Repetition As a Weapon: What Is The Effect of the Illusory Truth Effect on Conspiracy Theories and Their Debunking?

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Abstract

Repetition seems to increase truth judgments regardless of factual truth, so it is worth investigating whether conspiracy theories are also affected by the "illusory truth effect", and if cognitive style and conspiracy mentality play a moderating role on this effect. We also wanted to investigate whether repeating debunking would yield a similar effect to repeating conspiracy theories. Two experiments were completed by 145 participants. First, they were shown true trivia, false trivia, and conspiracy theory statements and were asked to provide judgments of truth for each of them. Half of the statements were already shown to participants prior (in an interest judgment task). We measured participants' conspiracy mentality and preferred thinking style (analytical or intuitive) to research whether they acted as moderators to the illusory truth effect. We found repetition to insignificantly increase truth judgments of conspiracy theories, while trivia statement truth judgments, both true and false, were significantly increased. Our second experiment aimed to find out whether a similar effect could be found in debunking statements. We showed a debunking of one previously shown statement to each participant twice, with an interest judgment task in-between, and a truth judgment task afterward. Truth judgments were lower as a result of repeated debunking. However, results indicated that the truth judgment of conspiracy theories was not reduced by repeated exposure to debunking, while false trivia statements' truth judgment was significantly lowered. The effectiveness of repetition may depend on the type of statement individuals are exposed to: in both experiments, conspiracy theories were more resistant to changes in truth judgment. Whether natural exposure with more context or different methods of debunking would change these results remains a question for future research.

Keywords: Conspiracism, conspiracy theories, debunking, illusory truth effect, repetition

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On October 12, 2022, a jury awarded radio show host and conspiracy theorist Alex Jones with a punishment of $965 million in damages from a total of 15 plaintiffs. These victims had been threatened and harassed for years due to Jones' spreading of conspiracy theories regarding the deadly school shooting in Sandy Hook which took the lives of 26 people in 2012. Jones asserted that the school shooting was staged, made up by gun control lobbyists, and that, in actuality, no casualties were suffered at all. As a consequence of vigorously spreading his conspiracy theory, his dedicated followers took it upon themselves to harass and threaten the families of the deceased children that had lost their lives in the mass shooting. The Alex Jones trial is a painful recent example of a conspiracy theory being repeated enough to a large audience and, as a result, causing severe harm to people's lives.

Conspiracy theories are attempts at ultimate explanations for social or political events, often paired with claims of powerful groups conspiring to make these events occur. Critically, these theories often lack the support of significant empirical evidence, yet acceptance of them remains elevated among the public (Uscinski et al., 2022). Some individual psychological differences reliably predict conspiracy theory belief, indicating that certain individuals are more susceptible to belief in conspiracy theories than others. For example, low critical thinking ability is correlated with increased conspiracy theory belief (Lantian et al., 2021), and higher levels of education are negatively correlated to conspiracy theory belief (van Prooijen, 2016). Additionally, research has shown that a reliable determinant for belief in one conspiracy is belief in other conspiracies (Swami et al., 2011). This 'conspiracy mentality' is not equal to a particular belief in one (or multiple) conspiracy theory(ies) but rather explains the bias towards believing in the existence of already existing conspiracies as well as the

tendency to believe any theories that may emerge in the future (Imhoff & Bruder, 2014). Because of the 'infectious' nature of conspiracy theories, and the dissemination of some theories having direct or indirect negative effects on both physical and mental human well-being (Jolley & Douglas., 2014; Jolley et al., 2019), it is crucial to be able to discern between skeptical thinking and beliefs that are the result of a conspiracy mentality, as well as to determine how this mentality can be prevented from spreading.

Alex Jones has been a radio and online show host for many years, endorsing various extremist conservative political ideas to his followers. Through much repetition of his statements, he has managed to amass a large, dedicated community of people who believe his claims - whatever they are - as he repeats them. The effect of repeated exposure leading to an increase in the perceived truth judgment of a piece of information is called the 'illusory truth effect' (Hasher et al., 1977). The illusory truth effect has been shown in many different areas of (mis)information processing, but little research has been done on the domain of conspiracy theories specifically. In a recent study, Béna et al. (2022) confirmed that repetition increases truth judgments of trivia statements (as previously shown by Dechêne et al., 2010), and found that conspiracy statements could be susceptible to the illusory truth effect as well.

Interestingly, Dechêne et al (2010), concluded that some psychological predispositions, specifically conspiracy mentality and preferred cognitive style (discerning between intuitive and analytical-style thinking) did not increase the size of the illusory truth effect. Intuitive-style thinking is a type of thinking that prioritizes quick and intuitive answers over slower, more rational analysis associated with analytical-style thinking. Béna et al. (2022)'s findings however do not confirm existing research that has shown that belief in conspiracy theories is often associated with higher levels of intuitive thinking (Pytlik et al., 2020; Yelbuz et al., 2022) and scoring higher on conspiracy mentality (Bruder et al., 2013).

