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Repetition could increase the perceived truth of conspiracy theories

Jérémy Béna^a, Mathias Rihet^b, Ophélie Carreras^b, & Patrice Terrier^b

^aUCLouvain, Belgium

^bCLLE, Université de Toulouse, CNRS

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Author note

Correspondence concerning this article should be addressed to Jérémy Béna, UCLouvain, PSP IPSY, 10 Place du Cardinal Mercier, 1348, Louvain-la-Neuve, Belgium. Email: jeremy.bena@uclouvain.be

Abstract

Conspiracy theories can be repeatedly encountered, which raises the issue of the effect of their repeated exposure on beliefs. Earlier studies found that repetition increases truth judgments of factual statements, whether they are uncertain, highly implausible, or fake news, for instance. Would this “truth effect” be observed with conspiracy statements? If so, is the effect size smaller than the typical truth effect, and is it associated with individual differences such as cognitive style and conspiracy mentality? In the present preregistered study, we addressed these three issues. We asked participants to provide binary truth judgments to conspiracy and factual statements already displayed in an exposure phase (an interest judgment task) or new (displayed only in the truth judgment task). We measured participants’ cognitive style with the 3-item Cognitive Reflection Test (CRT), and conspiracy mentality with the Conspiracy Mentality Questionnaire (CMQ). We found that repetition increased truth judgments of conspiracy theories, unmoderated by cognitive style and conspiracy mentality. The truth effect was smaller with conspiracy theories than with uncertain factual statements. The results suggest that repetition may be a simple way to increase belief in conspiracy theories. Whether repetition increases conspiracy beliefs in natural settings and how it contributes to conspiracism compared to other factors are important questions for future research.

Keywords: Belief; Conspiracy theories; Truth effect; Repetition; Truth; Truth-by-Repetition

Repetition could increase the perceived truth of conspiracy theories

Repetition typically increases truth judgments of statements regardless of their actual truth status (for meta-analysis, see Dechêne et al., 2010; see also Brashier & Marsh, 2020; Pillai & Fazio, 2021; Unkelbach et al., 2019). This “truth effect” is commonly explained by processing fluency (e.g., Reber & Schwarz, 1999; Unkelbach & Greifeneder, 2013) and familiarity (e.g., Begg et al., 1992). Repetition makes statements easier to process and more familiar than new ones, which are used as cues for truth (e.g., Brashier & Marsh, 2020; Ecker et al., 2022; see, e.g., Unkelbach & Rom, 2017 for a referential account).

The bulk of studies on the truth effect used uncertain factual statements (Henderson et al., 2021), often under the assumption that statements’ truth ambiguity is necessary to observe the truth effect (e.g., Dechêne et al., 2010; see Unkelbach & Stahl, 2009 for a formal model with this assumption). Some recent studies used more diverse statements, some of which challenged this assumption. For instance, the truth effect has been observed with true Covid-19 related statements (Unkelbach & Speckmann, 2021), political opinions (Arkes et al., 1989), rumors (DiFonzo et al., 2016), fake news (Pennycook et al., 2018), emotional statements (Moritz et al., 2012), and statements that contradict people’s prior knowledge (Fazio et al., 2015; Fazio, 2020), sometimes blatantly so (Fazio, Pennycook, & Rand, 2019; Lacassagne et al., 2022).

In the present manuscript, we investigated whether repetition increases belief in conspiracy theories (hereafter, conspiracism). Conspiracy theories aim to explain social and political events through reference to the machinations of powerful agents and networks (e.g., Douglas et al., 2019; Hofstadter, 1966). With the Internet, conspiracy theories can spread broadly, raising questions such as the antecedents and consequences of conspiracism (see, e.g., van Prooijen & van Vugt, 2018).

It is commonly assumed that beliefs in conspiracy theories (i.e., conspiracism) are rooted in individual differences and predispositions. For instance, intuitive (analytic) thinking has been associated with increased (decreased) conspiracism (e.g., Swami et al., 2014; van Prooijen, 2017). Other individual differences such as the motivations to believe (Douglas et al., 2019; Douglas & Sutton, 2017), belief in finalism (Wagner-Egger et al., 2015), paranoia (Brotherton & Eser, 2015), and other personality traits (Goreis & Voracek, 2019) have also been associated with conspiracism.

