, and assessed the suitability of the candidate for the position. To test our hypothesis, participants first read either a strong or a weak résumé of the job candidate. This manipulation, taken from prior research (e.g., Petty et al., 2006), has shown that strong résumés produce predominantly favourable thoughts and weak résumés produce predominantly unfavourable thoughts about the job candidate when the information is processed. After participants read the résumé, they were asked to list their thoughts about the job candidate. This was followed by the (high vs. low) perceived COVID-19 threat induction. Next, all participants rated the favourability of their thoughts (to make thought valence salient) and also the confidence they had in their thoughts. Finally, they reported their attitudes towards the job candidate and an attention check.<sup>5</sup> After all measures were completed, participants were debriefed and thanked.

### 5.1.3 | Independent variables

#### *Résumé quality*

All students were presented with a curriculum vitae for a job candidate. Half of the participants received a résumé which contained strong information implying that the candidate would be highly qualified for the supposed position in Marketing, whereas the remaining half of participants received a résumé containing weak information suggesting that the candidate would be poorly qualified to fill the position. The résumé containing strong merits indicated that the candidate had earned his degrees from a prestigious university, had professional experience in well-known corporations, spoke three relevant languages (French, English and German), and had high knowledge about specific software programs. In essence, the résumé containing strong information clearly indicated that the candidate was well qualified for the position. In contrast, the weak vita indicated that the candidate had degrees and experience in unrelated fields, spoke just one foreign language, and did not have experience with specific software. Thus, the weak vita plainly indicated that the candidate was not well-suited for the job. The résumé manipulation has been used successfully in prior research, showing that the strong version produced mostly favourable thoughts about the job candidate whereas the weak version of the résumé induced mostly unfavourable thoughts (Briñol et al., 2012; Horcajo, Briñol et al., 2022; Johnson et al., 2017; Petty et al., 2006). Nonetheless, that assumption will be checked in the current study.

#### *Perceived COVID-19 threat*

In the high perceived COVID-19 threat condition, participants provided open-ended responses to two questions about the COVID-19 pandemic. Specifically, participants were asked to: 'Please, describe in detail what thoughts or ideas come to your mind about the possibility of being infected by COVID-19.' and 'Describe in detail what emotions or feelings you feel about the possibility of being infected by COVID-19.' These items were adapted from questions used in prior research on other sources of threat that have been studied previously, such as the threat emerging from considering one's own death (see Lambert et al., 2014; Rosenblatt et al., 1989). In the low perceived COVID-19 threat condition, participants answered two similar questions, but instead of responding to questions about COVID-19, they wrote about a mildly aversive topic (i.e., 'being cold'). That is, participants were asked to 'Please, describe in detail what thoughts or ideas come to your mind about the possibility of being very cold.' and 'Describe in detail what emotions or feelings you feel about the possibility of being very cold.' This low perceived COVID-19 threat condition was also adapted from previous control conditions used in research on psychological threats (see Burke et al., 2010; Rosenblatt et al., 1989).

### 5.1.4 | Dependent variables

#### *Thought favourability*

Immediately after the reading of the curriculum vitae, participants were asked to list the thoughts that went through their minds as they were reading the résumé. When this study was completed, two judges, unaware of experimental conditions, coded the thoughts listed. Each thought was classified as favourable, unfavourable, or neutral towards the job candidate. Findings demonstrated a strong level of initial agreement between the judges (i.e., Kappa coefficients ranged from .807 to .952), and disagreements were resolved by discussion. Two examples of favourable thoughts were: 'The candidate studied in prestigious universities' and 'The candidate is brilliant.' Two examples of unfavourable thoughts were 'The candidate doesn't speak English' and 'Those degrees have nothing to do with the job position.' An index of favourability of message-related thoughts was formed by subtracting the number of unfavourable message-related thoughts from the number of favourable message-related thoughts and dividing this difference by the sum of favourable and unfavourable thoughts (see Petty et al., 1983, for additional details on the thought listing and scoring procedure). Higher scores represented higher thought favourability.

#### *Thought confidence*

After the perceived COVID-19 threat manipulation and before reporting their attitudes, participants were asked to rate the confidence they had in their thoughts. Thought confidence was assessed on three items, including confidence, validity, and certainty in the thoughts listed. Responses were measured on 7-point scales (1 = *not at all confident/valid/certain* to 7 = *extremely confident/valid/certain*;  $M = 5.527$ ,  $SD = 1.015$ ). A composite index of thought confidence was formed by

<sup>5</sup> Demographics were not recorded for participants in Study 3.



averaging responses to these three measures ( $\alpha = .867$ ) as has been done in prior research on SVT (see Briñol & Petty, 2022, for a review).