In the first part of our research, we aim to translate and replicate Béna et al. (2022)'s study on a Dutch-speaking population. We want to improve on a few of their methodological decisions to improve the validation of our research outcome. First, the sample Béna et al. (2022) used lacks representativity and context. While financially limited, we would like to recruit a varied population of participants through different means of both off- and online sampling. Additionally, contrary to Béna et al. (2022), we will split trivia statements into two separate groups for analysis - true and false statements, to measure any discrepancy between the two. Participants are not expected to know if a statement is true or false beforehand. If the difference of the illusory truth effect between false and true trivia statements is large, it may mean participants had more knowledge of the statements than we assumed, which could influence otherwise valid results. Our first research question is as follows:

RQ_1:'What is the effect of the repetition of statements on the perceived truth value of true trivia, false trivia, and conspiracy theories respectively, and how does thinking style and conspiracy mentality affect this?'

If repetition increases the truth judgment of (conspiracy) statements, it would be considered a relevant challenge to determine whether the effect can be (partially) counteracted. The illusory truth effect appears to be strong overall (Dechêne et al., 2010), even when participants are made aware of the effect before an experiment (Calio et al., 2020). This indicates that conspiracy theory belief, if induced by repetition, may be difficult to reverse. Conspiracism is currently often combated through the act of 'debunking', the process of exposing flawed misinformative claims with the aim of reducing belief in the claims among receivers of the message. If repeated debunking could be proven to reduce truth judgments towards conspiracy theory statements, it could be a valuable finding for future

debunking strategies. As an extension of our replication study, we wish to find out whether exposing participants to repeated debunking messages of a statement has an influence on their truth judgment of the statement. Conspiracy theories are more easily and quickly spread than debunking messages, and as such, it is more realistic to first expose participants to true, false and conspiracy statements, and display the debunkings afterwards.

Participants read repeated debunking messages on one of the statements (either true trivia, false trivia, or a conspiracy statement) they read in the first experiment. After their debunking exposure, their belief in the statement is measured once more. We split the trivia statements into two separate conditions again to note if there is any significant difference between a supporting text (in the case of the true trivia statement) and a debunking text (in the case of the false trivia statement).

Our RQ_2 is therefore presented as:

RQ_2: 'How does the repetition of debunking affect the perceived truth value of repeated conspiracy statements, and how does it compare to true and false trivia statement debunking?'

Theoretical Framework

Conspiracism

Conspiracy theories are attempts at alternate explanations for large-scale events based on two or more powerful actors conspiring to make these events happen, usually with ulterior motives (Grimes, 2016). Conspiracy theories often lack significant empirical evidence. Despite this, support for various conspiracy theories remains elevated among the public (Uscinski et al., 2022). Conspiracy theories are often connected to other conspiracy theories, creating a worldview of interwoven theories. Being convinced in one conspiracy theory is,

therefore, a reliable determinant for belief in others as well (Swami et al., 2011). Additionally, research has shown that conspiracy theory belief is often part of a larger 'conspiracy mentality' (Imhoff & Bruder, 2014). This mentality consists of a skewed worldview in which conspiracy theories of all kinds are biased to be truthful and mainstream accounts of events are easily disregarded. The Conspiracy Mentality Questionnaire (CMQ), designed by Bruder et al. (2013), is a 5-item questionnaire about general conspiracy theory-related worldviews, such as "politicians usually do not tell us what truly motivates their decisions". Participants answer on a 5-point Likert scale the degree to which they agree with the statements. A higher score on the CMQ is linked to increased levels of conspiracism (Imhoff & Bruder, 2014). Béna et al. (2022) recently confirmed higher scores on the CMQ being related to more truth judgments on conspiracy statements (but not trivia statements) in their research.

Conspiracism is related to non-normative behavior as a result of a different social reality heavily impacted by distrust (Pummerer, 2022). This non-normative behavior has significant impacts on society: Neglection of climate change, prejudice of out-groups (which leads to discrimination and can spread across other out-groups), or refusing to get vaccinated are all examples of the potential consequences of conspiracism (Jolley & Douglas, 2014; Jolley et al., 2019; van der Linden, 2015). Critically, not all conspiracy theories are factually untrue or a result of conspiracism, which is an important consideration when doing research in this domain. Some notable conspiracy theories have been proven to be correct, such as the famous Watergate scandal. The threat of conspiracy theories is, thus, not the skepticism towards mainstream descriptions of events but rather the cognitive processes that lead to an individual being biased towards giving credence to conspiracy theories in general. Therefore, it is relevant for researchers to be able to discern between beliefs that are the result of critical thinking, and beliefs that are a result of the cognitive processes that create a bias towards

alternate explanations of events. For our research specifically, it is relevant to understand the impact of the cognitive processes such as the conspiracy mentality and whether it has a relation to the illusory truth effect.

While the conspiracy mentality is not exclusive to specific groups of people, some personal differences leave individuals more susceptible than others. Individuals who are biased towards an intuitive thinking style as opposed to analytical thinking are more likely to engage in conspiracism (Lantian et al., 2021; Pytlik et al., 2020; Yelbuz et al., 2022). Intuitive thinking is a type of thinking style that is linked to instinctive decision-making, understanding, and feeling, whereas analytical thinking or "reasoning" is often associated with slower, rational thinking and is more subject to conscious judgments (Kahneman, 2003). This finding is interesting, as conspiracy theorists would often describe themselves as critical thinkers (Lantian et al., 2021), which would hint at a preference for more analytical thinking styles. However, evidence suggests analytical thinking styles are negatively related to belief in conspiracy theories instead (Šrol, 2021). Activating analytical thinking in respondents also appears to be a crucial factor in reducing conspiracism among individuals (Swami et al., 2014).