Research also investigated the consequences of exposure to conspiracy theories on behavior, behavioral intentions, and prejudice (Jolley & Douglas, 2014a 2014b; van der Linden, 2015; for a review, see Jolley, Mari, & Douglas, 2020). Such studies have yielded results consistent with the possibility of an increase in belief due to participants being merely exposed to a conspiracy theory. Of importance, such studies did not collect measures of belief in the presented conspiracy statements (e.g., adhesion; accuracy; truth judgments), or these measures were not collected as a function of repeated exposure. In addition, such studies typically displayed only one overarching conspiracy theory – conspiracy statements that are thematically related (e.g., conspiracy theories of Princess Diana’s death; of climate change, Douglas & Sutton, 2008; Jolley & Douglas, 2014a). To test the effect of prior exposure on belief, one needs to measure belief in conspiracy theories when they were presented before and when they are new – in other words, when exposure to the conspiracy theories is repeated or not.

To our knowledge, no experimentation investigated the effects of (repeated) exposure to conspiracy theories on their believability. As the endorsement of conspiracy theories may be key in influencing behavior, it is critical to directly address the causal role of repetition on truth judgments of conspiracy theories. Interestingly, in the “new conspiracism” (Muirhead & Rosenblum, 2019), repetition, not evidence, validates conspiracy theories. The ‘new

conspiracism' is conspiracy without the theory. This conspiracism dispenses with the burden of explanation and imposes its own reality through repetition (exemplified by the catchphrase "a lot of people are saying"), a phenomenon amplified by social media. Although this phenomenon tackled in the political science domain assigns repetition a major role, this role has yet to be tested.

Here we ask whether the truth effect will extend to conspiracy statements.

In an earlier investigation, Béna et al. (2019) found initial evidence in line with the hypothesis that repetition might increase the perceived truth of conspiracy statements. Béna et al. reanalyzed two large-scale surveys that used representative samples of the French population (Institut Français d'Opinion Publique; IFOP, 2017, 2019). In these surveys, respondents indicated whether they had already seen and to what extent they agreed with 10 conspiracy statements, corresponding to popular conspiracy theories (e.g., "NASA faked the Moon landing," "The Illuminati is a secret organization that seeks to manipulate the population"). The reanalyses showed that participants agreed more with conspiracy statements when they recognized them than when they perceived the statements as being new. Although Béna et al. were not in the position to analyze agreement as a function of actual repetition but only as a function of perceived repetition, their results are in line with previous studies finding that recognized statements were more believed than statements deemed to be new, whether the statements were actually old or not (Bacon, 1979).

In the present high-powered preregistered experiment, we manipulated repeated exposure to conspiracy statements and uncertain factual statements (trivia statements). Based on the range of statements that the truth effect was found with and on the initial results from Béna et al. (2019), we hypothesized that repeated exposure would increase truth judgments of conspiracy statements. We included trivia statements to compare the magnitude of the truth effect with conspiracy statements compared with trivia statements. By repeating statements

only once, manipulating materials within participants, and administering a binary true/false truth judgment task, we proceeded to a relatively conservative test of the truth effect with conspiracy statements. For instance, the truth effect was not found with highly implausible statements (e.g., “the Earth is a perfect square”) when only one repetition and scales with few response points were used (Pennycook et al., 2018), but occurred when more repetitions and a more sensitive scale were involved (Lacassagne et al., 2022). As a result, not finding the truth effect with conspiracy statements would not speak against the existence of such an effect – more favorable conditions (e.g., more repetitions, more sensitive scales, and possibly processing only conspiracy statements) may reveal an effect. Finding the truth effect with conspiracy statements would be informative as we would learn that repeated exposure is a possible antecedent of conspiracism.

In addition to assessing the causal effect of repetition on truth judgments of conspiracy and trivia statements, we also probed participants’ cognitive style and conspiracy mentality (two widely studied individual differences in the context of conspiracism). As mentioned above, conspiracism has been associated with several individual differences, including cognitive style. In contrast, truth effect research found little evidence to date for correlations between the magnitude of the truth effect and individual differences, including cognitive style (de Keersmaecker et al., 2019; but see Newman et al., 2020 for a correlation with the need for cognition). Recent studies suggest that some participants are resistant to the truth effect (Schnuerch et al., 2020; see also Henderson et al., 2020; Lacassagne et al., 2022) for reasons that remain to be identified. If we find a truth effect with conspiracy statements, an important question is whether it depends on individual differences, such as cognitive style and conspiracy mentality. In addition, as we included trivia statements, we were able to test whether the size of the truth effect with trivia statements depends on cognitive style (conspiracy mentality is less relevant on this matter).

