



Misplaced certainty and simple thinking[☆]

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ABSTRACT

Research has mostly approached certainty as a universal remedy for uncertainty. Going beyond the dichotomy of certainty-uncertainty, five studies examined misplaced (unsubstantiated) certainty in relation to people's thinking in a simple way, namely, seeking what is easy to process and well-defined. Misplaced certainty predicted a preference for comparatively simpler speech (Study 1), simpler paintings (Kitsch; Study 2), and simpler evaluations of the world and of other people (Study 3). When experimentally induced, misplaced certainty fostered simpler evaluations of the world than well-placed (substantiated) certainty (Studies 4–5) and well-placed and misplaced uncertainty (Study 5). Misplaced certainty also fostered more epistemic threat than other epistemic structures. Epistemic threat, in turn, predicted simpler thinking. These findings suggest that when certainty is misplaced and thus threatening, it may preclude intellectual depth and sophistication.

Certainty is a tempting psychological state. The conviction that one knows the “truth” about oneself (e.g., Wichman et al., 2010), one's group (e.g., Kruglanski & Orehek, 2012), other people (e.g., Benkendorf & Sommer, 2021), societal events (Olcaysoy Okten et al., 2022), or even the outcomes of mundane decisions (Griffin & Tversky, 1992) may provide one with a sense of power and safety (Beres, 1980). Similarly, a large body of literature has shown that uncertainty is aversive (FeldmanHall & Shenhav, 2019). People try to alleviate the negative effects of uncertainty (e.g., in terms of anxiety, depression; Oleson et al., 2000; Weary et al., 2001) by seeking closure and clarity (e.g., Kruglanski, 1994), control (e.g., Bordia et al., 2004), and high certainty even for things that are recognized to be unknowable (e.g., future; Olcaysoy Okten et al., 2022).

Given the psychological costs of uncertainty and doubt, the quest for certainty is an understandable one, though with potentially problematic consequences. Gollwitzer et al. (2022) has shown that misplaced certainty, that is, the certainty that is not substantiated by oneself or the outside world can be epistemically threatening. This epistemic threat, defined as a subjective experience of a threat directed to one's knowledge (Fallis, 2020), may, in turn, trigger defensive reactions such as determined ignorance of views or facts that may contradict with one's

certainty (Gollwitzer & Oettingen, 2019; Olcaysoy Okten et al., 2022; Olcaysoy Okten et al., 2023) and hostility towards those who doubt one's certainty or deem it wrong (Gollwitzer et al., 2022).

The present research investigates another potential outcome of misplaced certainty: simple thinking. With epistemic threat embedded in this certainty mentality, those who embrace misplaced certainty may prefer the world to be simple and have simplistic and potentially biased preferences in various life domains, such as when communicating with others or interpreting others' behaviors. This way, they can feel in control of their “threatening” environment and maintain their certainty in the presence of opposing information. Specifically, we investigate the relation of misplaced certainty to simple thinking in terms of a preference for well-defined and easy-to-process options and operations over complex and difficult-to-process ones (Hofer, 2000; Miller, 1993; Neuberg & Newsom, 1993). We suggest that misplaced certainty may come with a preference for what seems a clear-cut, simple message.

1. Misplaced certainty

People may claim certainty even for things that they deem unknowable or things that most others would claim to be unknowable,

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such as the future (“I know the pandemic will be over soon;” Olcaysoy Okten et al., 2022), metaphysical phenomena (“I know we are not alone in the Universe;” Gollwitzer & Oettingen, 2019), and what is right or wrong (“I know abortion is wrong under all circumstances;” Gollwitzer et al., 2022). This subjective sense of certainty has been broadly referred to as *misplaced* certainty (Oettingen et al., 2022; see also Mitzen & Schweller, 2009), as it involves holding certainty about things despite subjectively recognizing disconfirmation from existing evidence or other people. Recent work suggests that misplaced certainty can be observed as either a chronic tendency that is moderately stable over time (Olcaysoy Okten et al., 2022), or can be experimentally induced as a state (Gollwitzer et al., 2022).

Although misplaced, that sense of certainty can be welcomed by the beholder; through misplaced certainty, one can take control of uncertain states without much effort and thinking. Indeed, misplaced certainty emerges as a tempting and prevalent mentality in many domains of personal importance (e.g., political, health, interpersonal). In a series of studies, almost all participants reported having experienced misplaced certainty in at least one life domain (Gollwitzer & Oettingen, 2019). For example, individuals may feel certain that God exists despite recognizing that God’s existence is technically unknowable or that their presidential candidate will win the election despite recognizing that the future is unknowable (e.g., Olcaysoy Okten et al., 2022).

At the same time, however, misplaced certainty triggers an epistemic threat due to the individual’s recognition of doubt or opposition either internally or from an outside source. Those with misplaced certainty may feel like the outside world is attempting to steal a prized possession, their sense of knowing, from them. Importantly, despite the wide range of topics that can be subject to misplaced certainty, through the sense of threat embedded in it, misplaced certainty has been associated with the same set of defensive cognitions. One of these cognitive outcomes is determined ignorance, a potential way to contain threat and help one preserve certainty in one’s own viewpoints (Gollwitzer et al., 2022). Those with higher misplaced certainty tend to determinedly ignore skeptics and information that challenges their view and are less likely to update their false beliefs in response to corrective feedback (Olcaysoy Okten et al., 2022; Olcaysoy Okten et al., 2023). Misplaced certainty also relates to heuristic thinking more generally; those with a general sense of misplaced certainty (“I know the unknowable”) reported a lower need for cognition and behaved more impulsively (Gollwitzer & Oettingen, 2019).

2. Where misplaced certainty meets preference for the simple

Preference for the simple can be conceptualized as the tendency to prefer well-defined and easy-to-process options over complex ones (e.g., Hofer, 2000; Neuberg & Newsom, 1993). In psychology, preferences for the simple have been studied in the form of making simpler causal explanations for events (Lombrozo, 2007), dichotomous thinking (e.g., “people are either good or bad,” Jonason et al., 2018; Oshio, 2009), categorizing individuals (e.g., stereotyping; Quinn et al., 2007; Sherman et al., 1998), and avoiding new complex information (“epistemic freezing”; Kruglanski & Freund, 1983). It is therefore associated with biases in both cognition (e.g., poor patterns of learning and closed-mindedness; Kunda, 1999; Rietzschel et al., 2007) and social interactions (e.g., discrimination; Vasiljevic & Crisp, 2013).

When do people prefer the simple over complex options? Past research has associated the preference for relatively simple choices with motivational factors such as a higher need for structure and cognitive closure (De Dreu et al., 1999; De Zavala et al., 2010; Neuberg et al., 1997), as well as environmental factors including low perceived control (Ma et al., 2019), or high perceived threat (e.g., Spencer et al., 1998). Accordingly, preferring simple options or simple explanations of events can bring a sense of control. Thus, it may help downregulate threat via accessing clear-cut definitions about oneself (I am a member of group X and we believe Y; Goode et al., 2017), other people (stereotyping;

Moskowitz, 2010), or the environment (categorization; Xiao et al., 2023).

Although misplaced certainty has been found to lead to epistemic threat that in turn leads to poor information-seeking and antisocial behavior, research is silent how misplaced certainty translates into people’s preferences. We suggest that misplaced certainty may lead to a preference for simplicity, because simple thinking may help replenish a sense of control. Thus, choosing the simple options may help people clinging to misplaced certainty to dispel threats of their sense of certainty. In fact, it may be that the poor information processing patterns observed among those with misplaced certainty may stem from a preference for handling simple rather than complex information when experiencing epistemic threat.

3. Misplaced certainty vs. well-placed certainty

Misplaced certainty includes recognizing an internal/external doubt or opposition, and therefore a sense of epistemic threat. However, certainty can also be *well-placed* when it is about things that one appropriately recognizes as undoubted or confirmed by validated sources (“I know that today is Sunday,” Gollwitzer & Oettingen, 2019). Because the beholder of well-placed certainty recognizes their knowledge is grounded in reason, they should not experience epistemic threat. Thus, they should not show the defensive reactions and poor information seeking patterns associated with misplaced certainty (Gollwitzer et al., 2022). Indeed, Olcaysoy Okten et al. (2023) have shown that those who experienced more well-placed certainty were *more* likely to change their misconceptions upon corrective feedback. Hence, given that there is no epistemic threat and complex new information is welcomed, those with well-placed certainty should not prefer a heuristic like simplicity.