Interestingly, while intuitive thinking is traditionally not linked to increased certainty in confidence assessments (De Neys et al., 2011), conspiracism has been linked to overconfidence (Vranic et al., 2022). Overconfidence could then also lead to individuals overestimating their critical thinking ability (Lantian et al., 2021), which may explain why conspiracists often think of themselves as thinking critically. This inflated perception of critical thinking may also be related with a prejudice known as the "confirmation bias" - a tendency to search for and prioritize information in a way that confirms existing beliefs, while disregarding counterevidence (Westerwick et al., 2017), causing individuals to (incorrectly) reinforce their existing beliefs. Whether individuals with a preference towards

intuitive thinking leads to increased belief after repeated exposure to conspiracy theories is therefore relevant to study.

Illusory truth effect

The illusory truth effect, as established by Hasher et al. (1977), states that the frequency of occurrence of a statement improves the statement's referential validity. Repeated statements are processed easier (Begg et al., 1992; Reber & Schwarz, 1999) and are more familiar (Arkes et al., 1991; Begg et al., 1992) than new statements, increasing their perceived truthfulness. The illusory truth effect is effective for both spoken (Gigerenzer, 1984) and written (Arkes et al., 1989) statements on time frames varying from minutes (Begg & Armour, 1991) to weeks (Hasher et al., 1977). While researchers used various topics for the statements presented, they often used simple and quickly verifiable trivia statements (Henkel & Mattson, 2011; Reber & Schwarz, 1999) rather than more complex statements to which the answer is considered ambiguous. Scholars used to think that little knowledge or much uncertainty about a statement is a necessary precursor for the illusory truth effect to occur (Henderson et al., 2021). However, more recent research suggests that even if statements contradict previously held beliefs or knowledge, repetition significantly increases the perceived truth of a particular statement (De Keersmaecker et al., 2019; Brashier et al., 2020).

Additionally, there is evidence to suggest that the believability of a statement does not moderate the strength of the illusory truth effect (Fazio et al., 2019). Even when participants are aware of the illusory truth effect's existence and actively trying to avoid it, the effect is diminished but not canceled (Nadarevic & Abfalg, 2016).

The aforementioned properties of the illusory truth effect lead to the assumption that conspiracism induced by the illusory truth effect may easily occur while also being difficult to negate. Even though the effect has been studied on various types of (mis)information, until

recently, conspiracy theories specifically have not been researched exclusively in this context. However, Béna et al. (2022) recently found that repetition of conspiracy statements did increase the truth judgments regarding conspiracy theories, indicating the illusory truth effect does hold true for conspiracy theories. Additionally, the researchers found that both cognitive style and conspiracy mentality did not have a significant impact on the effect size of the illusory truth effect. While this is congruent with previous research that found that the illusory truth effect is resistant across different levels of cognitive ability and style (De Keersmaecker et al., 2019), it is somewhat contrary to the findings that indicate conspiracy mentality and a preference for an intuitive thinking style are predictors for conspiracism (Dechêne et al., 2010) .This entails high scorers on the CRT as well as low scorers on the CMQ may not be protected sufficiently against the effects of illusory truth. Consequently, whether or not there is a significant correlation of cognitive style and conspiracy mentality to illusory truth, similar to the link to conspiracism, has relevant implications for future research.

Debunking

Debunking can be described as exposing the falseness of an idea or belief. In practice, debunking is often accomplished by showing counterevidence towards a claim or idea, exposing its flaws and shortcomings, and therefore attempting to persuade others to lessen their belief in this idea. Debunking is often seen as the counter-offense against conspiracy theories, and, consequently, much research has been focused on this topic in recent history. Through debunking, counter-evidence is presented to individuals, which elicits analytical thinking, with the goal of reducing levels of perceived truth judgment towards a specific piece of misinformation. However, it is a complex process that, when done improperly, can activate a “continued influence effect” – a phenomenon that refers to the continued effect of discredited information on behavior and beliefs (Johnson & Seifert, 1994). Worse yet,

attempts at debunking can lead to a boomerang-like phenomenon called the “backfire effect” – corrections of misinformation leading to increased instead of decreased misconception among the target group, essentially accomplishing the opposite of what debunking aims to achieve (Nyhan & Reifler, 2010).

The process of debunking is not fully understood and is considered difficult to execute correctly in a world in which attention is a currency, and personal backgrounds and biases are hard to account for. As a result, research shows mixed outcomes in the effectiveness of debunking. For example, a study by Stojanov (2015) was not able to increase the likelihood of the vaccination of a fictitious child among participants through various forms of debunking, even though medical conspiracy theory belief did decrease (Stojanov, 2015). This research highlights another critical issue with debunking – changing behavior is the desired outcome of debunking, and may not be as closely related to changing attitude as commonly thought. Fishbein and Ajzen (1975)’s Theory of Reasoned Action highlights this well: The leading factor for changing behavior is changed intention of behavior, not merely attitude. (Fishbein & Ajzen, 1975). Therefore, debunkings may not only need to change someone’s belief, but also intentionality towards a certain (changed) behaviour, which is more difficult to accomplish. Belief may be changed as a result of debunking, but if a changed belief does not change behavior, the effect of debunking is still muted.