Methods

We report how we determined our sample size, criteria for data exclusion, all manipulations, and all measures in the study. The preregistration, experiment program, data, and analyses are publicly available at https://osf.io/edzac/?view_only=f03c45d4cd3941d6aba3357fc69cd4df.

Participants and design

The design was a 2 (Repetition: repeated vs. new) \times 2 (Materials: conspiracy or trivia), with the two factors manipulated within participants. Trivia statements were either factually true or false, which is a nested manipulation inside the trivia statements condition.

We collected complete data from a total of 374 participants online. After data exclusion¹, there were 299 participants in the final sample ($M_{age} = 28.59$, $SD_{age} = 11.43$, 82.6% women, 57.53% students). An a priori power analysis (conducted with G*Power 3.1.9.7, Faul et al., 2007) showed that we needed 282 participants to detect an effect of Repetition on proportions of “true” judgments in the conspiracy statements condition (the critical effect we are interested in) as small as *Cohen’s* $d = 0.2$ (in a two-tailed paired samples t -test with $\alpha = .05/4 = .0125$).

Materials

Conspiracy statement selection. To operationalize conspiracy theories, we used twenty existing and widespread conspiracy statements (e.g., The Nasa faked the moon landing; Lady Diana’s accident was a disguised murder). We used 18 conspiracy statements from IFOP (2017, 2019, 2020; see also Wagner-Egger et al., 2015). We further created two conspiracy statements (one on hydroxychloroquine, the other on climate change). The 20

¹ Preregistered data exclusion criteria were as follow (participants can be excluded on more than one ground): Less than 5% of statements judged as true or false ($n = 0$); if the mother tongue is not French, an insufficient fluency in French (a self-disclosed French level below B2) ($n = 1$); declaring having searched information about the statements or the problems while performing the study ($n = 38$); declaring having responded to items without having read them ($n = 34$); declaring not wanting the data to be analyzed after having read a debriefing of the study objectives ($n = 10$).

conspiracy statements we used are available in French at

https://osf.io/edzac/?view_only=f03c45d4cd3941d6aba3357fc69cd4df.

Trivia statement selection. To use statements with average uncertain truth, we selected 20 factual statements (e.g., “There are no domestic snakes in Scotland and Groenland”) about a variety of topics (sciences, arts, history) from a larger pool of statements selected to be uncertain (including French translations of statements from Unkelbach & Rom, 2017, and Silva, 2014). Ten statements were factually true, and 10 statements were factually false. The 20 trivia statements we used are available in French at https://osf.io/edzac/?view_only=f03c45d4cd3941d6aba3357fc69cd4df.

Statement presentation. For each participant, 40 statements (20 conspiracy statements; 10 true factual uncertain statements; 10 false factual uncertain statements) were randomly allocated to either the repeated or new condition. In each Repetition condition, there were 20 statements (half conspiracy statements, half trivia statements).

Cognitive style. We used the original 3-item Cognitive Reflection Test (CRT; Frederick, 2005) to probe participants’ cognitive style. The CRT is intended to probe individual differences in the tendency to override intuitive but incorrect responses. We computed the number of problems correctly solved. No or few problems solved are associated with intuitive thinking, while more solved problems are associated with analytic thinking.

Conspiracy mentality. We administered the Conspiracy Mentality Questionnaire (CMQ; Bruder et al., 2013, translated in French by Lantian et al., 2016)². The CMQ is a five-item questionnaire probing individual differences in the general susceptibility to conspiracy explanations. Participants indicated how likely they thought each five statements was on a 5-

² In the preregistration, we stated that we were interested in two individual differences: cognitive style and skepticism. Please note that referring to “skepticism” in the preregistration is an error, as we were interested in conspiracy mentality, not skepticism.

point Likert scale (“Certainly not, 0%”, “Certainly, 100%”). For each participant, we computed the mean response (Cronbach’s $\alpha = .82$), with higher scores indicating a higher conspiracy mentality.

Procedure

After the ethical committee approval, we ran the study online with the Qualtrics online survey tool (Qualtrics, Provo, UT) between October 2020 and January 2021. We created a JavaScript code to randomize statements attribution in each repetition condition and order of presentation for each participant. We distributed the study through various Facebook groups. We said to the participants that the study was about the evaluation of information without further details. We strongly recommended participating on a computer in a quiet room.

