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## Empirical Article

**Experimental manipulation of uncanny feeling does not increase adherence to conspiracy theories**

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Research over the past decade has shown that endorsement of conspiracy theories (CTs) is shaped by motivated cognition processes. Accordingly, CTs are theorized to stem from compensatory processes, as individuals attempt to cope with existential threats (i.e., uncertainty, loss of control). Based on the meaning maintenance model, we investigated whether this compensatory effect could follow from epistemic threats in domains unrelated to CTs in the form of uncanniness. Feelings of uncanniness were experimentally manipulated through exposure to absurdist art and literature in a set of five studies, followed by a mini meta-analysis ( $N_{\text{total}} = 1,041$ ). We conducted a final, preregistered sixth study ( $N = 266$ ) manipulating uncanniness through autobiographical recall. No robust evidence for a compensatory effect was found. We discussed methodological and conceptual limitations of the meaning maintenance model, as well as boundary conditions under which conspiracy theories could have a compensatory function to deal with threats.

**Key words:** Conspiracy theories, meaning maintenance model, uncanny, threat, compensation, absurdist art.

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## INTRODUCTION

A conspiracy theory (CT) can be defined as a “proposed explanation of events that cites as a main causal factor a small group of persons (the conspirators) acting in secret for their own benefit, against the common good” (Uscinski, Klofstad & Atkinson, 2016, p. 58). A recent survey showed that 20% of French people agreed with the theory that the US government is supporting the war in Ukraine to hide the dubious economic activities of the president Joe Biden’s son, and 15% agreed with the theory that the massacre of civilians at Boutcha in Ukraine was staged by the Ukrainian authorities (IFOP & AMB-USA, 2023). According to another survey, 9% of French people think that vaccines against COVID-19 contain nano-electronic chips that can be tracked using 5G (IFOP & Reboot, 2022). The extent to which those beliefs are shared among the population is not limited to France. For example, in the United States, 25% of respondents said that it is definitely or probably true that powerful people intentionally planned the COVID-19 outbreak (Pew Research Center, 2020). In the United Kingdom, 35% of respondents said they do not think the official versions of the origins of serious terrorist attacks that have taken place in the country in recent years tell the whole truth (Policy Institute at King’s College London, 2022).

Far from being innocuous, beliefs in CTs can have serious negative societal consequences (Douglas *et al.*, 2019). Indeed, endorsing medical CTs may lead individuals to engage in risky

health behaviors, such as vaccine hesitancy and decreased compliance with social distancing rules during the COVID-19 outbreak (Bierwiazczek, Gundersen & Kunst, 2022; Marinho, Brown, Delouée & Jolley, 2020; van Mulukom *et al.*, 2022). Lamberty and Imhoff (2018) found that conspiracy mentality predicted a preference for so-called “alternative” medicine (over medically validated treatments). Endorsement of CTs also undermines acceptance of scientific knowledge (e.g., in the existence of climate change; Bertin, Nera, Hamer, Uhl-Haedicke & Delouée, 2021; Lewandowsky, Gignac & Oberauer, 2013) and is associated with endorsing or supporting political violence or radical actions (Vegetti & Littvay, 2022). Therefore, understanding the psychological processes that underlie adherence to CTs remains a crucial task.

*Conspiracy theories as compensatory processes*

Among the numerous determinants of adherence to CTs (e.g., individual differences in cognitive ability, personality; Goreis & Voracek, 2019; Stasielowicz, 2022), research over the past decade has shown that endorsement of CTs is also shaped by motivated cognition processes (Krekó, 2015; Kunda, 1990). Accordingly, endorsement of CTs has been conceptualized as an attempt to satisfy unmet psychological needs that are epistemic (i.e., feeling certainty and meaning regarding one’s surroundings), existential (i.e., feeling in control and safe), and social (i.e., defending the

image of oneself, feeling that one belongs to a group with a positive image) needs (Biddlestone, Green, Cichocka, Douglas & Sutton, 2022; Douglas *et al.*, 2019; Douglas, Sutton & Cichocka, 2017).

The role of epistemic motives in explaining adherence to CTs is supported by research showing that people adhere more to CTs under uncertainty (Biddlestone, Green, Cichocka, Douglas & Sutton, 2022; van Prooijen & Jostmann, 2013) and when they are motivated to search for coherent patterns in the environment (Van Elk & Lodder, 2018; van Prooijen, Douglas & De Inocencio, 2018; Whitson & Galinsky, 2008). Similarly, the role of existential motives is supported by research showing that people are more likely to turn to CTs when they experience general or existential anxiety (Biddlestone, Green, Cichocka, Douglas & Sutton, 2022; Liekefett, Christ & Becker, 2021; Scrima, Miceli, Caci & Cardaci, 2022) or powerlessness (see van Mulukom *et al.*, 2022). Finally, the role of social motives in explaining CTs was supported by studies that showed greater adherence to CTs among people who experience ostracism (Graeupner & Coman, 2017; Poon, Chen & Wong, 2020), collectivist values (Adam-Troian *et al.*, 2021), defensive in-group identity, or collective narcissism (Bertin, Marinthe, Biddlestone & Delouvé, 2022; Golec de Zavala, Bierwiazzonek & Ciesielski, 2022) or who hold intergroup prejudice (Imhoff & Bruder, 2014; Nera, Wagner-Egger, Bertin, Douglas & Klein, 2021).

This overall pattern of evidence suggests that individuals tend to turn to CTs in an attempt to regulate perceived threats to their psychological needs. In other words, adherence to CTs can result from compensatory processes following threats to basic psychological needs (Douglas, Sutton & Cichocka, 2017; Pellegrini *et al.*, 2021; Stojanov, Bering & Halberstadt, 2020).

#### *Meaning maintenance model and conspiracy beliefs*

Compensatory processes resulting from epistemic and existential threats were extensively addressed by the meaning maintenance model (MMM; Heine, Proulx & Vohs, 2006). The MMM was proposed as an overarching framework for multiple theories pertaining to compensatory responses to so-called “meaning” threats broadly defined (e.g., threats to certainty, perceived control, order, structure, or worldview coherence; Proulx & Inzlicht, 2012). According to this model, individuals understand their environment by structuring their experiences and knowledge in terms of expectations and anticipated causal relationships between stimuli (Proulx & Major, 2013). The MMM also assumes that when individuals’ meaning frameworks are violated, they experience a negative arousal that generates a motivation to resolve the violation (Proulx, Heine & Vohs, 2010). To do so, individuals can adjust their meaning frameworks so that the unexpected event becomes coherent with their beliefs (i.e., change their attitudes; Randles, Inzlicht, Proulx, Tullett & Heine, 2015). So, for instance, a job applicant faced with a rejection after an interview they believed to have been successful may retrospectively change their attitudes and believe they had failed the interview in the first place.