4. The present research

We predicted that misplaced certainty would relate to preferring simple (i.e., easy to process) options and perspectives over complex ones in various life domains. Five studies investigated this hypothesized relationship. Study 1 (pre-registered) examined the relationship between misplaced certainty and the preference to give an impromptu simple (vs. complex) speech. Study 2 examined whether misplaced certainty relates to artistic preferences for simple (Kitsch) paintings rather than complex (Avantgarde) ones. Study 3 (pre-registered) tested whether misplaced certainty relates to simpler evaluations of others (i.e., dichotomous thinking). In these studies, we conducted robustness tests to confirm that the hypothesized relationship between certainty and the preference for simplicity is unique to misplaced rather than well-placed certainty.

Studies 4 and 5 (both pre-registered) investigated the causal effects of misplaced certainty on simple thinking by comparing misplaced certainty to other epistemic structures: well-placed certainty (Study 4–5) as well as well-placed uncertainty (Study 4–5) and misplaced uncertainty (Study 5). Both studies examined epistemic threat as a mediator of the relationship between misplaced certainty (vs. other epistemic structures) and simple thinking. For all studies, we report how we determined our sample size, all data exclusions, all manipulations, and all measures (see Supplements). In all studies, participants were at least 18 years old and provided online informed consent before proceeding with the study.

5. Study 1: misplaced certainty and preference for simple speech

Study 1 tested the relationship between misplaced certainty and the tendency to prefer giving a simpler speech with fewer details and context. Specifically, participants were told to imagine giving an impromptu public speech in front of investors and colleagues. We then provided participants with two (one simple and one complex) quotes as a potential basis of their speech and had them evaluate each quote in

terms of whether they would use it in their speech. We predicted participants' level of misplaced certainty would relate to a greater preference for the simple quote. We also predicted misplaced certainty might relate to a lower preference for the complex quote. The study design, sample size, hypotheses, and analyses were pre-registered [here](#). All materials are available [here](#).

5.1. Method

5.1.1. Participants

As the Prolific survey platform required recruiting at least 300 participants to provide an U.S. representative sample, and considering potential attrition, we requested 350 participants. This sample size outnumbered our a priori power analyses for partial correlation (power: 0.80, alpha: 0.05, an estimated small correlation of 0.20: 194 participants). Among the 353 participants who submitted responses, 62 participants failed at least one attention check question and were removed from the analyses (final sample: 142 females, 126 males, five other, 18 unknown, $M_{age} = 44.14$, $SD_{age} = 16.30$). All participants received \$8/hourly.

5.1.2. Materials

5.1.2.1. Stimulus preparation. For the Speech Evaluation Task, we created and pre-tested two quotes, one including simpler content than the other about the same topic. Both quotes included a summary of three months of teamwork for a new mobile investment application. Drawing from existing research in linguistics (Abdallah & Langley, 2014; Aggerholm et al., 2012; Piantadosi et al., 2012), we made one quote simpler by using general blanket statements, leaving out specifics (e.g., time, context), and using simpler linguistic forms (e.g., shorter, and higher frequency words and shorter sentences). Other than these features, the two quotes were similar (see Supplements for content-matching analyses). Both quotes referred to the existing products' weaknesses and the new product's advantages (e.g., affordability, live assistant), research and development process (usability test results), and the timeline of launching the product.

We pilot-tested the quotes in terms of perceived simplicity with 50 independent participants on Prolific. After reading both quotes, participants were asked to pick one of the quotes in response to the following questions; "which quote uses simpler words more frequently?", "which one uses more general sentences?", "which one contains longer sentences? (reverse-coded), and "which one is simpler overall?" The simple quote was consistently chosen as the simpler option (chi-squares >25.92 , $p < .001$).

5.1.2.2. Speech evaluation task. In the main study, participants were told to imagine that they need to give an impromptu job presentation to explain to project investors and colleagues their team's 3-months' work on a new mobile investment application (see full materials here). To ensure that the participants evaluate the quality of the quotes carefully, we also told them to imagine that the quality of their presentation would determine their team's salary bonus. Participants were then presented with the two quotes on the same screen as options to be included in their presentation.

After reading both quotes at their own pace, participants saw each quote again and evaluated each by responding to four items on a 7-point scale (e.g., "This quote is highly reasonable," "I would feel more confident if I chose this quote to deliver," "Delivering this quote will allow me to perform a better presentation overall," 1: *Completely false*, 7: *Absolutely true*). One of the four items reduced the inter-item reliability of the preference scales and was dropped in the final calculations, $\alpha_{simple} = 0.86$, $\alpha_{complex} = 0.91$, though including this item did not change the results. By having participants evaluate each quote separately rather than together on a bipolar scale, we aimed to have a nuanced analysis of

approaching simple options vs. avoiding complex ones.

5.1.2.3. Epistemic structures. After completing the Speech Evaluation Task, participants answered questions regarding their epistemic structures.

5.1.2.3.1. Misplaced certainty. We measured two versions of misplaced certainty; first, in terms of perceived *internal* ambivalence (i.e., certainty while recognizing internally that certainty is unsubstantiated) through a 3-item *Paradoxical Knowing* scale (Gollwitzer & Oettingen, 2019; e.g., "I know things that one can't actually know;" $\alpha = 0.94$). Second, we measured misplaced certainty in terms of perceived *external* opposition by most others (i.e., certainty while recognizing externally that certainty is unsubstantiated) through a 3-item *Discordant Knowing* scale (Bläser & Oettingen, 2021; e.g., "I know things that most other people will say can't be known;" $\alpha = 0.93$). The two scales were strongly correlated ($r = 0.66$, $p < .001$).

5.1.2.3.2. Epistemic controls. We assessed two other epistemic structures as in Gollwitzer and Oettingen (2019). First, to test the role of pure certainty in the preference for the simple, we measured *well-placed uncertainty* – the tendency to hold beliefs about unknowable things with doubt or uncertainty – as a control variable. This scale included the same items as the Paradoxical Knowing scale (measuring misplaced certainty), except that the word "know" was replaced with the word "believe" (e.g., "I believe things that one can't actually know," $\alpha = 0.92$). The verb "believe" has been validated to imply less certainty than the verb "know" (Gollwitzer & Oettingen, 2019).

Second, to test the role of one's certainty being *misplaced* rather than *well-placed* in the preference for simplicity, we measured *well-placed certainty* – certainty that is substantiated – via a *Concordant Knowing* scale (e.g., "I know things that one can actually know," $\alpha = 0.89$). All items were evaluated on 7-point scales (1 = *Not at all agree* to 7 = *Strongly agree*).

5.2. Results

Descriptive statistics and correlation matrices for epistemic structures are in the Supplements.¹

5.2.1. Misplaced certainty and speech preference

Overall, participants reported preferring the complex quote ($M = 5.77$, $SD = 1.35$) more than the simple quote ($M = 3.60$, $SD = 1.64$), $t(290) = -13.73$, 95 % CI [-2.48, -1.87], $d = 0.80$, $p < .001$. As pre-registered, we examined the relationship between misplaced certainty and preference for each quote in regression analyses by controlling for well-placed uncertainty (Fig. 1, Panels A & B). All confidence intervals were calculated via 1000 bootstrapped samples. As predicted, misplaced certainty related to a higher preference for the simple quote, similarly across the two measures of misplaced certainty (paradoxical knowing scale: $b = 0.24$, 95 % CI [0.11, 0.37], $t(288) = 3.83$, $p < .001$; discordant knowing scale: $b = 0.28$, 95 % CI [0.15, 0.41], $t(288) = 4.73$, $p < .001$). Misplaced certainty did not significantly relate to the preference for the complex option (paradoxical knowing scale: $b = -0.10$, 95 % CI [-0.20, 0.005], $t(288) = -1.89$, $p = .060$; discordant knowing scale: $b = -0.08$, 95 % CI [-0.19, 0.01], $t(288) = -1.66$, $p = .098$). That is, those with misplaced certainty preferred the simple option, though they did not particularly evaluate the complex one negatively. Well-placed uncertainty did not relate to these preferences, $ps > 0.1$.

¹ Misplaced certainty showed positive skewness across Studies 1–3 (though skewness always remained below the value of 1). To minimize the potential effects of skewed distributions on our results, we repeated all analyses for Studies 1–3 by dichotomizing the misplaced certainty scores. All findings were replicated (see Supplements).