The study was conducted online in French. After the display of the consent form and the collection of their agreement, participants gave demographic information (sex, age, professional situation, mother tongue, level on the Common European Framework of Reference scale for French if the mother tongue was other than French).

Instructions then indicated that statements, some true and some false, would be displayed without time limit with the task to rate their interest (as frequently done in truth effect studies, see, e.g., Henderson et al., 2021) on a 5-point Likert scale (1: “Not interesting at all”; 5: “Extremely interesting”). Participants then rated the interest of 20 statements (10 conspiracy statements; 5 trivia false; 5 trivia true) displayed in a random order one by one in the center of the screen.

Immediately after this task, participants were introduced to the true/false truth judgment task. In this task, the 20 statements from the interest judgment task were mixed to 20 new ones (10 conspiracy statements; 5 trivia false; 5 trivia true) and displayed in a random order one by one in the center of the screen without time limit. The instructions stressed that it was important

to answer even if some statements seemed odd or if the participants were uncertain. Participants were in addition asked not to look for information about the statements during the task.

Once the truth judgment task was completed, we administered the 3-item CRT and the CMQ. The CRT and CMQ order was counterbalanced between participants. In the CRT, participants were asked to solve three short problems displayed individually in a random order, without time limit. Participants had to give their response in an open numerical format. In the CMQ, we told participants that we were interested in their personal opinion and that they would indicate the extent to which they thought the five items, displayed on the same screen, were true.

Finally, we asked participants (1) whether they looked for information about the statements or the problems during the study (yes/no answer), (2) whether they happened to answer without reading the displayed statements (yes/no answer), and (3) after reading the study objectives, whether they allow us to use their data in our analyses (yes/no answer). We used responses to these three questions as exclusion criteria (see the *Participants* section above). Participants were then thanked and debriefed in a concluding text.

Results³

A truth effect with both trivia and conspiracy statements

We conducted the preregistered 2 (Repetition: repeated or new) \times 2 (Materials: conspiracy or trivia statements) repeated-measures ANOVA on the proportions of “true”

³ To conduct the statistical analyses, we used R (R Core Team, 2021) and the packages *afex* (Singmann, Bolker, Westfall, & Ben-Schachar, 2021, version 1.0-1), *emmeans* (Length, 2020, version 1.5.2-1), and *stats* (in base R). We made the raincloud plots (Allen et al., 2021) with scripts from Allen et al. and *ggplot2* (Wickham, 2016, version 3.3.5); we made the regression plots with *lme4* (Bates, Maechler, Bolker, & Walker, 2015, version 1.1-27.1.), *interactions* (Long, 2019, version 1.1.0) and *ggpubr* (Kassambra, 2020, version 0.4.0).