Although this is a classical prediction directly derived from an integrative take including cognitive dissonance theory (Harmon-

Jones & Harmon-Jones, 2007), the MMM offers less intuitive mechanisms that may be of interest to study CTs. In fact, the theory states that another way to resolve a meaning violation is to focus on alternative, accessible but unrelated (or remotely related) meaning frameworks that make sense out of the world (Heine, Proulx & Vohs, 2006) through a process called compensatory abstraction (Proulx & Inzlicht, 2012). This process can be defined as distal attempts to restore a sense of control and predictability in a domain not directly related to the one that was threatened (Proulx & Heine, 2010; Proulx & Inzlicht, 2012). Following our previous example, a rejected applicant could be more likely to adhere to CTs about immigrants or Jewish bankers to make sense of their failure. Hence, compensatory abstraction could be one of the cognitive processes underlying the robust, positive link between personal economic failure and beliefs in CTs (Adam-Troian *et al.*, 2022; Wagner-Egger, Adam-Troian, Cordonier, Cafiero & Bronner, 2022).

Several authors have repeatedly highlighted the theoretical usefulness using the MMM to understand how certain types of threats may motivate endorsement of CTs (see Golec de Zavala, 2021; Proulx & Inzlicht, 2012; van Prooijen, 2020). Yet, to the best of our knowledge, no empirical tests of MMM threat manipulations on endorsement of CTs have been conducted so far. In a MMM perspective, we propose that CTs could be considered as accessible beliefs that serve an existential and epistemic function when people’s meaning framework is disrupted. Meaning threat could trigger compensatory processes that would lead to endorsing CTs when they are available beliefs, because they would represent a powerful, encompassing alternative meaning framework. This is likely to be the case as CTs typically offer meaningful narratives to understand complex situations, seemingly coherent relationships between persons or events based on perception of patterns and agency (van Prooijen, 2020; van Prooijen & van Vugt, 2018). In other words, CTs “provide unifying, even if false, frameworks to interpret events that are otherwise difficult to connect and explain” (Golec de Zavala, 2022, p. 285). Importantly, according to the process of compensatory abstraction, endorsing CTs could be triggered by threats that do not necessarily relate to the content of CTs (or do so only remotely; Proulx & Inzlicht, 2012; Golec de Zavala, 2021). To mobilize a methodological framework comparable to those used in the studies about compensatory abstraction that is consistent with the MMM, and to consider meaning violations that are reasonably unrelated to conspiracy beliefs (CBs), we therefore propose to focus on a kind of meaning violation that is not personally threatening (Proulx & Major, 2013): feelings of uncanniness (Proulx, Heine & Vohs, 2010).

#### *Uncanny feeling as an epistemic threat*

Based on Freud (1990), uncanniness was defined by Proulx, Heine, and Vohs (2010) as a particular “feeling aroused by unfamiliar experiences in *familiar* situations” (p. 818), or by perceiving incongruities that are unexpected in a familiar setting. In a structured and meaningful situation, the perception of incongruent stimuli generates a violation of individual expectations. Proulx, Heine, and Vohs (2010) proposed (and

experimentally corroborated) that exposure to absurdist art and literature – in which unexpected elements are inserted into a familiar or meaningful structure – is an effective way to induce uncanny feeling and leads to “compensation” effects. As feelings of uncanniness threaten individual meaning frameworks about basic expectancies and not personal or social aspects (Proulx & Major, 2013), it can be conceptualized as a particular form of epistemic threat.

Note that epistemic threats – as considered in the CT literature – include, among others, epistemic uncertainty (Biddlestone, Green, Cichocka, Douglas & Sutton, 2022), which Proulx and colleagues closely linked with uncanny feeling (Proulx, Heine & Vohs, 2010) and absurdity (Proulx & Major, 2013), without necessarily specifying the nature of the relation between the two concepts. Following the few studies on CTs that experimentally manipulated epistemic uncertainty and were included in a recent meta-analysis (Biddlestone, Green, Cichocka, Douglas & Sutton, 2022), epistemic uncertainty and uncanny feeling can be considered as separate constructs. For example, in one study (van Prooijen & Jostmann, 2013), uncertainty was induced by asking participants to describe their emotional and physical state when they are “uncertain,” without offering a more precise definition of this feeling. In two other studies (Marchlewska, Cichocka & Kossowska, 2018, Study 2; Nyhan *et al.*, 2016), uncertainty was manipulated by the amount of information provided to describe the occurrence of an event susceptible to conspiracy explanation. Finally, in a meta-analysis (Biddlestone, Green, Cichocka, Douglas & Sutton, 2022), the evidence for an effect of epistemic uncertainty on CTs was mixed (i.e., significant among non-student samples and not among student samples).

Only Proulx, Heine, and Vohs’s (2010) work seems to have investigated the effect of feeling uncanniness in the context of compensatory processes. The results of a first study indicated that participants exposed to absurdist art compensated for the meaning threat by more affirming aspects of their cultural in-group than participants in the control condition. The results of a second study indicated that participants exposed to absurdist humor compensated for the meaning threat by punishing a lawbreaker more than participants in the control condition. Finally, in a third study, participants exposed to an absurdist painting or invited to think about their own mortality presented a higher need for personal structure – suggesting an increase in need for meaning – than participants in the control condition.

### *The present research*

In this study, we propose that MMM is of theoretical interest to better understand how endorsement of CTs may stem from compensatory processes following exposure to a threat. More specifically, compensatory abstraction could be a likely candidate to explain why individuals threatened in their personal or social lives (by failure or interpersonal rejection) are more prone to adhere to medical or political CTs that – at face value – do not meaningfully relate to these threats. In addition, the MMM conceptualized feelings of uncanniness as an original threat (Proulx, Heine & Vohs, 2010) that we propose to test as a particular kind of epistemic threat and distinct from epistemic uncertainty (as considered in Biddlestone, Green, Cichocka,

Douglas & Sutton, 2022). Insofar as evidence for an effect of epistemic uncertainty on endorsement of CTs is still mixed (see Biddlestone, Green, Cichocka, Douglas & Sutton, 2022), it seems important to test whether other types of related but distinct threats (i.e., uncanny feeling) can have an effect on endorsement of CBs. Feelings of uncanniness should therefore increase adherence to CTs if these are indeed accessible beliefs that serve an epistemic function following expectancy violations. We conducted a series of six studies to test this hypothesis.

### OVERVIEW

To test if endorsement of CTs can be triggered by an uncanny feeling, we conducted six experimental studies using subtle priming methods. The hypothesis we wished to test was straightforward. If induction of an uncanny feeling creates a meaning threat, and if CTs serve as a coping mechanism to restore meaning following such a threat, then exposure to uncanny stimuli should increase individuals’ adherence to CBs. Thus, we predicted that adherence to CTs would be higher in an uncanny condition compared with a control condition. If successful, this test would provide further empirical corroboration of the value of the MMM and feelings of uncanniness in understanding adherence to CTs. This article reports a series of six studies that are direct or conceptual replications of each other, focused on the main effect of uncanny feeling manipulation on adherence to CBs. To provide a concise presentation of this work, we first presented our five initial studies, followed by a mini meta-analysis (Goh, Hall & Rosenthal, 2016). At a second time, we presented a preregistered sixth and final study, carried out to ultimately attempt to replicate the previous results by overcoming some of the limitations common to the previous five studies.