### Attitudes towards the job candidate

Participants' attitudes towards the job applicant were assessed using six 7-point semantic differential scales measuring the evaluations of the candidate (i.e., good-bad, attractive-not attractive, desirable-undesirable, competent-incompetent, disciplined-undisciplined, committed-uncommitted;  $M = 4.826$ ,  $SD = 1.403$ ). Ratings on the scales were highly intercorrelated ( $\alpha = .908$ ), thus were averaged to create a composite attitude index. Responses to the attitude scales were scored so that higher values represented more favourable opinions of the job candidate.

### Attention check

At the end of the study, participants were asked to report the extent to which they paid attention during the study using one 7-point item, where (1) represented *low attention* and (7) represented *high attention* ( $M = 5.966$ ,  $SD = 0.899$ ).

## 5.2 | Results

All dependent measures were submitted to a 2 Résumé Quality (Strong vs. Weak)  $\times$  2 Perceived COVID-19 Threat (High vs. Low) analysis of variance (ANOVA).

### 5.2.1 | Thought favourability

As expected, the  $2 \times 2$  ANOVA on thought favourability revealed a main effect of résumé quality,  $F(1,144) = 604.385$ ,  $p < .001$ ,  $\eta_p^2 = .808$ , such that the final agreed evaluation of the judges showed that the participants' thoughts were more favourable in the strong ( $M = 0.816$ ,  $SD = 0.257$ , 95% CI [0.735, 0.897]) than in the weak résumé condition ( $M = -0.611$ ,  $SD = 0.426$ , 95% CI [-0.692, -0.530]). Because thinking about the résumé and the report of thoughts occurred before the perceived COVID-19 threat induction, we did not expect, or find, any other significant effects on this measure ( $F < 1$ ,  $ps > .360$ ).

### 5.2.2 | Thought confidence

Consistent with our predictions, there was a significant main effect of the perceived COVID-19 threat induction on participants' ratings of thought confidence,  $F(1,144) = 7.348$ ,  $p = .008$ ,  $\eta_p^2 = .049$ . Specifically, participants reported greater confidence in their thoughts in the high perceived threat condition ( $M = 5.743$ ,  $SD = 0.839$ , 95% CI [5.520, 5.966]) than in the low perceived threat condition ( $M = 5.311$ ,  $SD = 1.128$ , 95% CI [5.088, 5.534]). We also found a non-predicted main effect of résumé quality,  $F(1,144) = 9.300$ ,  $p = .003$ ,  $\eta_p^2 = .061$ , such that participants reported more confidence in their thoughts in the strong résumé condition ( $M = 5.770$ ,  $SD = 0.824$ , 95% CI [5.547, 5.993]) than in the weak résumé condition ( $M = 5.284$ ,  $SD = 1.129$ , 95%

CI [5.061, 5.507]). Importantly, as expected, there was no significant interaction effect ( $F < 1$ ,  $p = .778$ ).

### 5.2.3 | Attitudes towards the job candidate

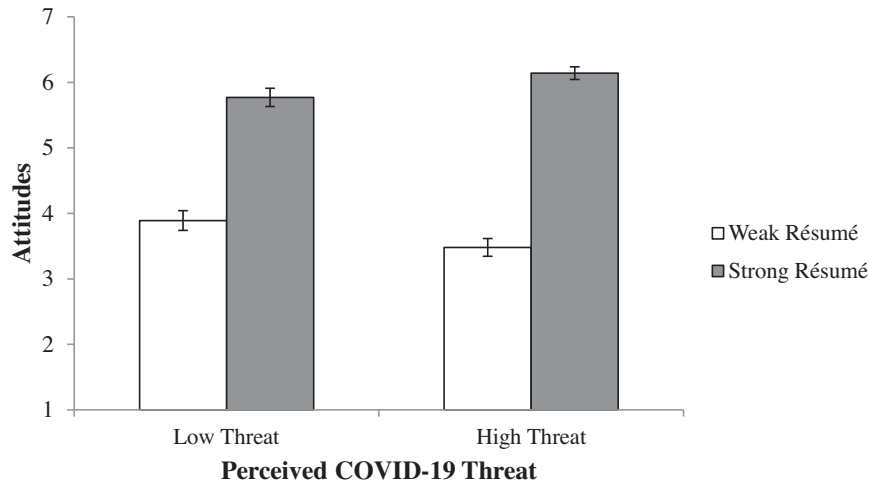
The  $2 \times 2$  ANOVA on attitudes towards the job candidate revealed a main effect of résumé quality, showing that participants in the strong résumé condition reported significantly more favourable attitudes towards the candidate, ( $M = 5.962$ ,  $SD = 0.746$ , 95% CI [5.777, 6.146]) than participants in the weak résumé condition, ( $M = 3.689$ ,  $SD = 0.889$ , 95% CI [3.505, 3.874]),  $F(1,144) = 296.514$ ,  $p < .001$ ,  $\eta_p^2 = .673$ . There was no main effect of perceived COVID-19 threat ( $F < 1$ ,  $p = .851$ ). Most importantly, there was a significant Résumé Quality  $\times$  Perceived Threat interaction,  $F(1,144) = 8.717$ ,  $p < .004$ ,  $\eta_p^2 = .057$  (Cohen's  $f^2 = 0.060$ ). As depicted in Figure 3, this interaction revealed that the effect of résumé quality on attitudes was greater in the high than in the low threat conditions. That is, participants assigned to the high perceived COVID-19 threat showed greater differentiation in attitudes between those who read the strong ( $M = 6.144$ ,  $SD = 0.587$ , 95% CI [5.883, 6.405]) versus the weak ( $M = 3.482$ ,  $SD = 0.824$ , 95% CI [3.221, 3.743]) versions of the résumé,  $F(1, 144) = 203.455$ ,  $p < .001$ ,  $\eta_p^2 = .586$ . For participants assigned to the low perceived COVID-19 threat, there was a smaller, albeit still significant difference between those who received the strong résumé ( $M = 5.779$ ,  $SD = 0.847$ , 95% CI [5.518, 6.040]) and those who received the weak résumé ( $M = 3.896$ ,  $SD = 0.915$ , 95% CI [3.636, 4.157]),  $F(1, 144) = 101.776$ ,  $p < .001$ ,  $\eta_p^2 = .414$ .<sup>6</sup>