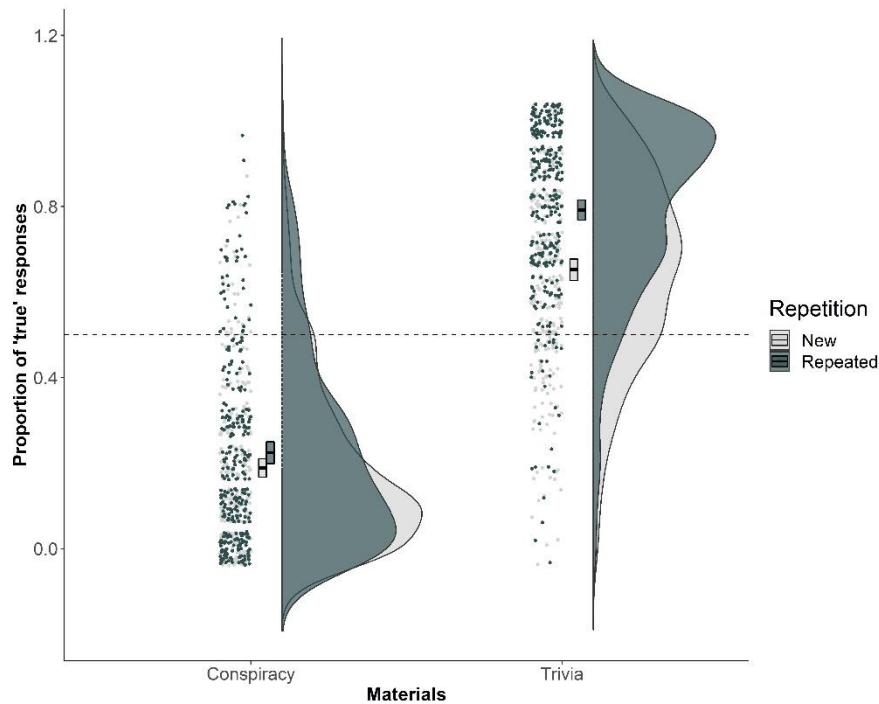


Figure 1. Proportions of “true” responses as a function of Materials and Repetition. The dots are the participants scores (jittered). The lower and upper limits of the boxplots are the 95% confidence intervals, with the mean in between. The distributions represent the kernel probability density of the data in each Materials \times Repetition condition (they may exceed the minimum and maximum observations, here 0 and 1).

Dashed horizontal line: no bias toward a “true” or “false” response.

responses (see Figure 1). The main effect of Repetition was statistically significant, $F(1, 298) = 119.45, p < .001, \eta^2_G = .041$. Overall, repeated statements were more often judged as true ($M = .51; SD = .13$) than new ones ($M = .42; SD = .13$). The main effect of Materials was also significant, $F(1, 298) = 877.19, p < .001, \eta^2_G = .599$. Trivia statements were more often judged as true ($M = .72; SD = .19$) than conspiracy statements ($M = .21; SD = .19$). Critically, these two main effects were qualified by a two-way interaction, $F(1, 298) = 42.7, p < .001, \eta^2_G = .015$ (see Figure 1).

To interpret the two-way interaction, we conducted pairwise Bonferroni-corrected multiple comparisons based on the full model in each Materials condition. For trivia statements, “true” responses were more frequent when the statements were repeated ($M = .79$;

$SD = .21$) than when they were new ($M = .65$; $SD = .22$), which is the typical “truth effect”, $t(298) = 11.43$, $p < .0001$, Cohen’s $d = 0.649$, $95\%CI_d = [0.526; 0.772]$. This effect of repetition was also significant for conspiracy statements: “true” responses were more frequent for repeated ($M = .22$; $SD = .22$) than new statements ($M = .19$; $SD = .19$), $t(298) = 3.45$, $p = .0006$, $d = 0.169$, $95\%CI_d = [0.072; 0.266]$. The truth effect was significant for both trivia and conspiracy statements, but larger for trivia statements.

Truth effect scores are unmoderated by CMQ and CRT scores

We conducted the preregistered multiple regression model with “true” responses proportions as the dependent variable and Repetition, Materials (both dummy-coded), mean Conspiracy Mentality Questionnaire (CMQ) scores, and the number of correct responses in the Cognitive Reflection Test (CRT, both standardized) as factors. Participants were added in the model as a random variable.

In line with the repeated-measures ANOVA we reported above, we found a main effect of Repetition, $F(1, 885) = 66.84$, $p < .001$, a main effect of Materials, $F(1, 885) = 2211.9$, $p < .001$, and a significant two-way interaction between Repetition and Materials, $F(1, 885) = 22.29$, $p < .001$. No other interactive effect involving Repetition was statistically