All studies were conducted in accordance with the Helsinki Declaration (WMO, 1964) and its later amendments, the ethical principles of the French Code of Ethics for Psychologists (CNCDP, 2021), and the 2016 APA Ethical Principles of Psychologists and Code of Conduct (APA, 2017). All statistical analyses were made using JAMOVI, and significance threshold  $\alpha$  was set at 0.05. Datasets and the materials used for all studies can be found on the following OSF repository: [https://osf.io/r5d7g/?view\\_only=fdaf8498a28d4af3bcf6bca57a724a72](https://osf.io/r5d7g/?view_only=fdaf8498a28d4af3bcf6bca57a724a72).

### STUDIES 1 TO 5

#### *General method*

In each study, participants were assigned to an uncanny vs. control condition. Uncanny feeling was manipulated through two different methods across studies. The five studies were based on paper-and-pencil (Studies 1 and 5) and online (Studies 2, 3, and 4) questionnaires. Mixing these two study formats should provide more internal and external validity to our results. Methodological details and sample characteristics for each study are summarized in Table 1. Based on methodological and theoretical considerations, we computed a priori power with G\*Power (Faul, Erdfelder, Buchner & Lang, 2009). We estimated the expected effect size as follows. First, uncanny feeling manipulation in Proulx, Heine, and Vohs’s (2010) study was associated with

Table 1. *Methodology and sample characteristics for Studies 1 to 5*

Study	Type	Prime	Population	$N_{\text{total}}$	$N_{\text{control}}$	$N_{\text{threat}}$	Male (%)	$M_{\text{age}}$
1	Paper	Text	Undergraduate students	134	69	65	15	18.87 (1.37)
2	Online	Painting	General	237	109	128	13	32.01 (11.90)
3	Online	Painting	General	269	146	123	17	36.92 (14.64)
4	Online	Painting	Undergraduate students	274	136	138	16	20.54 (4.35)
5	Paper	Painting	Undergraduate students	127	66	61	20	21.54 (2.86)

Note: Numbers between parentheses represent *SDs*.

differences on personal need of structures that was  $\eta^2 = 0.15$  (or Cohen's  $d = 0.84$ ). Because the online questionnaire methodology generates much more noise than in the carefully controlled laboratory conditions of the original experiment, we expected the effect size to be lower than this one, around  $\eta^2 = 0.10$ , which corresponds to a moderate effect (Cohen's  $d = 0.66$ ) according to Cohen (1988). Given this effect size, with parameters set for two-tailed independent samples *t*-tests, a power of 0.95 and  $\alpha = 0.05$ , minimum required sample size was 61 per condition ( $N = 122$ ) for each study. Only participants with missing data were removed from the sample. Datasets can be found on the OSF repository.

#### Detailed method for the five studies

**Study 1.** This study was conducted with a paper-and-pencil questionnaire, introduced as a study about “art, reasoning, and political opinions.” Uncanny feeling was induced with the same manipulation as in Proulx, Heine, and Vohs's (2010) Study 1, based on two texts. In the control condition, participants had to read a meaningful text, a version of Aesop's parable “The Tortoise and the Hare,” which ended with a conclusion following the moral premises of the story. In the uncanny feeling condition, participants had to read an absurd parable, an abridged version of Kafka's “An Imperial Message,” ending with an absurd conclusion that does not follow the premises of the story (see Proulx, Heine & Vohs, 2010, Study 1, for a detailed presentation about the content of these two parables). In Proulx, Heine, and Vohs's (2010) Study 1, the manipulation led the participants in the experimental condition to evaluate aspects of their cultural in-group as being more important to their identity than participants in the control condition, suggesting that the manipulation was effective in inducing uncanny feelings and then compensatory abstraction by affirming another available meaningful framework. In our study, participants were asked to carefully read the text, and they were told that they would have to later answer questions about it. Participants were randomly assigned to one of two conditions by the software.

Next, participants were asked to fill out a French version of the Positive and Negative Affect Scale (PANAS; Watson, Clark & Tellegen, 1988; see Caci & Baylé, 2007, for the French validation) and a distractor task. These two tasks were mainly used as a delaying period between the uncanny feeling manipulation and the measure of CT endorsement. In accordance with the general process model of threat and defense (Jonas *et al.*, 2014; Pyszczynski, Greenberg & Solomon, 1999; Wichman, Brunner & Weary, 2008), a delay period after exposure to threat is required to catalyze compensation effects on beliefs (for more details, see Greenberg, Pyszczynski, Solomon, Simon &

Breus, 1994). The experimental condition highlights a discrepancy between individual expectations about the conclusion of the parable and the effectively presented conclusion. This meaning violation should lead to an uncanny feeling that could be dealt with in different ways. The delay period was demonstrated to be necessary to lead participants to indirectly resolve the discrepancy with distal defenses that are compensatory reactions on domains unrelated to the threatened domain (e.g., Jonas *et al.*, 2014; Pyszczynski, Greenberg & Solomon, 1999). The PANAS consists of a series of 20 emotional states that participants have to assess on a five-point Likert scale (from 1 = *I do not feel that way at all* to 5 = *I extremely feel that way*). The two conditions should not differ in terms of emotional valence, so that subsequent uncanny feeling effect could not be attributed to a difference in arousal of negative feelings. The distractor task was presented as a reasoning test. Participants had to classify a series of 20 items according to their relevance in the context of a camping trip. Proposing the PANAS followed by such a distractor task during the delay period has been commonly used in previous threat-induced experiments (e.g., Proulx, Heine & Vohs, 2010; Webber *et al.*, 2018).

Adherence to CTs was measured by using the Generic Conspiracist Beliefs Scale (GCBS; Brotherton, French & Pickering, 2013; Lantian, Muller, Nurra & Douglas, 2016, for the French version), which consists of a series of 15 statements about various conspiracies (e.g., “A small secret group of people is responsible for all the major decisions taken in the world, such as going to war.”) that participants have to rate on a five-point Likert scale (from 1 = *definitely not true* to 5 = *definitely true*). The GCBS was used because it is generic enough to tap into global “conspiracist ideation” (Drinkwater, Dagnall, Denovan & Neave, 2020) and allow us to study general processes without content-specific effects. Participants were next presented with a measure of the familiarity level of the presented text and a manipulation check. The level of familiarity was rated on a nine-point Likert scale (“This text looks familiar to you,” from 1 = *not at all* to 9 = *totally*). For the manipulation check, participants had to fill in four items assessing perceived uncanniness of the text with nine-point Likert scales (“This text looks strange/worrying/absurd to you”; “The meaning of this text seems clear to you” [inverted item], from 1 = *not at all* to 9 = *totally*). In order for the material to be judged suitable for experimental purposes, we did not expect differences in familiarity between the two texts, but a substantial difference in perceived uncanniness should be found so that the absurd text would be judged as more uncanny than the representational one. Finally, participants had to fill in demographic information (age and gender) before being debriefed.