Additionally, we also examined whether there was a stronger relationship between thoughts and attitudes for participants in the high perceived COVID-19 threat than in the low perceived COVID-19 threat conditions. Regressing attitudes onto the relevant predictors (thought favourability, perceived COVID-19 threat, and their interaction term), a significant interaction emerged between thought favourability and perceived COVID-19 threat,  $B = 0.209$ ,  $t(144) = 2.594$ ,  $p = .010$ , 95% CI [0.050, 0.370]. Consistent with SVT, this interaction revealed that participants' thoughts exerted a stronger effect on attitudes when participants were in the high perceived COVID-19 threat condition,  $B = 1.655$ ,  $t(144) = 14.880$ ,  $p < .001$ , 95% CI [1.436, 1.875] than when they were in the low perceived COVID-19 threat condition,  $B = 1.237$ ,  $t(144) = 10.570$ ,  $p < .001$ , 95% CI [1.005, 1.468].

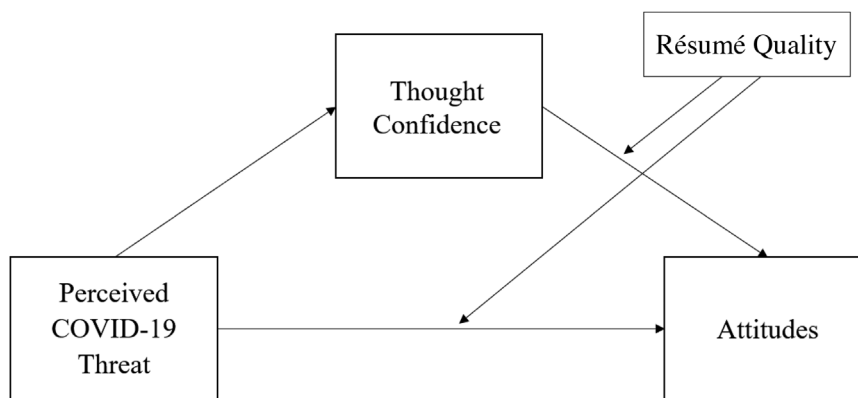
### 5.2.4 | Attention check

We submitted the attention check to the same 2 (Résumé Quality: Strong vs. Weak)  $\times$  2 (Perceived COVID-19 Threat: High vs. Low) ANOVA. Results showed that the extent of attention reported by par-

<sup>6</sup> Viewed differently, among participants in the strong résumé condition, there were more favourable evaluations of the candidate in the high ( $M = 6.144$ ,  $SD = 0.587$ , 95% CI [5.883, 6.405]) than the low ( $M = 5.779$ ,  $SD = 0.847$ , 95% CI [5.518, 6.040]) perceived COVID-19 threat conditions,  $F(1, 144) = 3.822$ ,  $p = .053$ ,  $\eta_p^2 = .026$ . In contrast, for participants in the weak résumé condition, there were less favourable evaluations of the candidate in the high ( $M = 3.482$ ,  $SD = 0.824$ , 95% CI [3.221, 3.743]) than the low ( $M = 3.896$ ,  $SD = 0.915$ , 95% CI [3.636, 4.157]) threat conditions,  $F(1, 144) = 4.930$ ,  $p = .028$ ,  $\eta_p^2 = .033$ .