Extensive meta-analyses have been published detailing effective recommendations that aid in producing the desired behavioral effect when debunking (Lewandowsky et al., 2012; Chan et al., 2017). A few of the most important recommendations are as follows: First researched by Tenney et al. (2009), an essential facet of successful debunking is filling in mental gaps that are created by the debunking (Tenny et al., 2009). When a conspiracy theory is only corrected, it often leaves gaps in the mental model a person has of the event. To successfully replace a conspiracy theory, an alternative and plausible theory has to be

provided, explaining why the theory is incorrect (Tenney et al., 2009). Second, to avoid the backfire effect as well as minimize the illusory truth effect of the misinformation, the information the debunking is trying to replace the myth with has to be emphasized over the myth itself (Ecker et al., 2011). Finally, it is important for an alternative explanation to be clear and simple enough to be grasped easily. Simple explanations are more attractive than complex ones, and if the myth is simpler than the truth, individuals are biased toward believing the myth (Chater & Vitányi, 2003).

A useful source on how to effectively debunk is "The Debunking Handbook", created by Lewandowsky et al. (2020). It summarizes many of the main points laid out in recent research on debunking. According to the handbook, debunking correctly and often is critical, using the formula of presenting fact first, then myth, then the fallacy of the myth, and finally reinforcing the fact. In our research, we will be utilizing this handbook for creating our debunking conditions.

Some studies have shown inoculation or pre-bunking to be promising variations of debunking (Compton et al., 2021; Lewandowsky & van der Linden, 2021). Inoculation theory carefully exposes individuals to small amounts of misinformation, after which the limited misinformation is debunked. This builds mental resistance for when the individual encounters 'real' versions of the misinformation, and they are more easily able to refute the misinformation, preventing the weakening of their belief. The method of "pre-bunking" is useful when misinformation is expected, but not when it is already spreading. To our knowledge, the role of the illusory truth effect on the effectiveness of debunking messages has never been researched in detail. We will be utilizing the main recommendations from Lewandowsky et al., (2012) as well as "The Debunking Handbook" (Lewandowsky et al., 2020) to research whether repeated debunking can be an effective way of reducing truth judgments towards both trivia statements and conspiracy theories.

Method

Participants and Research Design

We collected data from 209 respondents. Participants were gathered through Facebook posts in various online (local) communities as well as on Twitter (where anyone can see any post) and invited through physical flyers (on which a QR code and link were shown). Our final sample yielded 145 participants (M_{age} = 35.18, SD_{age} = 15.77, 51.0% identified as Male, $Mode_{education}$ = Bachelor's degree) at the end of data exclusion.[1]

A reproduction of Béna et al.'s (2022) research was conducted to answer RQ_1. The study featured a 2 (Repetition: repeated vs. non-repeated) x 3 (Materials: Conspiracy, True trivia, and False trivia) mixed design, with factors randomized and manipulated within respondents. A critical difference between our study and Béna et al.'s (2022), is that we differentiated between true and false trivia statements, whereas the original study only differentiated between trivia and conspiracy statements.

To answer RQ_2, the same participants were exposed to a 1 (Repetition) x 3 (Materials: Conspiracy, True Trivia, or False Trivia) between-subjects design. We discerned between true and false statements in our second experiment as well because the perceived truth judgment may differ between false and true trivia debunking messages (in the case of true trivia, the debunking message instead confirms the fact, and consequently results may differ from the false trivia condition). Comparing the debunking of false trivia statements specifically to the debunking of conspiracy statements leads to a more direct comparison between unverifiable statements for which counterevidence is directly given.

Table 1

[1] Exclusion criteria were as follows (some participants were excluded based on multiple of the below reasons): Incomplete (n = 18); if the mother tongue is not Dutch, an insufficient fluency in Dutch (below B2-level) (n = 6), declaring having searched for information about the statements while participating in the study (n = 22), declaring having responded to items without reading them (n = 31), not wanting the data to be analyzed after reading the debrief (n = 2)

Demographics Table

Category	Sub-category	Frequency	Percentage
Sex	Male	74	50.68%
	Female	71	48.63%
	Other	1	0.68%
Age	18-29	81	55.5%
	30-39	20	13.70%
	40-49	11	7.53%
	50-59	23	15.75%
	60-69	5	3.42%
	70-79	5	3.42%
	80+	1	1
Native Dutch	Native	138	94.52%
	Non-native	8	5.48%
Education level	Elementary school	2	1.37%
	High school	31	21.23%
	MBO 1-4	26	17.81%
	Bachelor's Degree	62	42.47%
	Master's Degree	24	16.44%
	Other	1	0.68%

Note. This table contains all participants that passed the exclusion criteria.

Materials

Conspiracy statements. Béna et al. (2022) used data and statements from the French Institute of Public Opinion (IFOP) for their experiment (Fourquet, 2020). We translated the statements used by Béna et al. (2022) into Dutch and replaced one (on hydroxychloroquine as a treatment for COVID-19, as there were already two COVID-19-related statements in the list

of conspiracy statements) with a conspiracy theory that was relevant for Dutch individuals ("The murder on Pim Fortuyn was actually organized by the governmental elite"; see Appendix A). Pim Fortuyn was a controversial and popular politician and minister-presidential candidate when he was murdered by a climate activist in 2002, commonly accepted to have been acting on his own volition.