The questionnaire was proposed to undergraduate students during courses. The sample consisted of 134 undergraduate students.

*Studies 2 to 5.* Studies 2, 3, and 4 were online questionnaires (with Limesurvey for Studies 2 and 4 and Qualtrics for Study 3), while Study 5 was operationalized with a paper-and-pencil questionnaire during undergraduate courses. Studies 2 to 5 were introduced as studies about “art, reasoning, and political opinions” and used the same uncanny feeling manipulation as Proulx, Heine, and Vohs’s (2010) Study 3, based on paintings. In this study, uncanny feeling was manipulated through exposure to four different types of art, but we retained only two groups for designing our protocol: absurd art (uncanny feeling condition) vs. representational art (control condition). Therefore, in the present studies, in the control condition participants were presented with John Constable’s representational piece *Landscape with a Double Rainbow*, whereas in the uncanny feeling condition, they were presented with the absurdist Rene Magritte’s *The Son of Man* (see Proulx, Heine & Vohs, 2010, Study 3 for a detailed presentation about the content of these two paintings). In Proulx, Heine, and Vohs’s (2010) Study 3, the presentation of the absurd art led to an increase in participants’ need for structure, compared with the representational art, suggesting an elevating need for meaning and a successful induction of uncanny feeling. In the present studies, participants were asked to take a close look at the picture because – they were told – they would have to later assess its meaning.

The following procedure was similar to that of Study 1. Participants were presented with the same delay period including the PANAS and the distractor task. Once again, they were asked to fill out the GCBS. Familiarity level of the painting was measured with one item (“This painting looks familiar to you”). For the manipulation check, participants had to fill in four items assessing perceived uncanniness of the painting (“This painting looks strange/worrying/absurd to you”; “The meaning of this painting seems clear to you” [inverted item] with nine-point Likert scales, except for Study 4. In Study 4, only three of these items were presented (“This painting looks strange/worrying/absurd to you”), due to a computer glitch. Familiarity level and uncanny feeling were operationalized with nine-point Likert scales in Studies 3, 5, and 6, while they were operationalized with a continuous slider ranging from 0% to 100% in Study 4. In order for the material to be judged suitable for experimental purposes, we did not expect differences in familiarity between the two paintings, but a substantial difference in perceived uncanniness should be found so that the absurd painting would be judged as more uncanny than the representational one. Finally, participants had to fill in demographics (age and gender) before being debriefed.

We recruited participants from the general population on social networks in Studies 2 ( $N = 237$ ) and 3 ( $N = 269$ ). We recruited undergraduate students with an online survey in Study 4 ( $N = 274$ ) and with a paper-and-pencil questionnaire during a course in Study 5 ( $N = 127$ ).

## Results

*Confirmatory analyses.* Independent samples  $t$ -tests were conducted to check potential differences on familiarity and

perceived uncanniness (see Tables S1 and S2, respectively, in the “Supplementary Analyses” file on OSF) according to paintings and texts presented in Studies 1 to 5. In Studies 2 to 5, the painting was systematically perceived by participants as more familiar in the experimental than in the control condition (all  $ps < 0.01$ ). In Study 1, the text was perceived by participants as more familiar in the control condition than in the experimental condition ( $p < 0.001$ ). In Studies 1 to 5, the perceived uncanniness measure showed an acceptable internal consistency, except for Study 5, in which it appeared to be questionable ( $\alpha_{\text{Study 1}} = 0.84$ ,  $\alpha_{\text{Study 2}} = 0.68$ ,  $\alpha_{\text{Study 3}} = 0.69$ ,  $\alpha_{\text{Study 4}} = 0.63$ ,  $\alpha_{\text{Study 5}} = 0.58$ ). As expected, the text in Study 1 and the painting in Studies 2 to 5 were systematically perceived by the participants as more uncanny in the experimental condition than in the control condition (all  $ps < 0.01$ ).

Potential differences on positive and negative affect between the control condition and the experimental condition were checked with independent samples  $t$ -tests for all studies. In all studies, PANAS showed good internal consistency for both positive ( $\alpha_{\text{Study 1}} = 0.87$ ,  $\alpha_{\text{Study 2}} = 0.89$ ,  $\alpha_{\text{Study 3}} = 0.87$ ,  $\alpha_{\text{Study 4}} = 0.87$ ,  $\alpha_{\text{Study 5}} = 0.85$ ) and negatives affect ( $\alpha_{\text{Study 1}} = 0.80$ ,  $\alpha_{\text{Study 2}} = 0.88$ ,  $\alpha_{\text{Study 3}} = 0.88$ ,  $\alpha_{\text{Study 4}} = 0.85$ ,  $\alpha_{\text{Study 5}} = 0.84$ ). No differences in positive affect between the two conditions were found (all  $ps > 0.09$ ). A higher level of negative affect was found in the control condition compared with the experimental condition in Studies 3 and 5 ( $ps < 0.05$ ), despite no differences being found in the other studies (all  $ps > 0.10$ ). Detailed results are presented in Tables S3 and S4 in the “Supplementary Analyses” file on OSF.

Differences in GCBS scores between the control condition and the experimental condition were tested with independent samples  $t$ -tests in each study. The GCBS showed a good internal consistency in all studies ( $\alpha_{\text{Study 1}} = 0.86$ ,  $\alpha_{\text{Study 2}} = 0.86$ ,  $\alpha_{\text{Study 3}} = 0.92$ ,  $\alpha_{\text{Study 4}} = 0.87$ ,  $\alpha_{\text{Study 5}} = 0.87$ ). Results are presented in Table 2 and Fig. 1. No difference in GCBS score was found in Studies 3, 4, and 5 (all  $ps > 0.10$ ), and these results stayed unchanged when familiarity level and negative affect were statistically controlled for. Contrary to our expectations, in Study 1, the GCBS score was significantly lower in the experimental condition ( $M = 2.87$ ,  $SD = 0.65$ ) than in the control condition ( $M = 3.13$ ,  $SD = 0.62$ ),  $t(132) = 2.38$ ,  $p = 0.019$ ,  $d = -0.41$ . However, this difference became non-significant when familiarity level and negative affect were statistically controlled for,  $p > 0.10$ . In Study 2, as expected, the GCBS score was

Table 2. Effect size and mean differences on GCBS score between the experimental and the control conditions in Studies 1 to 5

Study	$M_{\text{control}}$	$M_{\text{threat}}$	$t$	$df$	$d$
1	3.13 (0.62)	2.87 (0.65)	-2.38*	132	-0.41
2	3.25 (0.66)	3.52 (0.67)	3.15**	235	0.41
3	2.87 (0.81)	2.88 (0.92)	0.05	267	0.01
4	3.01 (0.64)	2.95 (0.81)	-0.75	272	-0.09
5	2.85 (0.65)	2.96 (0.69)	0.88	125	0.16

Note: Numbers between parentheses represent SDs.

\* $p < 0.05$ .

\*\* $p < 0.01$ .