**FIGURE 3** Attitudes as a function of résumé quality and perceived COVID-19 threat.



**FIGURE 4** Moderated mediation model.

Participants did not vary as a function of résumé quality,  $F(1, 144) = 0.405$ ,  $p = .525$ ,  $\eta_p^2 = .003$ . Those assigned to the weak résumé condition did not pay significantly more or less attention ( $M = 5.919$ ,  $SD = 1.057$ , 95% CI [5.711, 6.127]) than those assigned to the strong résumé condition ( $M = 6.014$ ,  $SD = 0.712$ ; 95% CI [5.806, 6.221]). The same occurred with the induction of the perceived COVID-19 threat,  $F(1, 144) = 0.074$ ,  $p = .785$ ,  $\eta_p^2 = .001$ , and those assigned to the COVID-19 threat condition did not pay significantly more or less attention ( $M = 5.946$ ,  $SD = 0.809$ , 95% CI [5.738, 6.154]) than those assigned to the being cold condition ( $M = 5.986$ ,  $SD = 0.986$ , 95% CI [5.779, 6.194]). The interaction also was not significant,  $F(1, 144) = 1.001$ ,  $p = .319$ ,  $\eta_p^2 = .007$ .

### 5.2.5 | Mediation analysis

To examine whether thought confidence mediated the effect of the theorized interaction between résumé quality and perceived COVID-19 threat on attitudes, we tested the mediation hypothesis using Model 15 in the Process Macro for SPSS (see Hayes, 2022). This model is a moderated mediation analysis in which threat was treated as the independent variable, attitudes as the dependent variable, thought confidence as the mediator, and résumé quality as a moderator of both the relationship between threat and attitudes and the relationship between

thought confidence and attitudes (see Figure 4). The model predicting thought confidence found a significant effect of the perceived COVID-19 threat,  $b = 0.216$ ,  $SE = 0.082$ ,  $t(146) = 2.645$ ,  $p = .009$ . The model predicting attitudes found a significant effect of the Thought Confidence  $\times$  Résumé Quality interaction,  $b = 0.193$ ,  $SE = 0.071$ ,  $t(142) = 2.714$ ,  $p = .008$ . In addition, a significant main effect of résumé quality,  $b = 1.112$ ,  $SE = 0.067$ ,  $t(142) = 16.601$ ,  $p < .001$ , and a significant Résumé Quality  $\times$  COVID-19 Threat interaction,  $b = 0.155$ ,  $SE = 0.066$ ,  $t(142) = 2.338$ ,  $p = .021$ , were found.

Most importantly, results revealed that the indirect effect via thought confidence was significantly different from zero,  $b = 0.084$ ,  $SE = 0.042$ , 95% CI [0.021, 0.194], supporting the proposed mediation. This model also provides the conditional indirect effect of perceived COVID-19 threat on attitudes at values of the moderator (Résumé Quality). That is, the indirect effect was positive and significant for the strong résumé condition,  $b = 0.063$ ,  $SE = 0.035$ , 95% CI [0.012, 0.153], and negative but non-significant for the weak résumé condition,  $b = -0.020$ ,  $SE = 0.018$ , 95% CI [-0.070, 0.008]. Although the effect for the weak message was not significant, the pattern is clear in showing that confidence leads to opposite findings depending on the valence of the thoughts.<sup>7</sup>

<sup>7</sup> In addition to the mediation just reported, we conducted an additional mediational analysis using Model 4 of the PROCESS add-on for SPSS (see Preacher & Hayes, 2004; Shrout & Bolger,

### 5.3 | Discussion

Consistent with our predictions, Study 3 showed that perceived COVID-19 threat increased thought confidence, and this thought confidence was a plausible mediator. This finding is especially important given that it provided empirical evidence of the proposed mechanism. These results are consistent with the idea that perceived threats such as COVID-19 can polarize judgements unrelated to the threat by magnifying the impact of accessible thoughts on judgements and operating via the proposed self-validation mechanism.

These results are consistent with the idea that experimental conditions affected confidence while not influencing the extent of thinking, at least when assessed with the attention check item included in this study. Although the findings of this study can be interpreted as being more consistent with the proposed mechanism (confidence) than with other potential alternatives such as potential differences in the amount of thinking, one could still wonder about the extent to which the particular induction of threat used in this study affected other non-assessed features. For example, one might consider whether the threat manipulation led to compensatory confidence (as proposed) or simply increased confidence directly (e.g., because there is high perceived consensus for perceptions about highly threatening topics like COVID-19, or because the pandemic has become a more familiar topic for which people might have more knowledge). To ensure that the manipulation used in this third study affected perceptions of threats as intended rather than influencing alternative constructs that also could have been affected by that manipulation (e.g., perceived consensus), a final study was conducted.

## 6 | STUDY 4

This final study was designed to examine to what extent the topic of both threat conditions used in the previous study (i.e., COVID-19 vs. being cold) affected other potential features beyond threat, such as the amount of thinking, perceived consensus, familiarity, accessibility, and knowledge. In this study, participants were randomly assigned to complete the same task used in Study 3 to manipulate the salience of the COVID-19 pandemic. Thus, participants were randomly assigned to either write essays about the COVID-19 pandemic (high perceived threat condition) or about being cold (low perceived threat condition). Following this manipulation, participants were asked to rate their perceptions of threat, and also their perceived amount of thinking, perceived consensus, familiarity, accessibility, and knowledge about the focal topic for which they were asked to write as part of the threat induction (i.e., COVID-19 vs. being cold).