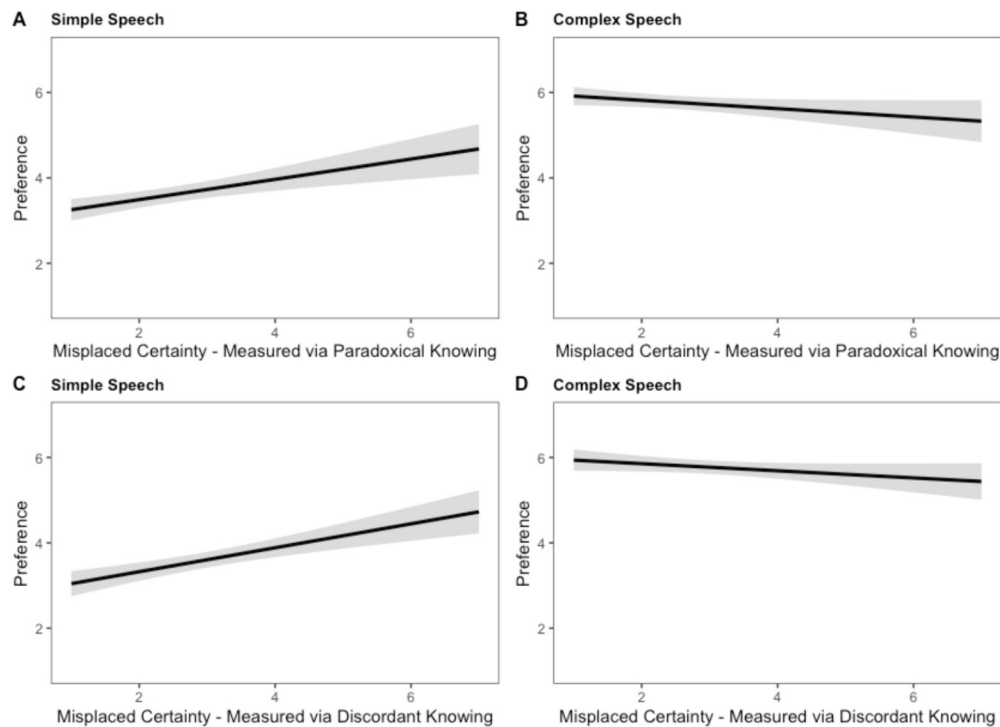


Fig. 1. The relationship between misplaced certainty and preference for the simple (A and C) and complex (B and D) quotes. Misplaced certainty was measured either via a Paradoxical Knowing Scale (A and B) or a Discordant Knowing Scale (C and D). All models control for well-placed uncertainty (beliefs in the unknowable). Error bands: 95 % CIs (using `geom_ribbon` in R).

5.2.2. Well-placed certainty and speech preference

Controlling for well-placed certainty in the analyses reported above did not change any patterns (see Supplements). When we explored the relationship between well-placed certainty and the preference for the simpler speech, we found patterns that were opposite of the patterns of the relations with misplaced certainty. Well-placed certainty related to less preference for the simple quote, $b = -0.23$, 95 % CI $[-0.36, -0.06]$, $t(289) = -3.11$, $p = .002$, and more preference for the complex quote, $b = 0.37$, 95 % CI $[0.24, 0.52]$, $t(289) = 6.84$, $p < .001$. Controlling for well-placed uncertainty did not affect these findings (see Supplements). Although these patterns are consistent with recent work by Olcaysoy Okten et al. (2022), suggesting that well-placed certainty relates to effective information processing, we refrain from interpreting these results as they were not replicated in later studies.

5.3. Discussion

As expected, misplaced certainty related to a higher preference for giving a simple speech including shorter sentences, more frequently used short words, and more general content than an alternative with more details, context, and complexity. The opposite pattern was observed for well-placed certainty. Together, these findings demonstrate a nuanced relationship between certainty and the preference for simple versus complex speech.

6. Study 2: misplaced certainty and preference for simple art

Study 2 aimed to conceptually replicate Study 1 and expand it to preferences of simple options in a different domain: visual art. In visual art, simple properties overlap with the properties of *Kitsch*. Ortlieb and Carbon (2019) defined *Kitsch* pieces as simplistic, in the sense that they are conventional, effortless, instantly identifiable, and provoke positive emotions. In that sense, *Kitsch* is the opposite of *Avantgarde*, which is unconventional, not easily identifiable, and provokes disturbing emotions. Here we tested whether misplaced certainty related to preferences

of simple properties, namely, a greater appreciation of *Kitsch* rather than *Avantgarde* art. We predicted, replicating Study 1, misplaced certainty would relate to a preference for the simpler, namely, a greater liking for *Kitsch* paintings. Given that artistic experience would likely impact artistic taste, we controlled for artistic experience in all analyses.

6.1. Method

6.1.1. Participants

A sample of 270 participants (see Study 1 for power analysis) was requested from the Prolific research platform considering potential attention check failures. Seven participants submitted the participation code without any data. Therefore, we had raw data from 263 participants. Eleven participants were excluded from analyses due to failing an attention check question, leaving us with 252 (142 women, 105 men, four nonbinary, one missing gender, $M_{age} = 30.14$, $SD_{age} = 10.72$) participants.

6.1.2. Materials

6.1.2.1. Stimulus preparation. Ten research assistants who were trained on the operationalization of *Kitsch* picked 30 images as being the most representative of *Kitsch* and 30 images as being the least representative of it (i.e., *Avantgarde*; see the full materials [here](#) for specific sources of each selected painting). In a pilot study, 60 independent participants recruited on Prolific evaluated the selected images in terms of their fit to *Kitsch* or *Avantgarde* categories.

Participants rated the *Kitchiness* of these images on three items (following the three criteria identified by Ortlieb & Carbon, 2019), asking about 1. the ease of identifying the theme, 2. generating positive emotions, 3. conventionality (1: *Not at all*, 7: *Very much so*). Next, we sorted all 60 images in terms of the averaged scores of *Kitchiness* and picked 12 stimuli with the highest ratings to represent the *Kitsch* category ($M = 6.01$; $SD = 0.13$) and 12 stimuli with the lowest ratings to represent the *Avantgarde* category ($M = 2.65$; $SD = 0.19$) in the main

study.

6.1.2.2. Painting preference. Participants evaluated 24 images of paintings presented in random order on the screen. They responded to one question underneath each image: “How much do you like the above painting?” (1: *Not at all*, 7: *Very much so*).

6.1.2.3. Epistemic structure. Misplaced certainty was measured via the paradoxical knowing scale included in Study 1 ($\alpha = 0.95$). We excluded the discordant knowing scale in the rest of our studies for brevity and its high correlation with the paradoxical knowing scale. Well-placed certainty ($\alpha = 0.91$) and well-placed uncertainty ($\alpha = 0.93$) were also measured as in Study 1 (1: *Not at all agree*, 7: *Strongly agree*).

6.1.2.4. Art experience. We measured participants’ experience with visual arts as control variables, as it may translate into their preferences. The two items read: “How much expertise do you have when it comes to paintings?” and “How much have you been surrounded by paintings in your life?” (1: *Not at all*, 7: *Very much so*).

6.1.3. Procedure

Participants evaluated the paintings and filled out the measures of the epistemic structures (the task order was randomized across participants). Finally, they responded to the questions about how much experience they had with art and demographic questions similarly to Study 1.

6.2. Results

6.2.1. Misplaced certainty and painting preference

The average preference for the Kitsch paintings ($M = 5.04$, $SD = 1.23$) was greater than the Avantgarde paintings ($M = 2.98$, $SD = 1.33$), $t(251) = 19.07$, 95 % CI [1.86, 2.29], $d = 1.20$, $p < .001$. The preference for Kitsch over Avantgarde paintings was smaller among those with higher expertise ($r = -0.23$, $p < .001$, 95 % CI [-0.34, -0.12]) and those who had higher exposure to art in their life ($r = -0.15$, $p = .017$, 95 % CI [-0.27, -0.02]).