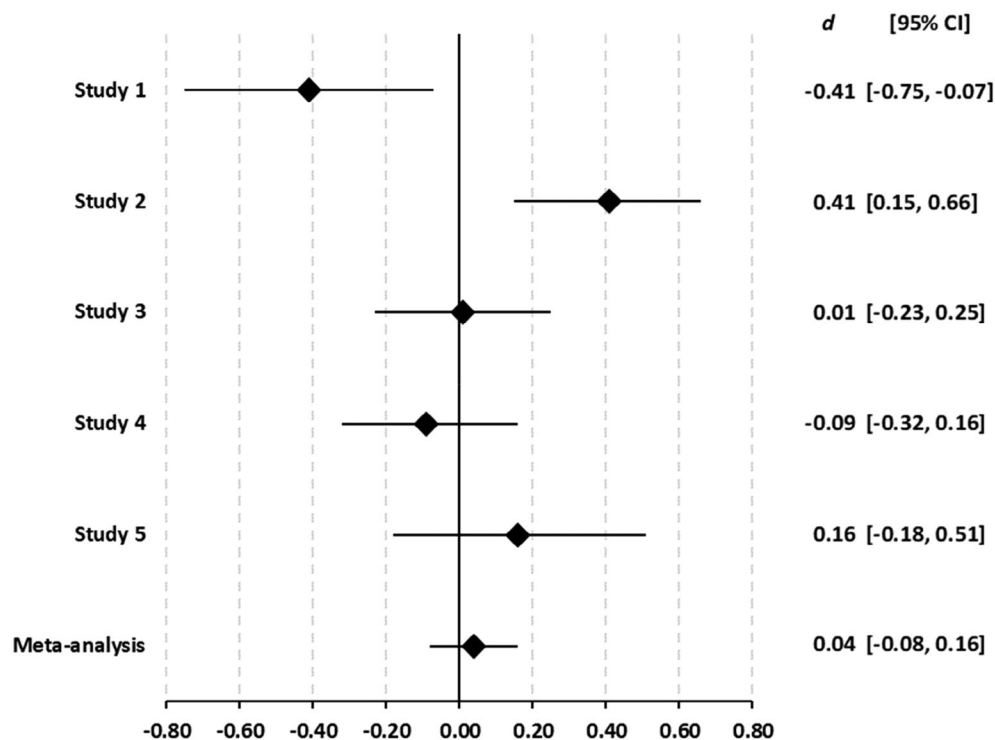


Fig. 1. Forest plot of effect size for mean differences on GCBS scores between experimental and control conditions for Studies 1 to 5. Error bars represent 95% CI.

significantly higher in the experimental condition ( $M = 3.52$ ,  $SD = 0.67$ ) than in the control condition ( $M = 3.25$ ,  $SD = 0.66$ ),  $t(235) = -3.15$ ,  $p = 0.002$ ,  $d = 0.41$ . This difference remained unchanged when familiarity level and negative affect were statistically controlled for. Details of analyses including familiarity level and negative affect as covariates are presented in Table S5 in the “Supplementary Analyses” file on OSF. Finally, in each study, no significant correlation between uncanny feeling and GCBS scores was found, except a negative correlation in Study 1 ( $r = -0.19$ ,  $p = 0.029$ ). However, when controlling for familiarity level, no significant partial correlation was significant (all  $ps > 0.10$ ; see Table S6 in the “Supplementary Analyses” file on OSF for detailed results).

To mini meta-analyze our results (Goh, Hall & Rosenthal, 2016), we aggregated the databases from the five studies. It yielded an  $N = 1,041$  sample ( $M_{\text{age}} = 27.29$ ,  $SD = 12.16$ , 16% male). A mixed model was then computed with study label as random factor, uncanny condition as fixed factor, and GCBS score as the dependent variable, according to the following equation:  $\text{GCBS} \sim 1 + (1|\text{Study label}) + \text{Uncanny condition}$ . The model ( $\text{AIC} = 2343.02$ ,  $r^2_{\text{conditional}} = 0.07$ ) does not support the effect of uncanny induction on adherence to CBs,  $F(1, 1035.44) = 0.32$ ,  $p = 0.57$ . The effect size was not significantly different from a null effect, with  $b = 0.03$ , 95% CI [-0.06 to 0.12], and  $r^2_{\text{marginal}} < 0.01$  or  $d = 0.04$  (see Fig. 1). This result remained unchanged when the mini meta-analysis took into account familiarity level, negative affect, priming method (painting, text), and survey form (paper-and-pencil vs. online). Details of this latter analysis are presented in the “Supplementary Analyses” file on OSF.

**Exploratory analyses.** In the recent meta-analysis from Biddlestone, Green, Cichocka, Douglas, and Sutton (2022),

epistemic uncertainty was found to be significantly associated with endorsing more CTs among non-student samples and not among student samples. Given that epistemic uncertainty can be conceptualized as an epistemic threat close to (though distinct from) uncanny feeling and thus sharing some common points, we proposed as a post hoc and exploratory analysis to test the interaction between the uncanny condition (experimental vs. control condition) and the population (undergraduate students vs. general population) with another mini meta-analysis on the five studies. A mixed model was computed with studies labeled as random factor, uncanny condition, and population (undergraduate students vs. general population) as fixed effects<sup>1</sup> and GCBS score as the dependent variable, according to the following equation:  $\text{GCBS} \sim 1 + (1|\text{Study label}) + \text{Uncanny condition} + \text{Population} + \text{Uncanny condition} \times \text{Population}$ . The model ( $\text{AIC} = 2340.75$ ,  $r^2_{\text{conditional}} = 0.09$ ) revealed neither a main effect of uncanny induction nor the main effect of population on adherence to CT beliefs, respectively  $F(1, 1034.45) = 0.40$ ,  $p = 0.53$ ,  $F(1, 3.05) = 0.79$ ,  $p = 0.44$ . However, the Uncanny condition  $\times$  Population interaction was significant,  $F(1, 1034.45) = 5.11$ ,  $p = 0.024$ . Among the general population, simple effects analyses revealed significantly higher GCBS scores in the experimental condition ( $M_{\text{estimated marginal}} = 3.20$ ,  $SE = 0.16$ ) than in the control condition, with a small effect size ( $M_{\text{estimated marginal}} = 3.07$ ,  $SE = 0.16$ ),  $t(1034.64) = 2.01$ ,  $p = 0.044$ ,  $d = 0.13$ . Among undergraduate students, no difference in GCBS scores was found in the experimental condition ( $M_{\text{estimated marginal}} = 2.93$ ,  $SE = 0.13$ )

<sup>1</sup>Population was entered as a fixed factor (and not as a random factor) in the mixed model in order to allow for the testing of the Condition  $\times$  Population interaction.

compared with the control condition ( $M_{\text{estimated marginal}} = 3.00$ ,  $SE = 0.13$ ),  $t(1034.06) = -1.17$ ,  $p = 0.24$ ,  $d = -0.07$ . This result remained unchanged when the mini meta-analysis took into account familiarity level, negative affect, priming method (painting, text), and survey form (paper-and-pencil vs. online). Details of this latter analysis are presented in the “Supplementary Analyses” file on OSF.