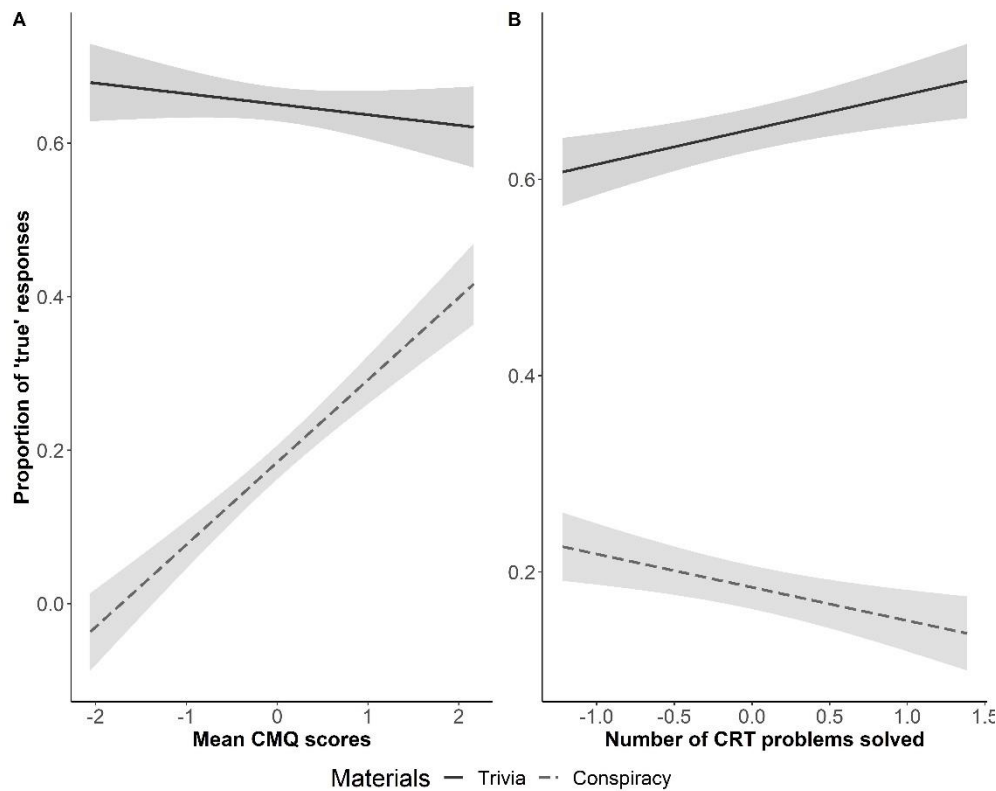


Figure 2. Proportions of “true” responses as a function of Materials and mean CMQ scores (A) and the number of CRT problems correctly solved (B). The shaded areas around the regression lines are the 95% confidence intervals. Mean CMQ scores and the number of CRT problems correctly solved were standardized in the regression analyses.

significant, indicating that the size of the truth effect was left unmoderated by CMQ and CRT scores both with trivia statements and conspiracy statements.

We found a main effect of CMQ scores on the proportions of “true” responses, $F(1, 295) = 68.91, p < .001$: Higher CMQ scores were associated with larger proportions of “true” responses. We found a significant two-way interaction between CMQ scores and Materials, $F(1, 885) = 139.32, p < .001$. For trivia statements, proportions of “true” responses did not vary as a function of CMQ scores (see Figure 2A). We tested this effect in a non-preregistered multiple regression similar to the main analysis reported above, except we removed the Materials factor and we restricted the analyses to the trivia or conspiracy statements. The effect of CMQ scores was not significant, $F(1, 295) = 2.12, p = .146$. In

contrast, for conspiracy statements, higher CMQ scores were associated with larger proportions of “true” responses, $F(1, 295) = 192.98, p < .001$. The latter result aligns with the notion that CMQ scores capture a general tendency to believe in various conspiracy theories.

Back to the full regression model, another statistically significant effect was a two-way interaction effect between Materials and CRT scores, $F(1, 885) = 35.43, p < .001$ (see Figure 2B). Similar to the non-preregistered regression analyses we conducted to decompose the interaction involving CMQ scores, we applied the same analytical strategy to decompose the interaction between Materials and CRT scores. For trivia statements, higher CRT scores were associated with larger proportions of “true” responses, $F(1, 295) = 9.76, p = .002$. In contrast, for conspiracy statements, higher CRT scores were associated with smaller proportions of “true” responses, $F(1, 295) = 14.82, p < .001$.

Discussion

Repetition has been found to increase truth judgments of false, implausible, and misleading information. Although conspiracy theories can be seen as such statements, whether repetition increases truth judgments of conspiracy theories has yet to be investigated. In the present experiment, we manipulated repeated exposure to conspiracy and trivia statements before asking participants to judge the truth of repeated and new statements. We also assessed participants’ conspiracy mentality and cognitive style (intuitive vs. analytic thinking). We found that repetition increased truth judgments of trivia statements (replicating the truth effect with the typical statements, e.g., Dechêne et al., 2010; Unkelbach et al., 2019) and conspiracy statements (extending the demonstration of the truth effect to another category of statements). Of note, conspiracy mentality and cognitive style were not associated with the size of the truth effect, whether with trivia or conspiracy statements. The latter result may be surprising if one assumes that beliefs in conspiracy theories are mainly rooted in stable psychological dimensions/predispositions such as a conspiracy mentality. Consistent

with Swami et al. (2014), we found that analytic thinking was negatively associated with conspiracy statements' overall level of truth judgments. We also found results consistent with the notion that conspiracy mentality captures a general propensity towards conspirational thinking (e.g., Imhoff & Bruder, 2014): truth judgments of conspiracy statements (but not trivia statements) were positively associated with conspiracy mentality, regardless of their repetition. In the present section, we briefly discuss some implications of the present results for future research on conspiracism and the truth effect.