Next, we regressed preference for each category of paintings on misplaced certainty by controlling for well-placed uncertainty as well as art expertise and exposure (Fig. 2, Panels A & B). As predicted, misplaced certainty related to a higher preference for the Kitsch paintings, $b = 0.15$, 95 % CI [0.06, 0.22], $t(247) = 3.19$, $p = .002$. Misplaced certainty did not relate to preference for the Avantgarde paintings, $b =$

0.03, 95 % CI [-0.07, 0.13], $t(247) = 0.59$, $p = .556$. Consistent with Study 1, those with misplaced certainty liked the simple option more though they did not evaluate the complex one more negatively. Well-placed uncertainty did not relate to the preferences, $ps > 0.21$. These results conceptually replicated Study 1.

6.2.2. Well-placed certainty and painting preference

Again, controlling for well-placed certainty in the main analyses did not change the above-reported patterns (see Supplements). When the relationships between preference for Kitsch and Avantgarde paintings were regressed on well-placed certainty (by controlling for art expertise and exposure), no significant relationship was observed (Kitsch: $b = -0.06$, 95 % CI [-0.17, 0.07], $t(248) = -0.856$, $p = .393$; Avantgarde: $b = -0.003$, 95 % CI [-0.14, 0.13], $t(248) = -0.046$, $p = .963$). Controlling for well-placed uncertainty did not affect the results (See Supplements).

6.3. Discussion

Consistent with Study 1, Study 2 showed that misplaced certainty is related to a greater tendency to prefer the simple option, this time as manifested in artistic preferences. Misplaced certainty predicted a greater preference for Kitsch paintings conveying simpler meanings independent of previous art experience. Well-placed certainty, however, did not relate to this artistic preference.

7. Study 3: misplaced certainty and simple (dichotomous) thinking

Studies 1–2 demonstrated that misplaced certainty predicts a preference for simpler options. In Study 3, we turned to simple (dichotomous) thinking in terms of evaluating other people. Does misplaced certainty predict evaluating others in a simple fashion, such as evaluating them as either “good” or “bad” – in a dichotomous manner? Research in social psychology addressing simple thinking largely focused on dichotomous thinking about the world (Jonason et al., 2018; Oshio, 2009) and on the reliance on simple categories like stereotypes (Macrae et al., 1994; Quinn et al., 2007; Sherman et al., 1998). We measured dichotomous thinking both in relation to the general world (e. g., “There are only ‘winners’ and ‘losers’ in this world”) and evaluation of other people (“I think of their behaviors as either positive or negative”), examining their relationship with misplaced certainty. The pre-registration, including all predictions, is available [here](#).

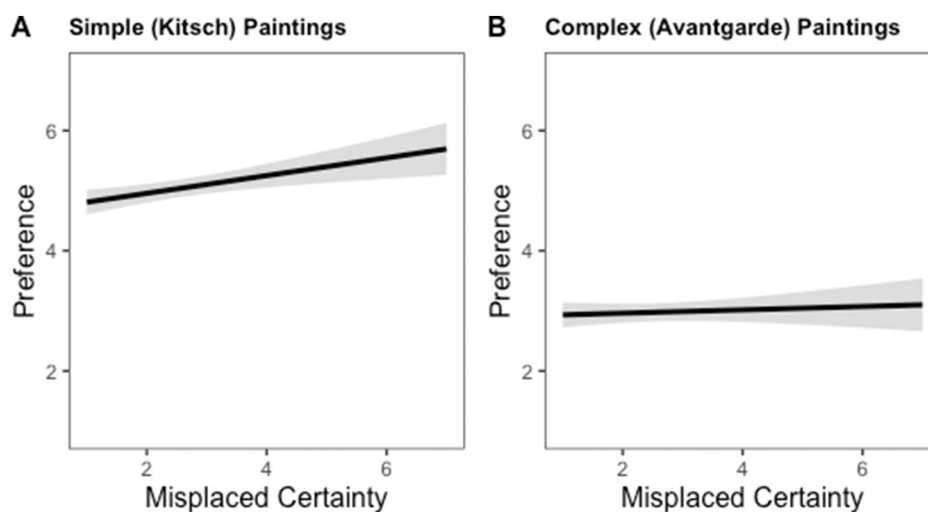


Fig. 2. The relationship between misplaced certainty and preference for simple (Kitsch, A) and complex (Avantgarde, B) paintings. All models control for well-placed uncertainty. Error bands: 95 % CIs (using `geom_ribbon` in R).

7.1. Method

7.1.1. Participants

We requested 126 participants from Amazon MTurk as suggested by our a priori power analyses for partial correlation (power: 0.80, alpha: 0.05, an estimated small correlation of 0.25 consistent with a pilot test). Four participants completed the study without submitting the participation code; therefore, we had raw data from 130 participants. Thirty-four participants were excluded from the analyses due to failing at least one attention check. All the analyses were conducted with 96 (37 females, 1 unreported, $M_{age} = 38.06$, $SD_{age} = 11.24$) participants.

7.1.2. Materials

7.1.2.1. Simple (dichotomous) thinking – general. Two subscales of the Dichotomous Thinking Inventory developed by Oshio (2009) tested chronic tendencies of simple evaluations. Dichotomous Beliefs subscale ($\alpha = 0.86$) included items about existing perceptions about the world (e.g., “People can clearly be distinguished as being “good” or “bad.”), whereas Preference for the Dichotomy subscale ($\alpha = 0.89$) included items on the motives to maintain simple thinking in general perceptions (e.g., “I want to clarify whether things are “good” or “bad.”). As the two subscales were highly correlated ($r = 0.62$, $p < .001$) and as pre-registered, we collapsed the two scores ($\alpha = 0.91$).

7.1.2.2. Simple (dichotomous) thinking – task-specific. Participants first evaluated sixteen behaviors (see Supplements). Specifically, they rated each of them in terms of positivity, negativity, and clarity (e.g., “How positive/negative is this behavior?”) on a 7-point scale (1: *Not at all*; 7: *Very much*). After completing this task, participants answered the following question measuring simple thinking in this person perception task: “When rating the behaviors, did you have an assumption in mind that a behavior should be either negative or positive, and not both?” (yes/no). The likelihood of answering this question as “Yes” indicated simple thinking during these evaluations as opposed to complex thinking (that a behavior could be both positive and negative).

7.1.2.3. Epistemic structures. All scales were the same as in Study 2. The order of scales and behavior evaluations were individually randomized. Exploratory materials are in the Supplements.

7.2. Results

7.2.1. Misplaced certainty and simple (dichotomous) thinking

We regressed dichotomous thinking on misplaced certainty by

controlling for well-placed uncertainty. As hypothesized, misplaced certainty predicted a higher tendency for dichotomous thinking in general, $b = 0.24$, 95 % CI [0.12, 0.35], $t(93) = 4.23$, $p < .001$ (Fig. 3, Panels A & B). When dichotomous thinking during the person perception task (0: no, 1: yes) was logistically regressed on misplaced certainty controlling for well-placed uncertainty, misplaced certainty significantly and positively predicted dichotomous thinking, $b = 0.51$, 95 % CI [0.25, 0.91], Wald $\chi^2 = 10.31$, $p = .001$. Specifically, for one unit change in misplaced certainty, the odds of engaging in simple thinking increased by a factor of 1.66. Well-placed uncertainty did not relate to dichotomous thinking in either of these models, $ps > 0.34$. Taken together, those with greater misplaced certainty were more likely to evaluate the world and other people in a simple manner (e.g., good vs. bad).

7.2.2. Well-placed certainty and simple (dichotomous) thinking

Again, controlling for well-placed certainty in the main analyses did not change the patterns reported above (see Supplements). When examined independently, well-placed certainty did not relate to simple or dichotomous thinking generally, $b = 0.06$, 95 % CI [−0.08, 0.23], $t(94) = 0.717$, $p = .475$, or during the person perception task, $b = -0.03$, 95 % CI [−0.37, 0.32], Wald $\chi^2 = 0.049$, $p = .826$. Controlling for misplaced uncertainty did not affect the results.

7.3. Discussion

Expanding previous findings, in Study 3, misplaced certainty related to simple thinking this time when evaluating other people. It predicted more dichotomous thinking both generally (about the world) and about specific people. However, well-placed certainty did not relate to dichotomous evaluations, showing again a unique pattern of preference for simplicity among those with misplaced certainty.