### Discussion

Confirmatory analyses do not support the existence of an effect of uncanny feeling on adherence to CBs. Exploratory analyses suggest that the predicted effect of uncanny feeling on adherence to CTs may occur only in a non-student sample, as observed with epistemic uncertainty in the recent meta-analysis of Biddlestone, Green, Cichocka, Douglas, and Sutton (2022). The authors proposed to explain this sampling effect by the possibility that students have access to more resources to tolerate or counteract epistemic uncertainty, and thus a lower need to compensate with endorsing CBs. Although interesting, the conditional effect we observed remains exploratory (it was considered after the collection of data in Studies 1 to 5 and Study 6), and of small size. It is therefore necessary to consider it with caution. The following study (Study 6) was designed to test the hypothesized effect of uncanny feeling on adherence to CTs by overcoming several methodological limitations common to the five previous studies. Indeed, the attention and seriousness with which the participants carried out the study were not checked, and potential outliers were not looked for and excluded. In addition, endorsement of CTs was measured with a single scale common to all studies. Moreover, only two different manipulations of uncanny feeling were used. Note that this study was conducted before the exploratory analysis on the interaction between condition and population was carried out, and it was not specifically designed to investigate this result further.

### STUDY 6

To ensure that the absence of the hypothesized effect of uncanny feeling on adherence to CTs was not related to common methodological limitations of the five studies, a final and preregistered study was conducted. It aimed to check whether the previous results can be replicated with some different measures of adherence to CBs, since the GCBS was the only measure in the five previous studies. In addition, we proposed to test another experimental manipulation of uncanny feeling, based on an autobiographical recall task. Finally, we also proposed to exclude outliers on several criteria that were not considered in the previous studies.

### Materials and procedure

This study was preregistered on *AsPredicted* (the preregistration form is available directly at [https://aspredicted.org/YAN\\_PSW](https://aspredicted.org/YAN_PSW), and on the OSF repository). Note that we have deviated from the preregistration on several minor points that are detailed and justified, as recommended by Claesen, Gomes, Tuerlinckx, and

Vanpaemel (2021), in a dedicated file, “Deviations from pre-registration,” available in the OSF repository. The study was conducted with an online questionnaire introduced as a study about “reasoning and personal and political opinions” with Limesurvey (<https://www.limesurvey.org/fr/>). Uncanny feeling was operationalized as a between-subjects variable, with four conditions. Among the three experimental conditions, two have been taken from the previous studies and are the absurd art painting (Rene Magritte’s *The Son of Man*) and the absurd parable (an abridged version of Kafka’s “An Imperial Message”). In contrast to previous studies, to limit the possibility that the participants were looking at the absurd painting or reading the absurd text too briefly, the page presenting the stimulus was not able to be changed until 20 s for the painting and 60 s for the text. The third and original experimental condition was an autobiographical recall task we designed for the study’s purposes. As an introduction to the task, it was explained to participants that we can sometimes experience strange and disturbing moments for no apparent reason, where we suddenly feel a sense of absurdity and strangeness. Participants were next asked to remember the last similar situation they experienced, and then to describe in detail the place they were in, the people present, the actions that took place, and their emotional and physiological feelings. To limit the possibility that participants would not perform the autobiographical recall task correctly, the text had to contain at least 500 characters (about 100 words) to be validated and go to the next page of the questionnaire. In the control condition, participants were simply presented with a message asking them to click on the “Next” button. Participants were randomly assigned to one of the four conditions by the software.

Next, participants were presented with the same delay period including the PANAS ( $\alpha_{\text{positive affect}} = 0.89$ ;  $\alpha_{\text{negative affect}} = 0.91$ ) and the distractor task, as in previous studies. An attention check item was inserted in the middle of the PANAS and was presented as follows: “Attention question: please answer ‘3.’” No manipulation check was included in this study, as manipulations based on the texts and paintings were found to be efficient in the previous studies, and to ensure a short completion time. For each participant, adherence to CTs was measured with three scales. In addition to the French version of the GCBS (see Studies 1 to 5), the study included the French version of the Conspiracy Mentality Questionnaire (CMQ) from Bruder *et al.* (2013; for the French version, see Lantian *et al.*, 2016) and the French version of the single-item conspiracy beliefs scale from Lantian, Muller, Nurra, and Douglas (2016). The CMQ consists of a series of five statements about various conspiracies (e.g., “There are secret organisations that have a considerable influence on political decisions.”) that participants have to rate on an 11-point Likert scale (from 0% = *certainly not* to 100% = *certainly yes*, with increments of 10%). The five items were averaged to compute a mean score. The single-item conspiracy beliefs scale (“I think that the official version of the events given by the authorities very often hides the truth.”) was rated on a nine-point Likert scale (from 1 = *completely false* to 9 = *completely true*). The presentation order for the three scales was randomized. The GCBS and the CMQ showed a high internal consistency ( $\alpha_{\text{GCBS}} = 0.95$ ;  $\alpha_{\text{CMQ}} = 0.90$ ).



### Sample and data screening

The minimum required sample size was estimated following the same procedure and the same parameters as in Studies 1 to 5, except that independent samples *t*-tests were planned as one-tailed. Thus, the minimum required sample size after exclusions was 51 per condition ( $N = 204$ ). In order to anticipate the exclusion of participants, our targeted sample size was rounded up to 250 participants. A total of 284 participants provided a complete response to the questionnaire. They were recruited from a company panel and compensated for their participation. Following preregistered exclusion criteria, 18 participants were excluded from the database. More precisely, we excluded participants who failed the attention check item ( $n = 4$ ; Aust, Diedenhofen, Ullrich & Musch, 2013), who answered “a lot” to the question “Have you been disturbed or distracted by your environment during the study?” ( $n = 2$ ), and who did not follow the instructions for the biographical recall task (i.e., participants who had written a recall obviously unrelated to feelings of uncanniness, or meaningless; this criterion was independently evaluated by two authors, and disagreements were resolved after consultation between the two authors;  $n = 12$ ). Finally, 266 participants were retained for the analyses ( $N_{\text{control}} = 71$ ,  $N_{\text{painting}} = 74$ ,  $N_{\text{text}} = 70$ ,  $N_{\text{autobiographical recall}} = 51$ ; 53% male;  $M_{\text{age}} = 43.15$ ,  $SD_{\text{age}} = 13.55$ ). The dataset can be found on the OSF repository.

### Results

Potential differences on positive and negative affect between the control and each of the three experimental conditions were checked with independent samples *t*-tests. No differences in positive affect were found (all  $ps > 0.10$ ). A higher level in negative affect was found in the control condition, compared with the painting condition,  $t(143) = -2.48$ ,  $p = 0.014$ ,  $d = -0.41$ . Detailed results are presented in Table S7 in the “Supplementary Analyses” file on OSF.