Trivia Statements. For our trivia statement selection, we also used the statements used by Béna et al. (2022), translated into Dutch. These were 20 factual statements (e.g. "Green tea has the capacity to capture oxygen-derived radicals of up to 1253 μmol TE/100g") about various topics with average uncertain truth. Half of the selected statements were true, while the other half were verifiably false (see Apppendix A).

Debunking Statement Selection. To decide which statements were used for debunking, we asked 20 people (through convenience sampling) to select the most interesting conspiracy theory statement from the list. The most popular statement would be the conspiracy theory statement utilized in the debunking experiment. These individuals were asked not to participate in the study if they were exposed to it at a later date. The true and false trivia statements were randomly selected from the pool of statements.

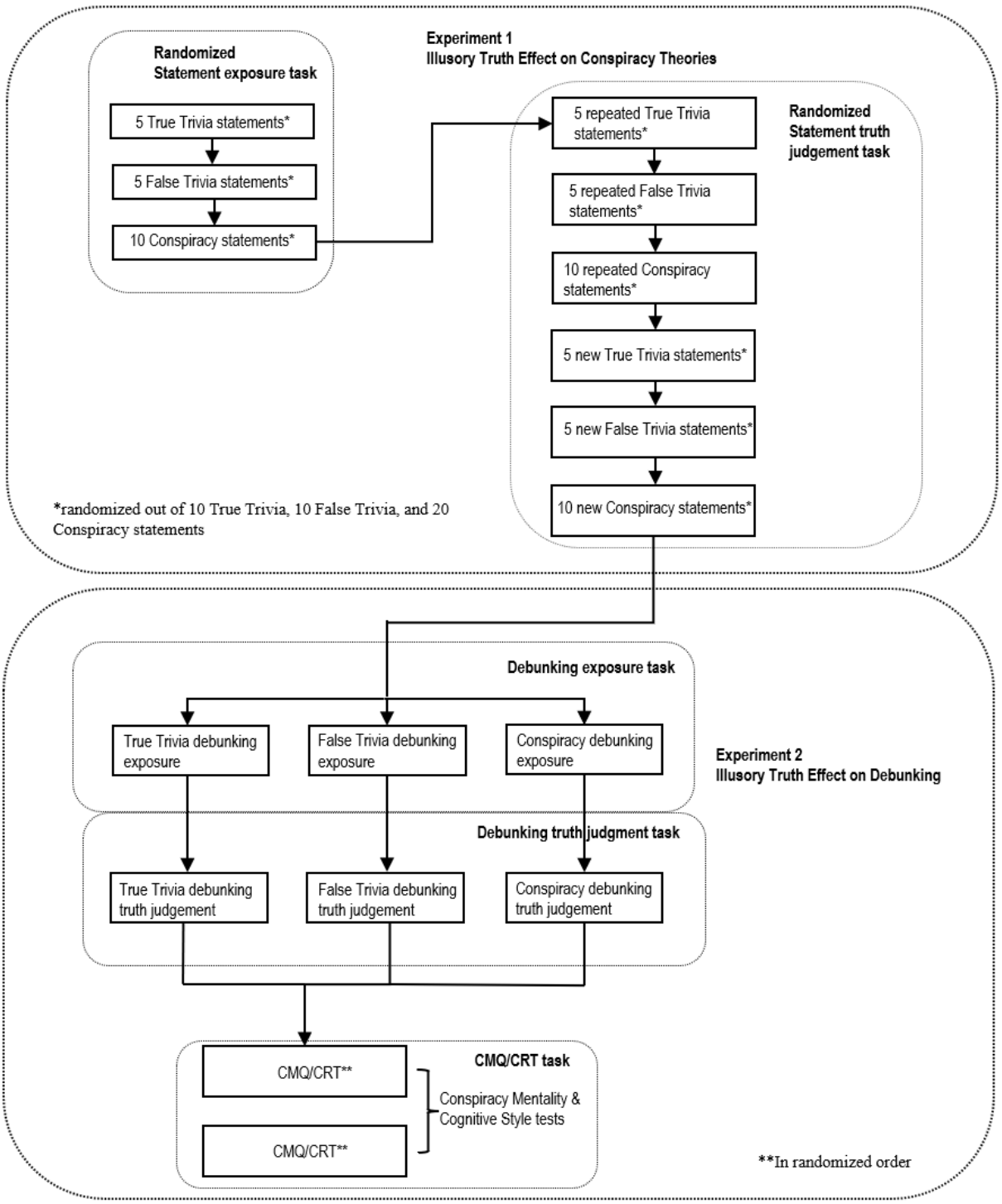
Cognitive Style. We utilized the original 3-item Cognitive Reflection Test (CRT) (Frederick, 2005) translated into Dutch. This test consists of three randomly assorted simple math riddles that, if solved quickly and intuitively, are often answered wrong but when thinking deliberately and analytically are easy to solve correctly. The CRT was created to explore the individual differences of respondents with regard to the tendency to override (incorrect) intuition with analytical thinking. More correctly-solved test items are associated with analytic thinking, while fewer or no test items solved correctly are associated with intuitive thinking. Measuring cognitive style through the CRT helps us determine whether cognitive style plays a role in the illusory truth effect.