We expected the threat induction (i.e., COVID-19 vs. being cold) to have an impact on perceptions of threat while not affecting the other measures. That is, we predicted that individuals in the high

(vs. low) perceived COVID-19 threat condition would report feeling more (vs. less) threatened, while not reporting differences in amount of thinking, perceived consensus, familiarity, accessibility, and knowledge.

### 6.1 | Method

#### 6.1.1 | Participants and design

One hundred undergraduate psychology students (84% women, mean  $age = 19.540$ ,  $SD = 3.220$ ) at the Universidad Autónoma de Madrid participated in partial fulfillment of a course requirement. Participants were randomly assigned to one of the two experimental conditions (i.e., Perceived COVID-19 threat vs. Being cold) in a between-participants factorial design. Sample size was determined based on the number of participants we were able to collect during the week in which the study was posted. The study was available for just one week during October 2022 and the final sample ( $N = 100$ ) provided .80 power to detect an interaction effect size of Cohen's  $f^2 = 0.080$ .

#### 6.1.2 | Procedure

Participants were randomly assigned to provide open-ended responses related to either catching COVID-19 or being cold. After this threat manipulation (identical to Study 3), participants were asked to rate their perceptions of threat about the focal topic (i.e., either COVID-19 or being cold), how much thinking they invested, and other questions related to the perceived consensus, familiarity, accessibility, and knowledge about either COVID-19 or being cold, depending on the assigned condition.

#### 6.1.3 | Independent variable

##### *Perceived COVID-19 threat*

Participants were randomly assigned to the same manipulation of threat used in Study 3.

#### 6.1.4 | Dependent variables

##### *Perceptions of threat*

After the threat manipulation (COVID-19 vs. being cold), participants were asked to rate their perceptions of threat of either COVID-19 or being cold, depending on the assigned condition. Responses were measured on a 7-point scale (1 = *not threatening at all* to 7 = *completely threatening*;  $M = 3.620$ ,  $SD = 1.689$ ).

##### *Extent of thinking*

Participants were also asked to rate how much thinking they invested. Responses were measured on a 7-point scale (1 = *low thinking* to 7 = *high thinking*;  $M = 6.230$ ,  $SD = 1.109$ ).

2002). When using this approach, Résumé Quality  $\times$  Thought Confidence significantly mediated the relationship between our Résumé Quality  $\times$  Perceived COVID-19 Threat variable and attitudes, (Indirect Effect  $a \times b = 0.040$ , 95% CI [0.010, 0.095]). Therefore, as was the case for Model 15, mediation by thought confidence was also supported as plausible (Shrout & Bolger, 2002) when using Model 4.

### Perceived consensus

Participants were asked to rate to what extent there is consensus regarding how it feels to get either COVID-19 or being cold. Responses were measured on a 7-point scale (1 = low consensus to 7 = high consensus;  $M = 5.020$ ,  $SD = 1.137$ ).

### Familiarity

Participants were asked to rate the familiarity they have with the assigned topic. Responses were measured on a 7-point scale (1 = low familiarity to 7 = high familiarity;  $M = 5.680$ ,  $SD = 0.994$ ).

### Accessibility

Participants were asked how quickly their feelings about the assigned topic come to mind. Responses were measured on a 7-point scale (1 = very slow to 7 = very fast;  $M = 5.920$ ,  $SD = 0.861$ ).

### Knowledge

Participants were asked how much knowledge they have about the assigned topic (i.e., either COVID-19 or being cold). Responses were measured on a 7-point scale (1 = low knowledge to 7 = high knowledge;  $M = 5.820$ ,  $SD = 0.903$ ).

## 6.2 | Results

All dependent measures were submitted to a one-way ANOVA using the manipulation of perceived COVID-19 threat (vs. being cold) as the predictor.

### 6.2.1 | Perceptions of threat

As expected, results showed that the threat item varied as a function of the threat induction,  $F(1, 99) = 15.244$ ,  $p < .001$ ,  $\eta_p^2 = .135$ . Those assigned to the COVID-19 threat condition ( $M = 4.240$ ,  $SD = 1.492$ , 95% CI [3.816, 4.664]) reported feeling more threatened than those assigned to the being cold condition ( $M = 3.000$ ,  $SD = 1.678$ ; 95% CI [2.523, 3.477]).<sup>8</sup>

### 6.2.2 | Extent of thinking

Also importantly, results showed that the extent of thinking did not vary as a function of the threat induction,  $F(1, 99) = 0.073$ ,  $p = .788$ ,  $\eta_p^2 = .001$ . Those assigned to the COVID-19 threat condition ( $M = 6.260$ ,  $SD = 1.103$ , 95% CI [5.946, 6.573]) did not think significantly more or less than those assigned to the being cold condition ( $M = 6.200$ ,  $SD = 1.124$ ; 95% CI [5.880, 6.519]).