8. Study 4: effects of misplaced certainty vs. well-placed certainty on simple thinking

Going beyond the correlational approach, Study 4 examined the causal link between misplaced certainty and simple thinking. Participants were placed in one of the three epistemic conditions: misplaced certainty, well-placed certainty, and well-placed uncertainty, following the instructions by Gollwitzer et al. (2022). Next, we measured participants’ dichotomous thinking as in Study 3. Additionally, we explored epistemic threat as a potential mechanism through which misplaced certainty may foster dichotomous thinking. Predictions and plans for analyses were pre-registered [here](#). A supplementary study is available in

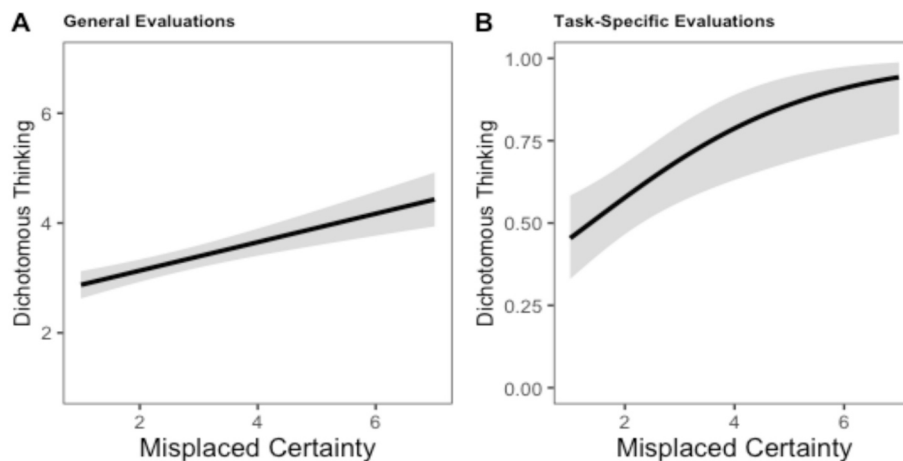


Fig. 3. The relationship between misplaced certainty and dichotomous thinking generally (A) and during a task-specific evaluation task (B). All models control for well-placed uncertainty. Error bands: 95 % CIs (using geom_ribbon in R).

Supplements.

8.1. Method

8.1.1. Participants

Gollwitzer et al. (2022) recruited 150 participants per condition (450 in total) for a small to moderate effect ($d = 0.35$; 85 % power). Considering potential attrition and exclusions, we requested 525 participants from the Prolific platform. Five hundred and twenty-six participants submitted responses. Fifty-eight participants were excluded from the analysis due to failing at least one of the three attention checks as pre-registered. All analyses were conducted with 468 (230 females, 235 males, 2 nonbinary, one unreported, $M_{age} = 39.35$, $SD_{age} = 13.54$) participants.

8.1.2. Materials

8.1.2.1. Epistemic structure manipulation (condition). Borrowing from Gollwitzer et al. (2022; Study 1), which induced misplaced certainty via a discordant knowing manipulation, we assigned participants to one of three conditions: misplaced certainty, well-placed certainty, and well-placed uncertainty. In the misplaced certainty condition, participants were asked to report something that they knew about their society with high certainty. Next, they were told to imagine that most other people in the world opposed their claim by “claiming that what they know and are certain about, namely that, [participant’s response] is unknowable.”

The two control conditions differed from misplaced certainty in terms of one of the two components: self-certainty or other people’s opinions. The well-placed certainty condition was designed as the misplaced certainty condition, except those participants were told to imagine most other people in the world were “claiming that what they know and are certain about, namely that, [participant’s response] is knowable.” Hence, their certainty was well-placed.

Well-placed uncertainty condition was similar to the misplaced certainty condition, except that participants first reported something they believed but had doubts about (instead of something they were certain about). Next, they were told to imagine that most other people in the world were “claiming that what they believe but have doubts about, namely that, [participant’s response] is unknowable. Hence, their uncertainty was well-placed.

8.1.2.2. Manipulation checks. We checked the manipulation of self-certainty via three items (e.g., “I feel certain that it [participant’s response] is true”; 1: *Not at all agree*, 7: *Strongly agree*). We also checked the degree of majority opposition via three other items (e.g., “In the world described above, people are saying it is unknowable”; 1: *Not at all agree*, 7: *Strongly agree*).

8.1.2.3. Threat. Next, we measured epistemic threat as a potential mediator as in Gollwitzer et al. (2022, Study 1), namely by having them respond to a three-item measure regarding how they would feel in that world including “I would feel threatened,” “I would feel like I am being boxed into a corner,” “I would feel like people are out to get me” (1: *Not at all agree*, 7: *Strongly agree*), $\alpha = 0.93$.

8.1.2.4. Simple thinking. To measure simple thinking under the induced epistemic structure, we adapted the Dichotomous Thinking Inventory (Oshio, 2009) used in Study 3 to our specific scenario. We asked participants to continue imagining the world where most people claim what they say is knowable or unknowable and asked them to respond to five questions regarding their feelings and actions in that described world. All five items were adapted from the Dichotomous Thinking Inventory as follows; “I would avoid ambiguous situations in this world,” “I would want to clarify who is *good* and who is *bad* in this world,” and “I would think of everyone as being either *my friend* or *my enemy*,” “I would want

to clarify whether things are *good* or *bad* in this world,” and “I would see the people in this world as either *winners* or *losers*” (1: *Strongly disagree*, 7: *Strongly agree*), $\alpha = 0.86$.

8.2. Results

8.2.1. Manipulation checks

As expected, self-certainty was similar across the two certainty conditions (misplaced certainty: $M = 6.74$, $SD = 0.052$; well-placed certainty: $M = 6.64$, $SD = 0.61$; $p = .304$), and in each condition, it was significantly higher than in the well-placed uncertainty condition ($M = 4.50$, $SD = 1.44$; $ps < 0.001$). As predicted, the misplaced certainty ($M = 5.33$, $SD = 2.16$) and the well-placed uncertainty ($M = 5.51$, $SD = 1.58$) conditions did not differ in terms of the majority opposition ($p = .375$), and both conditions led to greater endorsement of the majority opposition than the well-placed certainty ($M = 2.21$, $SD = 1.60$; $ps < 0.001$). Participants’ high and low certainty statements were similar in terms of referring to a societal issue (as instructed), though they varied in contents. Examples in response to certainty instructions are: *Politicians are only interested in their own pockets*; *People are happier when they cooperate instead of compete*. Examples in response to uncertainty instructions are: *My society wants everyone to be enjoying equal rights*; *US democracy will fall soon*.

8.2.2. Simple thinking

A univariate ANOVA comparing the three conditions in terms of dichotomous thinking revealed a significant effect of condition as expected, $F(2, 465) = 4.52$, $p = .011$, $\eta^2 = 0.02$. Pairwise comparisons across the conditions showed that misplaced certainty ($M = 3.43$, $SD = 1.15$) led to more simple, dichotomous thinking than well-placed certainty ($M = 3.03$, $SD = 1.30$), $t(314) = 2.90$, $p = .004$, 95 % CI [0.13, 0.67], $d = 0.33$. Misplaced certainty did not differ from well-placed uncertainty in terms of dichotomous thinking ($M = 3.36$, $SD = 1.31$), $t(309) = 0.538$, $p = .591$, 95 % CI [-0.20, 0.35], $d = 0.06$. Well-placed uncertainty led to higher dichotomous thinking than well-placed certainty, $t(307) = 2.19$, $p = .029$, 95 % CI [0.03, 0.62], $d = 0.25$ (Fig. 4).

8.2.3. Epistemic threat: mediation

A mediation analysis (Hayes, Model 4) examined the mediating role of epistemic threat with a multi-categorical predictor using indicator coding (misplaced certainty was coded as the comparison group). The statistical significance of indirect effects was determined via

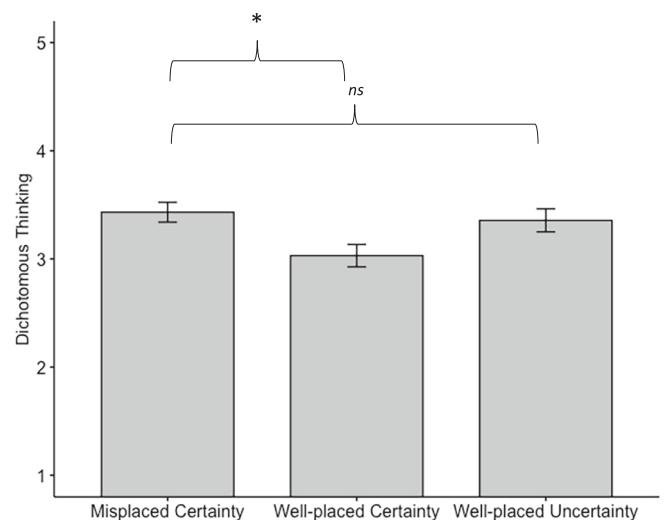


Fig. 4. Effects of epistemic structures on dichotomous thinking in Study 4. Error bars: ± 1 SE. Asterisks indicate statistical significance in the pairwise comparisons with misplaced certainty (main analyses); * $p < .05$.

bootstrapped 95 % bias-corrected confidence intervals (Fig. 5).