For each of the three dependent variables (i.e., GCBS score, CMQ score, single-item scale score), we carried out a one-way ANOVA on the four conditions (uncanny feeling manipulation: absurd art painting vs. absurd text vs. autobiographical recall vs. control condition). We expected a significant difference between the uncanny feeling conditions overall and the control condition

for each of the dependent variables. Moreover, we expected significant differences on dependent variables between the control condition and each of the uncanny feeling conditions (i.e., absurd art painting, absurd text, autobiographical recall task): CTs adherence should be lower in the control condition than in the three uncanny feeling conditions. For each dependent variable, three planned pairwise comparisons, one-tailed, would be used to test this hypothesis.

For each of the three dependent variables, no overall model effect from the one-way ANOVAs was found; for the GCBS score:  $F(3, 262) = 0.14$ ,  $p > 0.10$ ,  $\eta^2 < 0.01$ ; for the CMQ score:  $F(3, 262) = 0.20$ ,  $p > 0.10$ ,  $\eta^2 < 0.01$ ; for the single-item scale score:  $F(3, 262) = 0.29$ ,  $p > 0.10$ ,  $\eta^2 < 0.01$ . These results were unchanged when negative affect was statistically controlled for, all  $ps > 0.10$ . Contrast analyses revealed no significant differences for each dependent variable between the control condition vs. the three experimental conditions combined; for the GCBS score:  $t = 0.47$ ,  $p > 0.10$ ; for the CMQ score:  $t = 0.10$ ,  $p > 0.10$ ; for the single-item scale score:  $t = -0.66$ ,  $p > 0.10$ . These results were unchanged when negative affect was statistically controlled for, all  $ps > 0.10$ . Results for planned pairwise comparisons for each dependent variable between the control condition and each of the uncanny feeling conditions are presented in Table 3. No significant differences were found, all  $ps > 0.10$ . These results were unchanged when negative affect was statistically controlled for, all  $ps > 0.10$  (note that to account for negative affect, we carried out ANCOVAs with the uncanny feeling condition as independent variable and negative affect as covariate, that only allows for two-tailed and not one-tailed tests; detailed results are presented in Table S8 in the “Supplementary Analyses” file on OSF).

### Discussion

Again, based on the results observed in this study, we cannot conclude to an effect of uncanny feeling on adherence to CBs. This finding does not appear to be related to the measure of adherence to generic CBs, nor to the nature of the sample. Although this study did not allow us to test again the interaction between the uncanny feeling and the population type (revealed by the exploratory analyses in Studies 1 to 5), due to a small number of undergraduate students in this sample ( $N = 11$ ), if uncanny

Table 3. Effect size and mean differences between the control and each of the three experimental conditions, for each of the three measures of adherence to conspiracy beliefs measures for Study 6

DV	Experimental condition	$M_{\text{control}}$	$M_{\text{threat}}$	$t$	$df$	$d$
GCBS	Painting	2.68 (0.99)	2.65 (0.89)	-0.18	143	-0.03
	Text		2.58 (1.03)	-0.57	139	-0.10
	Autobiographical recall		2.62 (0.87)	-0.36	120	-0.07
CMQ	Painting	5.90 (2.40)	5.87 (2.17)	-0.07	143	-0.01
	Text		5.71 (2.50)	-0.47	139	-0.08
	Autobiographical recall		6.02 (2.03)	0.30	120	0.06
SIS	Painting	4.90 (2.28)	5.00 (2.31)	0.26	143	0.04
	Text		5.06 (2.55)	0.38	139	0.06
	Autobiographical recall		5.29 (2.18)	0.95	120	0.18

Note: Numbers between parentheses represent SDs. DV = dependent variable; GCBS = Generic Conspiracy Beliefs Scale; CMQ = Conspiracy Mentality Questionnaire; SIS = single-item scale. All  $ps > 0.10$ .

feeling would increase CTs only among a non-student population, it could have been detected.

## GENERAL DISCUSSION

The aim of this series of studies was to investigate whether a particular epistemic threat, the uncanny feeling, could increase endorsement of CTs through a compensatory abstraction process. We proposed that CTs could serve as a coping mechanism to restore a meaning framework following an epistemic threat, even when the threatened domain is not related to that of CBs. In this way, adherence to CTs was supposed to represent an outcome to the activation of sense-making processes. The six studies included different populations, induction methods, and measures of CTs. Yet, they did not provide robust evidence for the effect of an uncanny feeling on CT endorsement, despite being sufficiently powered. No difference in adherence to CTs according to manipulation of uncanny feeling was observed in the mini meta-analysis conducted on the results of Studies 1 to 5, nor in Study 6. However, these results may contribute to the identification of boundary conditions under which CTs could have a compensatory function allowing individuals to deal with psychological threat, which we propose to discuss in conjunction with the methodological limitations of our studies.

Manipulation checks carried out for painting and text suggested that both stimuli are well perceived by participants as uncanny, consistent with Proulx, Heine, and Vohs (2010). However, they do not ensure that participants were well affected by an uncanny feeling. In addition, we did not use a manipulation check for the autobiographical recall task (Study 6). Consequently, its ineffectiveness to induce the expected uncanny feeling cannot be ruled out. Moreover, it is possible that the experimental context and design, and in particular the distractor task, were not efficient in catalyzing compensatory abstraction effects. Indeed, threat-induced effects on beliefs occur strongly after some delay (Jonas *et al.*, 2014) and when participants are leading to suppress threat-related cognitions (Greenberg, Pyszczynski, Solomon, Simon & Breus, 1994). Although a similar task was efficiently used in Proulx, Heine, and Vohs (2010), we cannot rule out this possible limitation, especially because we did not control for attention focused and time spent by participants on the distractor task.

Another important methodological limitation common to all six studies is the generic nature of the measures of CTs (i.e., the GCBS in Studies 1 to 6, the CMQ and the single-item scale in Study 6). Indeed, generic CTs are conceptualized as a trait variable or rather stable inter-individual differences, with a low context sensitivity (for the GCBS, see Brotherton, French & Pickering, 2013; for the CMQ, see Bruder, Haffke, Neave, Nouripanah & Imhoff, 2013; for the single-item scale, see Lantian, Muller, Nurra & Douglas, 2016), while specific CTs (related to specific domains, events, or social groups) are more context sensitive and malleable (Imhoff, Bertlich & Frenken, 2022). Although adherence to generic CTs predicts adherence to specific CBs, these two levels of measures are empirically and conceptually different (Frenken & Imhoff, 2021; Imhoff, Bertlich & Frenken, 2022). Thus, although our experimental manipulations of uncanny feeling did not affect adherence to generic CBs, they could affect adherence to specific

CBs. In this way, some studies show that experimental manipulations of threats to psychological needs such as economic inequality (Salvador Casara, Suitner & Jetten, 2022) and particularly lack of control (for a meta-analysis, see Stojanov & Halberstadt, 2020; but see also the meta-analysis from Biddlestone, Green, Cichocka, Douglas & Sutton, 2022) are more likely to affect adherence to specific than generic CBs, although CTs are not insensitive to any form of experimental manipulation more generally (e.g., Mao, Yang & Guo, 2020, Study 2; Marchlewska, Green, Cichocka, Molenda & Douglas, 2022, Study 3; Swami, Voracek, Stieger, Tran & Furnham, 2014, Studies 2 and 3). A possible effect of uncanny feeling manipulation on specific CTs could be examined in further studies.