### 6.2.3 | Perceived consensus

The same occurred with perceived consensus. That is, there were no differences in perceived consensus across the topics used to induce high (COVID-19) and low (being cold) perceptions of threat,  $F(1, 99) = 0.772$ ,  $p = .382$ ,  $\eta_p^2 = .008$ . Those assigned to the COVID-19 threat condition ( $M = 4.980$ ,  $SD = 1.121$ , 95% CI [4.601, 5.238]) did not perceive significantly more or less consensus than those assigned to the being cold condition ( $M = 5.120$ ,  $SD = 1.154$ ; 95% CI [4.791, 5.448]).

### 6.2.4 | Familiarity

Results also showed that familiarity did not vary as a function of the threat induction,  $F(1, 99) = 0.040$ ,  $p = .842$ ,  $\eta_p^2 = .000$ . Those assigned to the COVID-19 threat condition ( $M = 5.660$ ,  $SD = 0.981$ , 95% CI [5.381, 5.938]) did not perceive the topic to be any more or less familiar than those assigned to the being cold condition ( $M = 5.700$ ,  $SD = 1.015$ ; 95% CI [5.411, 5.988]).

### 6.2.5 | Accessibility

The same occurred with accessibility. That is, there were no differences between conditions in how quickly participants reported their feelings to come to mind,  $F(1, 99) = 0.483$ ,  $p = .489$ ,  $\eta_p^2 = .005$ . Those assigned to the COVID-19 threat condition ( $M = 5.980$ ,  $SD = 0.820$ , 95% CI [5.746, 6.213]) did not perceive thoughts to come to mind any more or less quickly than those assigned to the being cold condition ( $M = 5.860$ ,  $SD = 0.903$ ; 95% CI [5.603, 6.116]).

### 6.2.6 | Knowledge

Finally, results also showed that knowledge did not vary as a function of the threat induction,  $F(1, 99) = 0.195$ ,  $p = .660$ ,  $\eta_p^2 = .002$ . Those assigned to the COVID-19 threat condition ( $M = 5.780$ ,  $SD = 0.864$ , 95% CI [5.534, 6.025]) did not perceive knowing any more or less about the topic than those assigned to the being cold condition ( $M = 5.860$ ,  $SD = 0.947$ ; 95% CI [5.590, 6.129]).

## 6.3 | Discussion

The results of this fourth study showed that threat conditions (i.e., COVID-19 vs. being cold) did not differ in any of the measured alternative constructs, only in perceived threat. Although not definitive, these results supported the idea that threat induction did not affect other constructs beyond threat, therefore providing further evidence that the obtained results of Studies 1–3 emerged through a compensatory route rather than through alternative routes. Although a more reliable measure of the constructs assessed in this study could have been more sensitive to any potential differences between threat conditions, the

<sup>8</sup> Even though COVID-19 was probably perceived as relatively less threatening at the time of this final study (October, 2022) than when the original studies were conducted (May 2020, September, and October 2021), the important result is that COVID-19 was still perceived as a bigger threat than being cold.

null effects found for those measures (along with the rest of evidence provided in the other three studies) helps make the compensatory validation explanation a plausible interpretation of the findings.

## 7 | GENERAL DISCUSSION

To test the hypothesis that people can cope with threats by exhibiting compensatory confidence that can be misattributed to accessible thoughts unrelated to the threat, we conducted four different studies varying materials and procedures. Participants were first asked to generate initial thoughts about themselves (Studies 1 and 2) or thoughts about others (Study 3). Thought valence and perceived COVID-19 threat were either measured or manipulated. Results of Studies 1 and 2 showed that increased feelings of threat from COVID-19 were associated with a greater use of thoughts in forming attitudes regardless of whether the accessible thoughts were measured (Study 1) or manipulated (Study 2). Importantly, perceptions of COVID-19 threat affected thought usage even though the thoughts about the self were not directly related to the threat.

Given the materials and results of Studies 1 and 2, one might wonder to what extent the effect of COVID-19 threat on thought usage is constrained to thoughts relevant to the self. However, Study 3 conceptually replicated these findings using a full experimental design with different materials and inductions, and most importantly with an object of evaluation that was totally different from the self. As noted, participants in Study 3 were asked to think about a job candidate (rather than about themselves as in the first two studies), and COVID-19 threat was experimentally manipulated (rather than measured). Thus, in Study 3, we removed the self as the object, the perceived threat was totally unrelated to the content of thoughts, and the two independent variables were fully orthogonal. Despite these changes, participants in the COVID-19 (vs. being cold) condition showed greater impact of their previously generated thoughts on attitudes towards the job applicant. Importantly, this study provided evidence for the proposed meta-cognitive mechanism by showing that the obtained results on attitudes were plausibly mediated by the impact of COVID-19 threat on thought confidence. A final study (Study 4) addressed some potential alternative interpretations by showing that the induction of threat used in Study 3 affected perceived threat while not having an impact on other assessed features, ranging from perceived consensus to perceived knowledge.