Repeated exposure may be a simple way to increase conspiracism. Although the effect size we found was relatively small ($d = .169$) and smaller than the truth effect with trivia statements ($d = 0.649$), we note that we proceeded to a rather conservative test: Conspiracy statements were repeated only once, and we used a binary truth judgment task. Our results suggest that one repetition was enough to make some conspiracy statements believed more to the point of being perceived as true vs. false. As more repetitions have been shown to increase the size of the truth effect (e.g., Fazio et al., 2022; Hassan et al., 2021), real-world settings – in which repetition of the same information may occur more than once may even lead to larger effects of repetition on conspiracism.

Through analyses of two large-scale surveys in which respondents were asked whether they had already seen widespread conspiracy statements and adhered to them (IFOP, 2017; 2019), Béna et al. (2019) found that perceived prior exposure could increase conspiracism. However, even if perceived prior exposure could be associated with actual prior exposure, evidence for a causal effect of repeated exposure on conspiracy beliefs was awaiting. In showing that repetition increases truth judgments of conspiracy statements, the present experiment provides such an empirical support.

At the same time, we see reasons to be cautious about the generalizability of the current findings to richer, real-world contexts. To specifically determine the causal role of

repetition on conspiracism, we decided to use a truth effect paradigm, which is particularly suited to study how truth judgments depend on statements' repeated exposure. In the present experiment, statements were displayed without any context or source information. In real-world contexts, statements come with various additional information such as a source that can be more or less credible, be familiar or unknown, belong to one's same social group or another one, to name a few. On social media, pictures often go along with titles of news articles, comments, and reactions appear next to the statements. Possible sources of truth cues, whether valid or not, are various, and repeated exposure is only one of them. Whether repeated exposure increases conspiracism in natural settings is an open empirical question. Of interest, Nadarevic et al. (2020) found that participants rely on multiple cues to judge the truth of statements related to education, health, and politics on simulated social media posts. Testing whether repetition increases conspiracism in such richer settings would be informative to help identify when repetition delivers cues for truth judgments.

If repetition increases conspiracism beyond the procedure we used, an important challenge would be to reduce this effect. The truth effect with trivia statements is robust (Dechêne et al., 2010) and reducing it to non-significance is difficult. For instance, informing participants of the truth effect and asking them to avoid it did reduce the effect but not to the point of canceling it (Calio, Nadarevic, & Musch, 2020; Nadarevic & Abfal, 2016). This result suggests that repetition-induced conspiracism may be difficult to cancel, too, although empirical evidence is awaiting.

Of interest, asking participants whether a statement "has been used as fake news on social media" was found to create a "fakeness-by-repetition" effect where repeated trivia statements are more likely to be perceived as "fake news" than new statements (Corneille et al., 2020; for replication, see Béna et al., 2021). This result raises the possibility that repetition may sometimes help fight misinformation effects rather than consistently being an

issue to overcome. More research on this fakeness-by-repetition effect with consequential statements such as conspiracy theories and other types of misinformation would help identify judgment contexts where repetition can be used to fight belief in misinformation. Other interventions, such as orienting information processing on statements' truth right from the exposure phase may help reduce the truth effect (e.g., Brashier et al., 2020; Nadarevic & Erdfelder, 2014; Smelter & Calvillo, 2020; see the "accuracy focus" to reduce the spread of misinformation, e.g., Pennycook et al., 2020, 2021; see also Roozenbeek, Freeman, & van der Linden, 2021). Whether such manipulations can be implemented in rich real-world contexts and whether they limit the effect of repetition on conspiracism are important questions for future research.

Conclusion

Repetition may be a simple way to increase conspiracism. The present experiment showed that the effect of repetition on truth judgments extends to conspiracy statements, regardless of cognitive style and conspiracy mentality. As we were interested in determining the causal role of repetition for both trivia and conspiracy statements, we relied on a truth effect paradigm with minimal contextual information (e.g., no explicit source). Future research may study the causal effect of repetition on conspiracism in richer and more realistic contexts to test whether repetition increases conspiracism when other and possibly more diagnostic information is available (e.g., source credibility). If this is the case, identifying ways to reduce repetition-induced conspiracism may contribute to fighting conspiracism as a whole.

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