The paths from condition to threat were significant; compared to misplaced certainty, both well-placed certainty ($b = -1.34$, 95 % CI $[-1.74, -0.94]$, $t(465) = -6.61$, $p < .001$) and well-placed uncertainty ($b = -0.43$, 95 % CI $[-0.83, -0.03]$, $t(465) = -2.09$, $p = .037$) led to a lower level of threat. The path from threat to dichotomous thinking was also significant in the positive direction, ($b = 0.38$, 95 % CI $[0.32, 0.43]$, $t(464) = 13.79$, $p < .001$), that is, those who experienced less threat were less likely to engage in dichotomous thinking. Importantly, the path analyses revealed significant indirect effects of the condition through threat on dichotomous thinking; compared to misplaced certainty, both well-placed certainty ($b_{X1} = -0.50$, 95 % CI $[-0.68, -0.34]$) and well-placed uncertainty ($b_{X2} = -0.16$, 95 % CI $[-0.31, -0.01]$) led to lower dichotomous thinking through lower threat. Particularly, misplaced certainty predicted a greater tendency to engage in dichotomous thinking due to experiencing higher threat than the two control conditions. The direct effects were not significant in this model, $ps > 0.41$. When we conducted the same model allowing for a comparison between well-placed certainty and well-placed uncertainty (through indicator coding), we observed that the former was less threatening than the latter ($b = -0.91$, 95 % CI $[-1.31, -0.51]$, $t(465) = -4.45$, $p < .001$), and in turn, predicted less dichotomous thinking (indirect effect: $b_{X1} = -0.34$, CI $[-0.51, -0.19]$).

8.3. Discussion

In Study 4, experimentally induced misplaced certainty led to greater dichotomous thinking than well-placed certainty. Contrary to our expectations, the level of dichotomous thinking did not differ between the misplaced certainty and well-placed uncertainty conditions. However, perceived threat significantly mediated condition differences: misplaced certainty led to more dichotomous thinking than both conditions (even well-placed uncertainty) via higher perceived threat. These findings partially supported our prediction that misplaced certainty causes greater levels of simple thinking than other epistemic structures.

9. Study 5: effects of misplaced certainty vs. misplaced uncertainty on simple thinking

Study 5 aimed to conceptually replicate Study 4 by adding another control condition: misplaced uncertainty (doubting things most people are certain about; see Fig. 6 for the design). Furthermore, to standardize the content of statements held with high and low certainty, we asked participants to report a policy decision that they know and are certain (or believe but are uncertain about) would result in a positive change in society (as in Gollwitzer et al., 2022; Study 3). The pre-registration is here.

9.1. Method

9.1.1. Participants

Following the power analyses of Study 4, we needed at least 150 participants per condition (600 in total) for a small to moderate effect ($d = 0.35$; 85 % power). Considering potential exclusions, we requested 700 participants from the Prolific survey platform. Seven hundred and one participants submitted responses. Fifty-four participants failed at least one of the three attention checks and were removed from analyses, resulting in 647 (315 females, 317 males, 13 nonbinary, 2 unreported, $M_{age} = 34.22$, $SD_{age} = 13.28$) participants.

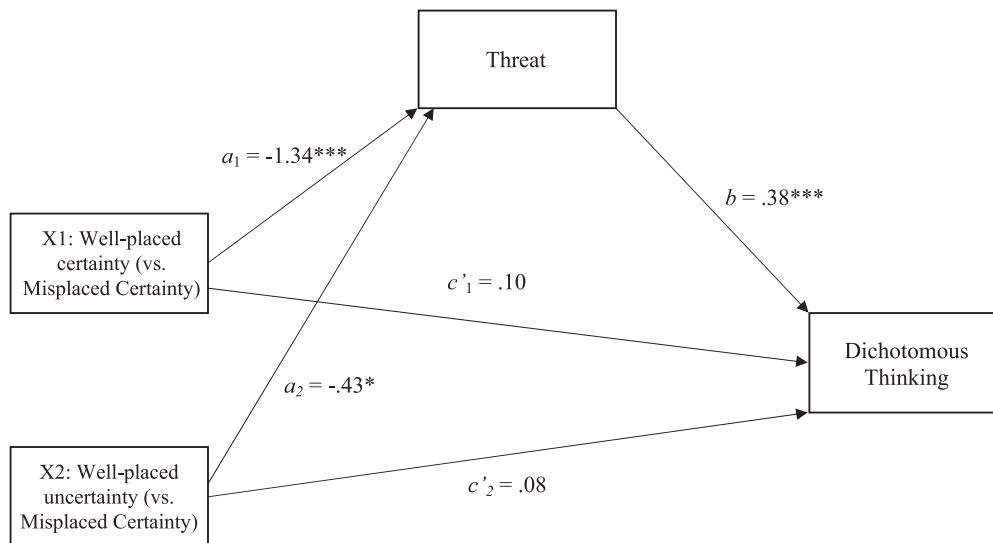
9.1.2. Materials and procedure

The procedure was the same as in Study 4 except for the following changes: First, we induced opposition and affirmation more explicitly by telling participants to imagine that most people were saying what they knew and were certain about [/*believe but are uncertain about*] is wrong [/*right*]. Second, we added another control condition, misplaced uncertainty, to have a complete design. In that condition, participants were first told to report something they believe but are uncertain about in their society and were told to imagine that most people were saying what they believe but are uncertain about is indeed right.

9.2. Results

9.2.1. Manipulation checks

Confirming that our mindset manipulation worked, self-certainty



Total Effect: $R^2 = .14$, $F(2,465) = 4.53$, $p = .011$.

Fig. 5. A path diagram of the simple mediation model with the experimental condition as the multi-categorical predictor, threat as the mediator, and dichotomous thinking as the outcome variable in Study 4. *** $p < .001$, * $p < .05$.



Fig. 6. Summary of the Study 5 design.

was similar across the two certainty conditions (misplaced certainty: $M = 6.66, SD = 0.60$; well-placed certainty: $M = 6.60, SD = 0.68; p = .593$) and significantly higher in these conditions than in the two uncertainty conditions (misplaced uncertainty: $M = 5.38, SD = 1.32$ and well-placed uncertainty: $M = 5.35, SD = 1.12; ps < 0.001$). Again, misplaced certainty ($M = 5.34, SD = 1.39$) and well-placed uncertainty ($M = 5.06, SD = 1.64$) conditions did not differ in terms of the majority opposition ($p = .069$), and both conditions related to greater endorsement of the majority opposition than well-placed certainty ($M = 1.97, SD = 1.33$) and misplaced uncertainty conditions ($M = 1.89, SD = 1.19; ps < 0.001$). The contents of low and high certainty statements overlapped in this study. Examples included in both high and low certainty statements are: *More gun control; Lowering taxes; Universal health care; Higher minimum wage.*

9.2.2. Simple thinking

When the four conditions were compared via a univariate ANOVA in terms of dichotomous thinking, a condition effect emerged as expected, $F(3, 643) = 40.69, p < .001, \eta^2 = 0.16$ (Fig. 7). Replicating Study 4, misplaced certainty ($M = 3.51, SD = 1.01$) led to greater dichotomous thinking than well-placed certainty ($M = 2.55, SD = 0.98$), $t(335) = 8.79, p < .001, 95\% \text{ CI } [0.74, 1.17], d = 0.96$. Misplaced certainty also led to greater dichotomous thinking than misplaced uncertainty, suggesting that dichotomous thinking was not a result of *misplacedness* per se ($M = 2.48, SD = 0.99$), $t(315) = 9.15, p < .001, d = 1.00$. This time, unlike Study 4, misplaced certainty condition led to greater dichotomous thinking than well-placed uncertainty as well ($M = 3.23, SD =$