It is important to note that Proulx et al. (2012) have argued that all existential threats, as well as a wide range of non-existential inconsistencies (e.g., dissonance), share some fundamental similarities. In fact, regardless of the specific antecedents, a 'core motivation' underlying any threat, or the discrepancy that activates basic neural processes related to anxiety (e.g., BIS and BAS, Jonas et al., 2014), is that individuals are motivated to reduce the threat (Jonas et al., 2014). Consistent with this proposal, the self-validation process examined in the current studies can be understood as a distal defence mechanism to restore certainty (or validity) and thereby mitigate the feelings of threat related to COVID-19. Also, it is important to high-

light that we found the same effects across multiple timepoints during the pandemic, suggesting that even when the incidence of COVID-19 became less severe, it still was capable of producing compensatory effects.

In sum, the present approach has been useful for understanding extreme sources of threat such as those coming from direct reminders of death (Horcajo, Briñol et al., 2022), as well as relatively more prevalent and familiar origins of threat such as those emerging from perceptions of COVID-19 (as illustrated by the current studies). Future research could benefit from examining the extent to which this self-validation mechanism could be relevant to addressing the effects of other sources of threats unrelated to health, such as merely receiving criticism, embarrassment, expectancy violations, belief discrepancies, and beyond (Briñol et al., 2015; Siev et al., 2022).

Furthermore, unlike most prior research which deals with a general sense of certainty influencing processes of primary cognition (e.g., affecting the content and the number of thoughts generated; see Heiss et al., 2021), we focused on a meta-cognitive mechanism (i.e., compensatory confidence affecting reliance on previously generated thoughts). It is also important to note that the effects found in the present research replicated results of prior self-validation studies (i.e., polarization of evaluation), even though the timing in which perceived threat was made accessible was not the conventional one in most studies of threat. That is, the present studies reveal that threat not only has effects when introduced *before* processing information, but also when made accessible *after* having generated thoughts and prior to rendering a judgement.

### 7.1 | Implications and practical applications

The compensatory validation process proposed for these studies is expected to be applicable to many different types of thoughts (Briñol & Petty, 2022). Regardless of how initial thoughts are activated (i.e., naturally as in Study 1, by instructions as in Study 2, or in response to external information as in Study 3), the thoughts subjected to validation processes can come from a wide range of topics including the self and others (as in the present studies), but they can also be about fake news, thoughts about the political system, society, groups, etc. The key idea behind this generalization feature is that confidence (in this case, the compensatory confidence emerging from threat) can be applied to whatever the accessible mental elements are in mind at the time, regardless of their specific content, valence, and nature.

Therefore, we believe that threats related to COVID-19 could produce a compensatory validation of whatever mental content is accessible at that time (e.g., including for instance thoughts related to shopping behaviour; Reddy, 2022). For example, regarding *fake news*, our expectation is that COVID-19 threat would lead people to rely on whatever thoughts they might generate after receiving misinformation. That is, if after reading a fake news story, someone generates a positive thought (e.g., starts believing that there is a global conspiracy or that the Earth is flat), then subsequent reminders of the COVID-19

threat would increase reliance on those initial thoughts. In that case, threat would magnify the impact of misinformation on relevant judgements and behaviours. In contrast, if people counter-argue fake news, generating negative thoughts, then the same reminder of COVID-19 (or some other threat) would increase reliance on the initial negative thoughts leading to strong rejection of the proposal embedded in the fake news. Therefore, the COVID-19 threat can make fake news more persuasive (when initial thoughts are favourable towards the intended proposal) or more likely to be rejected (when initial thoughts are against the proposal of the fake news). Similarly, if someone has initial thoughts consistent with the social or political system, and then they are threatened (e.g., by COVID-19), we would expect threat to magnify the effect of those initial system-consistent thoughts. However, if someone has initial thoughts against the system to begin with, then the very same threat will be expected to increase their impact leading to anti-system responses. Again, from the SVT perspective, threat inductions can either increase or decrease system justification depending on the thoughts validated by the compensatory defence from those threats.

Similarly, the extent to which individuals perceive COVID-19 as threatening would also be expected to polarize thoughts about groups and about society. For example, consider past research showing that other sources of threat unrelated to the pandemic (e.g., a terrorist attack) can polarize the responses from groups with different political ideologies. In that case, reminders of terrorist attacks increased perceived threat and produced opposite responses for Republicans and Democrats in the US, magnifying the effect of their initial political beliefs. For Republicans, defending against the threat from terrorism led to more war support, whereas for Democrats the same threat reminders led to less war support (see Burke et al., 2013). Consistent with these findings, other sources of threat have been shown to increase in-group identification (e.g., Arndt et al., 2002; Branscombe et al., 1993; Hohman & Hogg, 2015) and outgroup discrimination (e.g., Greenberg & Kosloff, 2008), and to polarize both chronic individual and cultural differences (e.g., Ma-Kellams & Blascovich, 2012; Salzman, 2001; see also, Schindler et al., 2021). Taken together, we can say that the same threat (in this case, from COVID-19) can increase but also decrease conflict (e.g., at the societal level, between groups, etc.), depending on individuals' initial thoughts. Consistent with this view, recent research has shown that threat produces opposite effects on attitudes towards immigrants depending on political ideology. This research showed that the relationship between political ideology (liberals and conservatives) and attitudes towards immigrants was affected by perceptions of threat: Conservatives (vs. liberals) reported more negative (vs. positive) attitudes towards immigrants as perceived threat increased (see Stewart et al., 2019).