Conspiracy Mentality. The Conspiracy Mentality Questionnaire (CMQ; Bruder et al., 2013) is a 5-item questionnaire that tests the differences in individuals' susceptibility to believing in conspiracy explanations. Participants indicate how likely they think each of the five statements is to be true on a 5-point Likert scale ("Certainly not, 0%," - "Certainly, 100%"). The mean response is calculated for each participant, with a higher score indicating a higher level of conspiracy mentality and, thus a larger chance of having the "conspiracy mentality" - the bias and belief towards many interconnected conspiracy theories. Using the CMQ, we will be able to measure whether conspiracy mentality has any effect on the illusory truth effect. We translated the CMQ into Dutch for our experiment.

Research Procedure

To allow participants to be recruited both offline (through face-to-face communication and flyers) and online (spread in neighborhood and city communities on Facebook and on Twitter using various hashtags), this experiment was conducted digitally. To help gather participants, participants were told they could win a €50 bol.com gift card if they took part in the study. Using Béna et al. (2022)'s original materials, we were able to utilize their exported file for our own experiment using the survey software Qualtrics (see Appendix B). To conduct the study in Dutch, first, the study was translated. After the consent form and agreement of the participant, demographic information was collected (sex, age, completed education, mother tongue, and their level of Dutch if their mother tongue was a language other than Dutch). Our research consisted of two experiments split into a total of five tasks (statement exposure, statement truth judgment, CMQ and CRT, debunking exposure, and debunking truth judgment), after which participants were debriefed. A full breakdown of the experiment procedure can be found in Figure 1. The experiment took, on average, 20 minutes to complete in total.

Figure 1



Instructions of the first test indicated to participants that statements would be displayed to them without a time limit. They were asked how interesting they found the statement (e.g., Henderson et al., 2021) on a 5-point Likert scale (1: “Not interested”; 5:

"Extremely interested"). Using a JavaScript script, we randomized the questions so that an equal allocation of five true trivia, five false trivia as well as 10 conspiracy theory statements were randomly displayed in this first exposure.

Following up on the statement exposure task, participants were introduced to the statement truth judgment task, in which they judged whether the presented statements were true or false. The initial 20 statements participants were exposed to were shown, together with the 20 statements they had not yet seen, for a total of 40 statements (20 conspiracy statements, 10 true trivia, 10 false trivia). All statements were displayed in random order. Participants were explained that it was important to answer even if they were unsure about their answers and were asked not to look up any information about the statements during the experiment. There was no time limit during this or any other part of the experiment.

After the statement truth judgment task from experiment one, participants were introduced to the debunking experiment. This experiment consisted of three separate conditions, to which participants were randomly allocated (true trivia, false trivia, or conspiracy statement). For the true trivia condition, a supporting message was shown. To see which statement was used for each condition, see Appendix A. A short text that debunked one of the statements that the participant had been exposed to earlier in experiment one was shown in this debunking exposure task. Similar to the first task of experiment one, the level of interest the participants submitted served no research purpose other than increasing the likelihood that the participant received full exposure to the text.

On the following page, a different version of the same debunking message was repeated for the debunking truth judgment task. After this second exposure, the participants were once again asked to judge whether the statement was true or false.

Upon completion of the debunking truth judgment task, the CRT and CMQ tests were shown to participants in random order. The CRT asked participants to answer three short

mathematical problems displayed in a random order, and without a time limit. The CMQ asked participants to rate the level of truth they would prescribe to five general statements about the world.

Finally, participants were asked whether they searched for any information about the statements ("yes" or "no") and whether they answered any questions without reading them properly ("yes" or "no"). "Yes" responses to these questions were used as exclusion criteria for our analysis. Participants were then asked once more for consent to use their data in our analysis, after which participants were thanked and debriefed. After the debrief, participants could opt-in to a €50 bol.com (an online Dutch department store) voucher by entering their email address.

Results[2]

We conducted a 2 (Repetition: Repeated vs New) x 3 (Materials: True Trivia vs False Trivia vs Conspiracy statements) repeated-measures ANOVA on the proportions of truth judgments as a function of Materials and Repetition. Repetition caused significant changes in perceived truth value overall, $F(1, 144) = 37.98$, $p < .001$. Repeated statements were perceived to be true more often ($M = 1.49$, SD = 0.18) than statements with only one exposure ($M = 1.55$, SD = 0.17). A higher value in our analysis means that the statement was perceived as more false (1 = true, 2 = false). The main effect of Materials was also significant, $F(1, 144) = 213.60$, $p < .001$. True trivia statements were most often stated as true ($M = 1.26$, $SD = 0.21$), followed by false trivia statements ($M = 1.33$, $SD = 0.25$) and finally statements about conspiracy theories ($M = 1.74$, $SD = 0.25$). Of note, the two main effects were qualified by a two-way interaction, $F(1, 144) = 5.22$, $p = .007$.