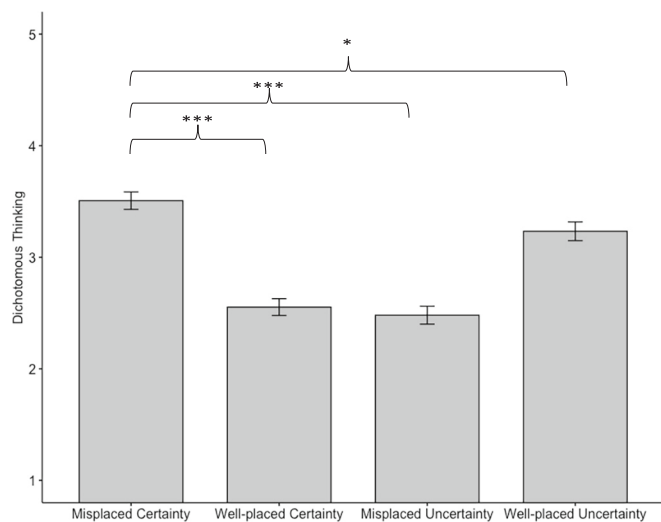


Fig. 7. Effects of epistemic structures on dichotomous thinking in Study 5. Error bars: + - 1 SE. Asterisks indicate statistical significance in the pairwise comparisons with misplaced certainty (main analyses); *** $p < .001$, * $p < .05$.

1.06), $t(323) = 2.39, p = .017, 95\% \text{ CI } [0.05, 0.50], d = 0.27$. As in Study 4, well-placed uncertainty led to more dichotomous thinking than well-placed certainty, $t(328) = 6.04, p < .001, 95\% \text{ CI } [0.46, 0.90], d = 0.67$. Well-placed uncertainty also led to more dichotomous thinking than misplaced uncertainty, $t(308) = 6.46, p < .001, 95\% \text{ CI } [0.52, 0.98], d = 0.73$. Well-placed certainty and misplaced uncertainty did not differ in terms of dichotomous thinking, $t(320) = -0.66, p = .511, 95\% \text{ CI } [-0.14, 0.29], d = -0.07$.

9.2.3. Epistemic threat: mediation

We conducted a mediation analysis (Hayes, Model 4) with a multicategorical predictor with indicator coding (misplaced certainty was the comparison group). The statistical significance of indirect effects was tested via bootstrapped 95% bias-corrected confidence intervals (Fig. 8).

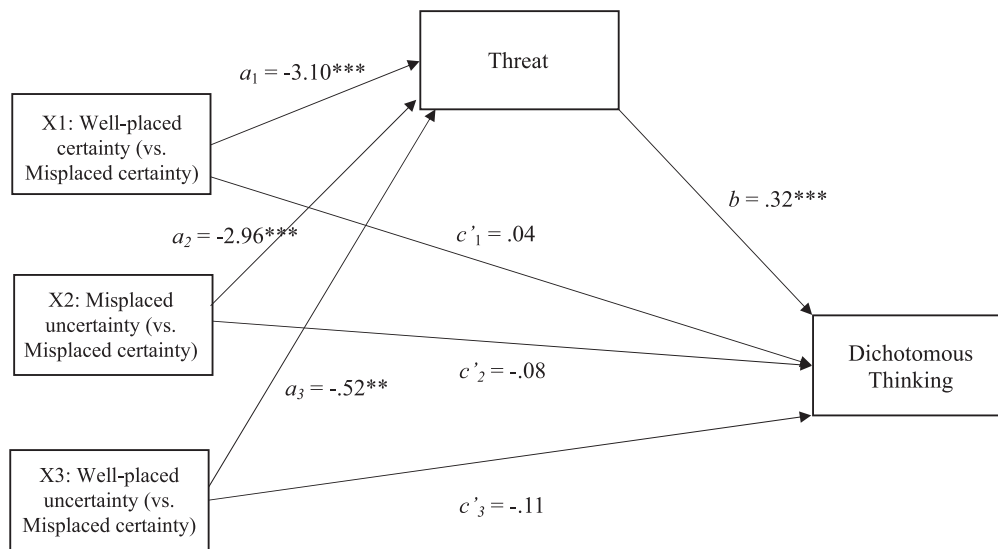
The paths from condition to threat were all significant; compared to misplaced certainty, well-placed certainty ($b = -3.10, 95\% \text{ CI } [-3.41, -2.78], t(643) = -19.41, p < .001$), misplaced uncertainty ($b = -2.96, 95\% \text{ CI } [-3.29, -2.64], t(643) = -18.00, p < .001$), and well-placed uncertainty ($b = -0.52, 95\% \text{ CI } [-0.84, -0.20], t(643) = -3.20, p = .015$) induced lower levels of threat. The path from threat to dichotomous thinking was again significant ($b = 0.32, 95\% \text{ CI } [0.27, 0.37], t(642) = 13.27, p < .001$); lower threat resulted in less dichotomous thinking. Replicating Study 4, the path analyses revealed significant indirect effects of the condition through threat on dichotomous thinking; compared to misplaced certainty, well-placed certainty ($b_{X1} = -0.90, 95\% \text{ CI } [-1.04, -0.76]$), misplaced uncertainty ($b_{X2} = -0.86, \text{ CI } [-1.00, -0.73]$), and well-placed uncertainty ($b_{X3} = -0.15, 95\% \text{ CI } [-0.28, -0.04]$) led to lower dichotomous thinking through lower threat. The direct effects were not significant, $ps > 0.28$.

9.3. Discussion

When we manipulated participants' views to fall under one of the four different epistemic structures (misplaced and well-placed forms of certainty and uncertainty), misplaced certainty led to the highest levels of simple, dichotomous thinking. As expected and consistent with Study 4, perceived epistemic threat significantly mediated the differential effect of misplaced certainty on dichotomous thinking, showing that certainty calls for simple evaluations when it is misplaced and therefore threatening.

10. General discussion

Five studies showed that misplaced certainty – an epistemically threatening form of certainty – relates to simple thinking. First, those embracing misplaced certainty as an epistemic structure tended to prefer simple options, both linguistically and artistically. In Study 1, the more people endorsed misplaced certainty the more they preferred to



Total Effect: $R^2 = .40$, $F(3, 643) = 40.69$, $p < .001$.

Fig. 8. A path diagram of the mediation model with the experimental condition as the multi-categorical predictor, threat as the mediator, and dichotomous thinking as the outcome variable in Study 5. *** $p < .001$, ** $p < .01$.

give a simple speech lacking details and context. In Study 2, the more participants endorsed misplaced certainty the more they preferred Kitsch paintings characterized by simple properties lacking artistic depth and complexity. Consistently in both studies misplaced certainty did not directly relate to preference for complexity.

Studies 3–5 examined the relationship between misplaced certainty and simple thinking in evaluations: do people with misplaced certainty evaluate the world and other people more simplistically? In a correlational design in Study 3, misplaced certainty related to dichotomous thinking both generally and in a person perception task. Studies 4–5 revealed a causal relationship between misplaced certainty and simple thinking: Misplaced certainty, induced by an experimental manipulation, triggered simple thinking more than well-placed (confirmed/substantiated) certainty or misplaced (opposed/unsubstantiated) uncertainty. Misplaced certainty also made people think in a simpler way than well-placed uncertainty in Study 5, where we used a stronger manipulation than in Study 4. The relationships between misplaced certainty and simple thinking were mediated by epistemic threat, suggesting that the threatening experience of one's certainty being challenged by the outside world pushed people to embrace thinking dichotomously.

The present work makes several contributions to the literature. First, it adds to the research on misplaced certainty and thus goes beyond the certainty-uncertainty dichotomy. Consistent with recent work (Gollwitzer et al., 2022), our studies show that certainty can be more threatening than uncertainty when it is felt to be unsubstantiated (see Study 4 and 5). We also show a novel outcome of the epistemic threat stemming from misplaced certainty: people embrace simple thinking and thus possibly preemptively reduce the variety of information they could process and learn from.

Second, we showed that simple thinking might not be triggered by any form of certainty but just by misplaced certainty. Study 1 showed that those who embraced well-placed certainty preferred complexity over simplicity. In Studies 4 and 5, well-placed certainty led to less dichotomous thinking than both misplaced certainty and well-placed uncertainty. By teasing apart misplaced and well-placed forms of certainty in our studies, we pointed to the boundary conditions of the relationship between certainty and simple thinking.