## 7.2 | Future research

As noted, the results of this research showed that people can cope with COVID-19 threat by exhibiting compensatory confidence that can be misattributed to any accessible thoughts even if those initial thoughts

are unrelated to the threat. Future research could benefit from examining the circumstances under which people are most likely to use this meta-cognitive process (rather than other defence mechanisms based on changes in primary cognition, which has been the focus of most prior research). For example, regarding potential moderators, SVT establishes that the occurrence of self-validation processes is moderated by whether thinking is relatively high or low. Specifically, SVT specifies that meta-cognitive processes are more likely to occur when thinking at the time of judgement or action is relatively high rather than low. That includes not only taking initial thoughts into consideration, but also thinking about the perceived validity of those thoughts. The idea is that because thought validation is a meta-cognitive process, it requires a greater extent of thinking than the mere generation of an initial thought. Therefore, future studies could be designed to vary elaboration to establish moderating conditions.<sup>9</sup>

As noted, previous research on SVT has demonstrated that thoughts can be validated by direct inductions of confidence (e.g., feeling powerful; see Briñol & Petty, 2022). In contrast, the present research predicted and found that thought validation also can result from compensatory confidence that emerges from defending the self from threats such as the COVID-19 pandemic. Future research should also examine similarities and differences between direct validation (the focus of most prior research in SVT) and compensatory validation (the focus of this current research). For example, it would be important to know whether the polarization effect that emerges from compensatory (vs. direct) confidence leads to different consequences in the long term. As noted earlier, future research could also examine similarities and differences between the threats emerging from the pandemic and other potential sources of threat. Finally, given that our samples were mainly composed by female undergraduates, future studies could benefit from using more diverse samples of participants and materials.<sup>10</sup>

## CONFLICTS OF INTEREST STATEMENT

We have no known conflict of interest to disclose.

<sup>9</sup> Even though Study 3 was designed to create relatively high thinking conditions across all participants (in fact, the average level of attention reported was very high,  $M = 5.966$ ,  $SD = 0.899$ , on a 7-point scale), one still could examine to what extent there was enough room for any potential moderation by the assessed item of attention. We found that the obtained two-way interaction between thought valence and threat induction was only significant for participants who reported higher levels of attention (+1SD),  $B = 0.269$ ,  $t(140) = 2.733$ ,  $p = .007$ , 95% CI [0.074, 0.463], but not for those with relatively lower levels of attention (-1SD),  $B = 0.127$ ,  $t(140) = 1.267$ ,  $p = .207$ , 95% CI [-0.071, 0.325]. However, when attention was entered as an additional factor, the three-way interaction was not significant,  $B = 0.079$ ,  $t(140) = 0.965$ ,  $p = .336$ , 95% CI [-0.083, 0.240].

<sup>10</sup> The samples of these studies were composed of mostly female participants. That is often the case in psychology studies given the enrolment patterns. However, we did not expect nor find any gender differences. First, we collapsed the data of the two studies in which gender was collected (Studies 1 and 2) for maximum power. After standardizing the dependent variables, dichotomizing at the median the continuous variable of thought valence in the only study in which it was not experimentally manipulated (Study 1) and including gender as an additional factor in this combined dataset, the results revealed that the predicted two-way interaction between thought valence and perceived COVID-19 threat on the dependent variable remained significant,  $B = 0.112$ ,  $t(381) = 3.818$ ,  $p < .001$ , 95% CI [0.054, 0.170], and was not further qualified by gender,  $B = -0.072$ ,  $t(378) = -0.736$ ,  $p = .462$ , 95% CI [-0.266, 0.121]. The same results were observed when gender was included as an additional predictor in each study analysed individually. The SVT two-way interaction was not qualified by gender either in Study 1,  $B = -0.044$ ,  $t(179) = -0.362$ ,  $p = .718$ , 95% CI [-0.284, 0.196], or in Study 2,  $B = -0.099$ ,  $t(196) = -0.578$ ,  $p = .564$ , 95% CI [-0.438, 0.239].

## TRANSPARENCY STATEMENT

The manuscript is accompanied with open data at the OSF platform (<https://osf.io/m9tru/>).

## ETHICS STATEMENT

Participants gave their informed consent prior to their inclusion in the study and research was conducted in accordance with APA guidelines on the ethical treatment of human subjects.

## DATA AVAILABILITY STATEMENT

The manuscript is accompanied with open data at the OSF platform (<https://osf.io/m9tru/>).

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