Exploratory results from Studies 1 to 5, carried out with a mini meta-analysis, interestingly suggest that uncanny feeling may lead only non-student participants to compensate for the epistemic threat with endorsement of CBs. However, the effect of uncanny induction on endorsement of CTs was not detected in Study 6 (including mainly non-students). This may suggest that this study was underpowered to detect this effect, or it may invite more caution about its existence. In their meta-analysis, Biddlestone, Green, Cichocka, Douglas, and Sutton (2022) observed a similar result with epistemic uncertainty, and they suggested that this can be explained by the potentially greater resources (e.g., frequent intellectual discussions) that students have to tolerate or counteract epistemic uncertainty. These epistemic resources can rely, for example, on a more predominant analytical thinking among students, this inter-individual variable being robustly associated with less endorsement of CTs (see Biddlestone, Green, Cichocka, Douglas & Sutton, 2022; see also Gjoneska, 2021). As another example, students' epistemic resources can also rely on greater literacy (Wild, Kyröläinen & Kuperman, 2022), which can be associated with lesser endorsement of CTs (e.g., Craft, Ashley & Maksl, 2017; Landrum & Olshansky, 2019; Pisl *et al.*, 2021). As the differences observed between students and non-students in the present studies rely on exploratory analyses and a weak effect size, they could be first replicated on several kinds of epistemic threats. Then psychological variables that could explain differences between students and non-students should be investigated. Importantly, the fact that students do not endorse more CTs following an epistemic threat could also be explained by the possibility that they actually perceive CTs as threatening, rather than as a meaningful framework. Indeed, people may be aware that CTs can be stigmatized, and that expressing them can lead to negative evaluations (Green, Toribio-Flórez, Douglas, Brunkow & Sutton, 2023) and anticipated fear of social exclusion by others (Lantian *et al.*, 2018). Following an epistemic threat, CTs may even be rejected if they are normally devalued by people. Consistently, the participants in Study 1 who were students endorsed significantly fewer CTs in the experimental condition than in the control condition (although this difference did not remain significant when familiarity and negative affect were statistically controlled for). Thus, the compensatory function of CTs may depend on how much they are initially valued by the population, which was not considered in the present study and represents therefore an important limitation.

Among other factors that could contribute to identifying boundary conditions for threat compensation on CT endorsement, the study of Kofta, Soral, and Bilewicz (2020) reports interesting results. The authors refer to another assumption of the MMM according to which all kinds of threats to meaning have the potential to induce the same motivation for compensation by turning to other meaningful frameworks. Their results did not support this assumption since political lack of control and not political uncertainty predicted more adherence to Jewish CTs. According to the authors, if both threats deprive people of meaning structure, uncontrollability differs from uncertainty in which it particularly motivates people to place blame of their misfortune on an antagonistic out-group. In the same way, van Prooijen (2020) suggested that the saliency of an antagonistic out-group during the meaning-making processes, following a meaning threat, could be a critical ingredient to lead people to perceive agency, and finally embrace specific CTs about this group. Finally, as pointed out by Biddlestone, Green, Cichocka, Douglas, and Sutton (2022), some studies indicate that different motivations or threats may interact to determine endorsement of CTs. For example, the results from Marchlewska, Cichocka, and Kossowska (2018) show that epistemic need for cognitive closure predicts endorsement of CTs only in a situation of existential uncertainty. The results from van Prooijen (2016) show that the manipulation of belongingness predicts endorsement of CTs only when participants also feel existential uncertainty. This suggests that inducing epistemic uncertainty in the form of uncanny feeling could lead participants to endorse more CTs only when they feel existential uncertainty. Thus, an important point for future studies would also be to verify whether certain threats (e.g., existential threat) would be moderators or necessary conditions for the effect of other threats (e.g., epistemic threat) on endorsement of CTs.

## CONCLUSION

In a set of six studies, we did not find robust evidence for an effect of uncanny feeling on endorsement of CBs as a threat-compensatory process in an unrelated domain. However, it should be noted that these results do not call into question the role of embracing CTs as an attempt to restore threatened epistemic needs more broadly. Adding to one of the only other studies that proposed conceptual links between MMM and CTs but did not corroborate them (Kofta, Soral & Bilewicz, 2020), these results do not support the relevance of the MMM to better understanding the compensatory function of CBs. Interestingly, our meta-analytical exploratory results suggested that the hypothesized compensatory process occurs only among individuals with low epistemic resources. In addition to individual differences, the recent literature indicates that compensatory function of CTs may depend on their level of specificity, the nature of exposed threat, the domain to which CTs and threat relate, the proximity between the two, and possible interactions between several threats. In particular, testing in future studies whether the existence of a link between the domain to which both the threat and CTs relate is a necessary condition for a compensatory function would also make it possible to test whether CTs provide meaning per se or only when they enable people to restore meaning in a particular domain. In order to better identify these boundary conditions, it

seems important to work on proposing a more detailed typology of the different types of threats by identifying their common points and delimiting their differences.

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## CONFLICT OF INTEREST

The authors report there are no competing interests to declare.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in the following OSF repository: [https://osf.io/r5d7g/?view\\_only=fdaf8498a28d4af3bcf6bca57a724a72](https://osf.io/r5d7g/?view_only=fdaf8498a28d4af3bcf6bca57a724a72).

## ETHICS APPROVAL STATEMENT

These studies were conducted in accordance with national and international ethical recommendations (APA, 2017; CNCDP, 2021; WMO, 1964). All participants gave informed consent before participating in these studies. No ethical approval of these studies was sought as this is not required by law or the Code of Ethics for Psychologists for non-interventional studies conducted in France.

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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article:

**Table S1.** *Familiarity level associated with texts and paintings according to the condition in Studies 1 to 5*

**Table S2.** *Perceived uncanniness of texts and paintings according to the condition in Studies 1 to 5*

**Table S3.** *Positive affect level associated with texts and paintings according to the condition in Studies 1 to 5*

**Table S4.** *Negative affect level associated with texts and paintings according to the condition in Studies 1 to 5*

**Table S5.** *GCBS scores according to the conditions adjusted on negative affect and familiarity level in Studies 1 to 5*

**Table S6.** *Zero-order Pearson's correlations and partial correlations, adjusted on familiarity level, between uncanny feeling and GCBS score in Studies 1 to 5*

**Table S7.** *Positive and negative affect levels associated with each of the experimental conditions, compared with the control condition in Study 6*

**Table S8.** *Effect size and mean differences between the control and each of the three experimental conditions, for each of the three measures of adherence to conspiracy theories measures, adjusted on negative affect in Study 6*

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