Third, we examined simple thinking across different domains;

linguistically, visually, and in evaluations. Thus, our findings elucidate the generalizability of the hypothesized patterns. These patterns were also examined via different design approaches (correlational and experimental) and were supplemented by pilot studies (Study 1) or replication studies (Study 3–5), demonstrating the robustness of the effects (see Supplements).

10.1. Implications and future directions

10.1.1. Certainty vs. uncertainty: what is more threatening?

The present study provided a nuanced picture of the processes that lead from epistemic structures to simple thinking. Most past research on the effects of uncertainty has compared uncertainty to the absence of uncertainty rather than to the presence of certainty (e.g., Weary et al., 2001; Wichman et al., 2010). We suggest that certainty, but only when misplaced, will lead to simple thinking via its effects on feelings of threat (see also Gollwitzer et al., 2022). One reason why the threatening impact of certainty had not come to the fore in past research may be that the outcomes of uncertainty have hardly been compared to those of various forms of certainty. Comparing uncertainty with various forms of certainty, we demonstrated that misplaced certainty might be more threatening than uncertainty and, in turn, may foster simpler thinking. By going beyond the uncertainty vs. certainty dichotomy, we hope to provide a new perspective to the old (and more general) question of the relationship between uncertainty and heuristic thinking (e.g., Tversky & Kahneman, 1974), assuming that simple thinking operates as a heuristic.

We also found that uncertainty was more threatening and produced simpler thinking when it was well-placed (confirmed) rather than misplaced (challenged; Study 5). There are at least two possible interpretations of this finding. First, the pure fact of opposition to one's belief embedded in the well-placed uncertainty condition ("your belief is wrong") as opposed to the affirmation embedded in the misplaced uncertainty condition could be responsible for the higher epistemic threat experienced in the former condition. So even for beliefs held with uncertainty, majority opposition (vs. affirmation) can induce some level of epistemic threat. Second, the opposition to one's belief embedded in the well-placed uncertainty condition could have operated as an affirmation to the epistemic experience of uncertainty ("your uncertainty is correct") and the experience of majority-confirmed uncertainty could have

led to greater epistemic threat and, in turn, simpler thinking. Regardless, these results indicate that simple thinking may become less likely when one recognizes that one's uncertainty is unwarranted. Future research should examine whether challenging uncertainty is an effective way to wean people off simple thinking towards more elaborative thinking.

10.1.2. Implications regarding simple thinking

We operationalized simple thinking as a relative term by referring to a preference for a well-defined, and thus, easier-to-process option (e.g., speech, painting) or evaluations compared to alternative, more complex, and thus more difficult-to-process ones. We refrain from suggesting that simple thinking corresponds to simplistic thinking defined as "treating complex issues and problems as if they were much simpler than they really are" (Lexico, n.d.). After all, the level of complexity is a relative term depending on who is judging the complexity and depending on further variables such as the context, measures, timing, etc.

Considering these limitations, simple thinking has been described in terms of a relative lack of intellectual depth. For example, past linguistic work demonstrated that simple speech (e.g., using simple words and sentence structures) brings shallowness and ambiguity (Abdallah & Langley, 2014; Aggerholm et al., 2012; Piantadosi et al., 2012). Simple artistic preferences such as Kitsch paintings undermine the unconventional and revolutionary mission of art (Ortlieb & Carbon, 2019). Simple evaluations show a shallow understanding of the world and trigger prejudiced attitudes (Allport, 1954).

On the other hand, simple thinking has been described as a helpful tool to increase perceived control over an environment. Philosophers have emphasized its critical role in hypothesis generation via increasing testability and explanatory power (Kelly, 2004). Simplifying abstract concepts makes science more accessible and feasible (e.g., facilitates inductive reasoning; see Gilboa & Samuelson, 2009). Therefore, one may speculate that by preferring the simple over complex, those with misplaced certainty may cope with their uncertain environment and preserve their certainty. They may even regulate their epistemic threat this way at least temporarily. Simple thinking may also facilitate certain socio-cognitive operations and interactions by operating as a useful heuristic. Future research should investigate the implications of simple thinking more systematically and examine its potential role in preserving certainty in the face of disconfirmation and opposition.

Although our findings clearly document their preference for simplicity, how those with misplaced certainty approach complexity is less clear. In Studies 1 and 2, where we teased apart preferences for simple and complex options, we found no relationship between misplaced certainty and evaluation of complexity. Perhaps misplaced certainty brings about ignorance of complex information, as documented by Olcaysoy Okten et al. (2022): Misplaced certainty about the future during the early times of the pandemic predicted ignorance of complex information provided by medical experts. If those with misplaced certainty ignore complex information when they can, their evaluations of complex information in our studies may be not very reliable (i.e., based on less systematic processing). When complex information cannot be ignored, people adhering to misplaced certainty may evaluate it as unlikely or even threatening. Future research may uncover those possibilities.

10.2. Limitations

We consider several limitations. Though we observed in our experiments that misplaced certainty fostered simple thinking via epistemic threat, we cannot exclude that a bidirectional relationship may exist between misplaced certainty and simple thinking. For example, those who experience processing fluency thanks to their simple thinking patterns may experience a sense of confidence (see Schwarz, 2010) which possibly fuels their misplaced certainty and resistance to challenging views (Briñol et al., 2012). Second, uncertainty may operate as a precursor of misplaced certainty, and in turn cause threat-induced

simple thinking. A longitudinal design may potentially capture a more comprehensive picture of the process. Third, we suggest that the relationship between misplaced certainty and simple thinking exists both at the trait (Studies 1–3) and state (environmentally induced; Studies 4–5) levels. Future research is needed to understand whether epistemic structures at the trait and at the state level serve similar purposes in their effects on simple thinking. Those with misplaced certainty, whether state or trait, can use simple thinking to maintain control and certainty in their environment by eliminating alternatives. However, there may be other consequences. For example, misplaced certainty by leading to simple thinking may save subjectively valuable time otherwise required for reflecting on the nuances of the argument. Fourth, what makes misplaced certainty "misplaced" may vary as a function of the type of misplaced certainty as well as the domain of misplaced certainty. Regarding the type of misplaced certainty, it could be misplaced due to being unknowable to oneself (paradoxical knowing) or to most others (discordant knowing). The function of simplicity may also vary in parallel to the nuances of the different types. In the former case (paradoxical knowing), where the threat emerges internally, simplicity may be indicated by a preference for simple information. In the latter case (discordant knowing), the epistemic threat is experienced socially (due to the possibility of immediate disconfirmation by others), and simplicity may manifest itself in social situations like evaluating others in simpler ways. Regarding the domain that misplaced certainty refers to, the domain could be about a technically unknowable topic (e.g., metaphysical) or a topic that is unknowable only now (e.g., certainty about the future). While the former content can never be substantiated, the latter can be substantiated over time (see Olcaysoy Okten et al., 2022; Exp. 3) and then produce different results than observed here. Fifth, our scope was limited to simplicity in evaluations and intentions rather than actual behaviors. Arguably, simple thinking may be more consequential when acted upon, as in the case of delivering a simple speech or writing a simple text devoid of intellectual depth. Finally, our studies only employed U.S. residents through online research platforms. Future research should consider potential biases in our sample characteristics and examine the generalizability of the findings across populations.

10.3. Conclusion

Past research has focused on the unwanted consequences of *uncertainty*. Here we suggest that *certainty* may relate to potentially problematic consequences, specifically in terms of people's simple versus complex thinking. We observed that misplaced (unsubstantiated) certainty predicted and caused simple thinking (i.e., seeking what is easy to process and well-defined) in preferences and evaluations. By extending our understanding of different epistemic structures we go beyond the traditional certainty vs. uncertainty dichotomy and thereby open a potential gateway to intellectual depth and openness to complexity.

CRediT authorship contribution statement

Irmak Olcaysoy Okten: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Visualization, Writing – original draft. **Kirill Kiselev:** Data curation, Formal analysis, Methodology, Writing – review & editing. **Gabriele Oettingen:** Conceptualization, Investigation, Methodology, Resources, Supervision, Writing – review & editing.

Declaration of competing interest

None.

Data availability

We have shared the link to our data on the manuscript.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.paid.2024.112734>.

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