To analyze the two-way interaction, we performed multiple pairwise comparisons

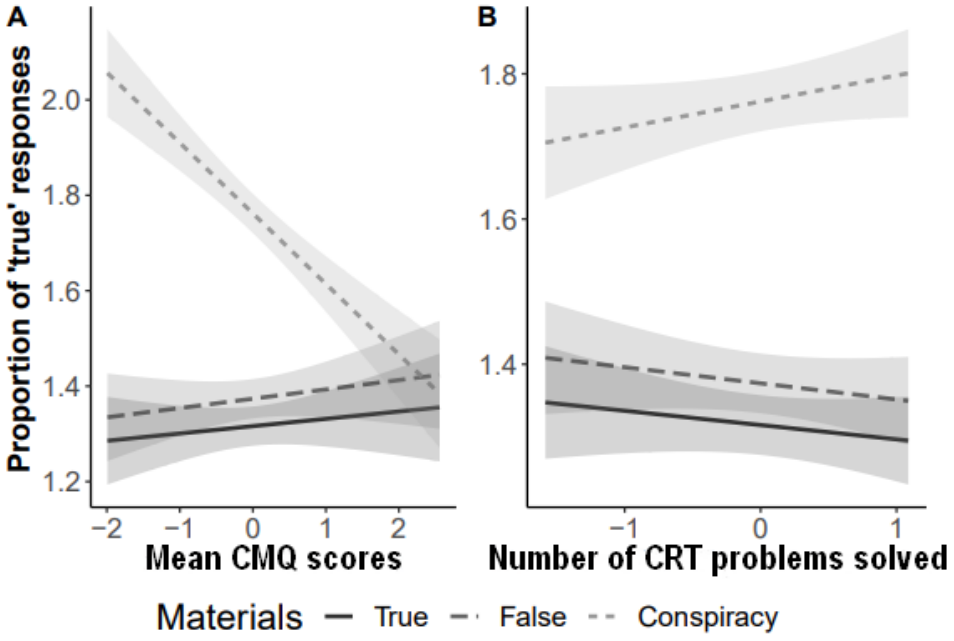
[2] To conduct the statistical analysis, we utilized and adjusted the original analysis of Béna et al., (2022), who used R (R Core Team, 2021) and the packages *afex* (Singmann et al., 2021, version 1.0-1), *emmeans* (Lenth, 2020, version 1.5.2-1) and *stats* (in base R). The regression plots were made with *lme4* (Bates et al., 2015, version 1.1-27.1.), *interactions* (Long, 2019, version 1.1.0) and *ggpubr* (Kassambara, 2020, version 0.4.0).

using the Bonferroni correction method for each Material Type condition. We found that for true trivia statements, the frequency of "true" responses increased when the statements were repeated (M = 1.20, SD = 0.24) compared to when they were new (M = 1.31, SD = 0.25), $t(144) = -5.727$, $p = < .0001$, Cohen's $d = -0.465$, 95%Ci_d = [-0.634; -0.297]. Similarly, false trivia statements were rated as more true when repeated (M = 1.29, SD = 0.28), compared to new (M = 1.37, SD = 0.28), t(144) = -3.658, $p = 0.0004$, Cohen's $d = -0.294$, 95%CI_d = [-0.456; -0.133]. Finally, for conspiracy statements, the illusory truth effect could not be observed with significance. While repeated (M = 1.73, SD = 0.28) statements were perceived to be true slightly more frequently than new (M = 1.76, SD = 0.27) statements, the analysis showed an insufficient effect, t(144) = -1.880, $p = 0.0622$, Cohen's $d = -0.107$, 95%Ci_d = [-0.219; 0.005].

The Illusory Truth Effect is not Moderated by CMQ or CRT Scores

We conducted a multiple regression analysis with the proportion of "true" responses as the dependent variable and Repetition, Material Type (dummy-coded), mean CMQ scores, and the number of correct responses on CRT as predictor variables. Participants were included as a random variable in this model. In accordance with the previously reported data from the repeated-measures ANOVA, we found a main effect on Repetition, $R^2 = .11$, $F(1, 705) = 25.24$, $p < .001$, and a main effect of Materials, $R^2 = .44$, $F(1, 705) = 421.00$, $p = < .001$. However, we did not find a significant two-way interaction, $R^2 = .08$, $F(1, 705) = 2.83$, $p = .060$. No other significant interactive effect with Repetition was found, which indicates that the illusory truth effect was not moderated by either the CMQ or CRT scores on any type of statement. Figure 2 outlines these results.

Figure 2



Proportions of "true" responses as a function of Materials and mean CMQ scores **(A)** and the number of CRT problems solved correctly **(B).** The shadows around the regression lines indicate 95% confidence intervals.

A main effect was found for CMQ scores on the proportions of "true" responses, $F(1, 141) = 13.50$, $p = <.001$. Additionally, a significant two-way interaction between CMQ scores and Materials was discovered, $F(1, 705) = 49.48$, $p = <.001$. To further analyze this result, we tested this in a multiple regression analysis similar to the analysis reported above, restricting the analysis to true trivia, false trivia, and conspiracy statements while also removing the Materials factor. On true trivia statements, the effect of CMQ scores was insignificant, $F(1, 141) = 0.00$, $p = .987$. Similarly, for false trivia statements, the effect of CMQ scores was also insignificant, $F(1, 141) = 0.22$, $p = .642$.

Finally, we did find a significant effect between CMQ scores and conspiracy statements, $F(1, 141) = 82.53$, $p = < .001$. Our study showed no significant effect in true

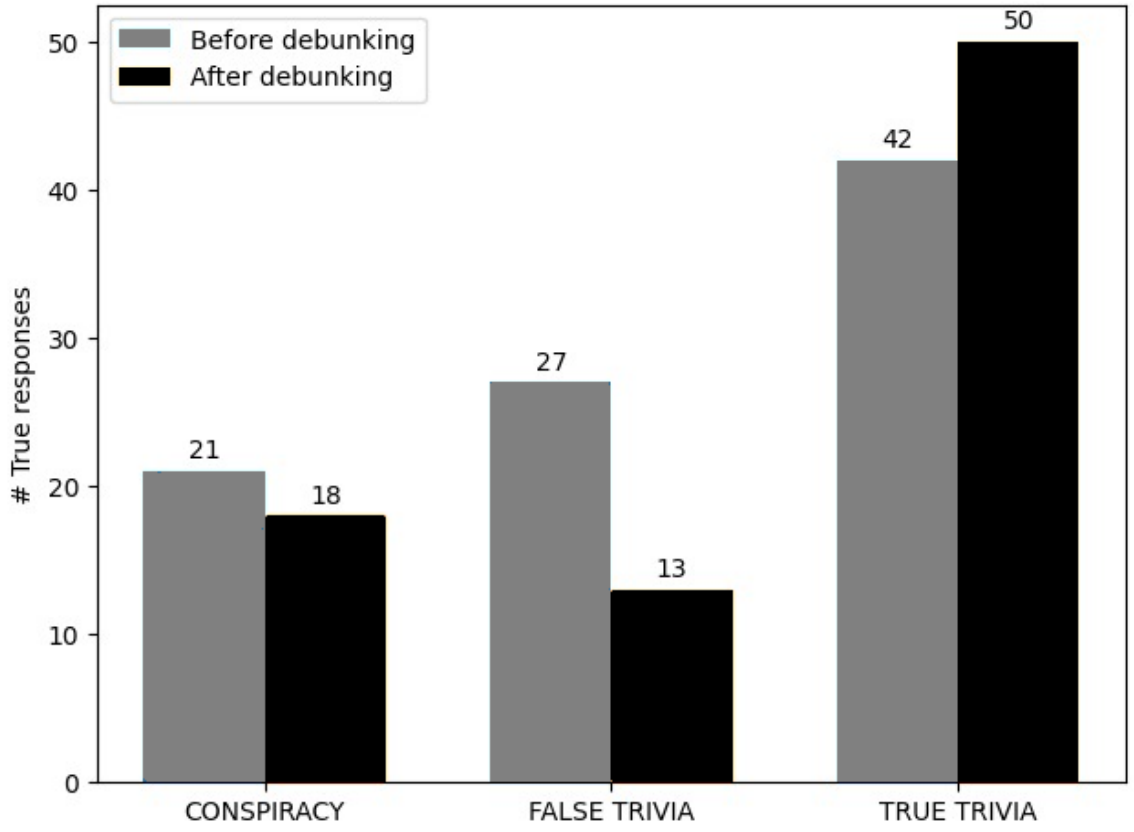
trivia, $F(1, 141) = 0.20$, $p = .657$, false trivia, $F(1, 141) = 0.08$, $p = .773$, nor conspiracy theory statements, $F(1, 141) = 3.39$, $p = .068$.

Conspiracy Theory Debunking is not Helped by the Illusory Truth Effect

We conducted a mixed factorial ANOVA on the proportions of "true" responses as the dependent variable, with Material Type (conspiracy debunking, false trivia debunking, true trivia support) as predictor. The main effect of Material Type was statistically significant, $F(1, 142) = 28.67$, $p < .001$, $\eta^2_G = .226$. Overall, the conspiracy theory statement was seen as the least true after exposure to debunking ($M = 1.67$, $SD = .48$) together with false trivia ($M = 1.67$, $SD = .48$) while the true trivia support condition was found to be the truest ($M = 1.04$, $SD = .19$). Figure 3 compares the truth judgment towards all conditions before and after the debunking experiment. A significant effect was found for the repetition effect overall, $F(1, 142) = 5.33$, $p = .022$, $\eta^2_G = .010$.

We found a statistically significant two-way interaction, $F(1, 142) = 14.57$, $p < .001$, $\eta^2_G = .054$. A pairwise t-test (with Bonferroni correction) was conducted to investigate the main effect on Materials. For true trivia, we found a significant difference in perceived truth value ($M_{diff} = .15$, $SD_{diff} = .36$), $t(51) = 3.05$, $p = .004$. The same held true for false trivia statements ($M_{diff} = .36$, $SD_{diff} = .67$), $t(38) = -3.35$, $p = .002$. However, for the group that read a conspiracy theory debunking statement, no significant difference was found ($M_{diff} = -.056$, $SD_{diff} = .30$), $t(53) = -1.35$, $p = .182$.

Figure 3.



Note. Count of "true" responses in true/false task **(grey)** compared to after the debunking task **(black)**. The conspiracy condition consisted of 54 participants, while the false trivia and true trivia conditions consisted of 39 and 52 participants respectively.

Discussion

The aim of our study was to solidify evidence for the illusory truth effect on conspiracy theories and explore the effect of debunking messages. There is robust evidence to suggest that repetition induces an increased level of truth judgment of all types of information, including misleading or implausible statements. Similar to Béna et al., (2022), we exposed participants repeatedly to true and false trivia statements as well as conspiracy theory statements, after which we asked them to rate the statements as true or false. Additionally, we asked them to describe the level of confidence they had in their answer. We

also took into account the participants' scores on the Conspiracy Mentality Scale and bias towards either intuitive or analytical thinking as a cognitive style.

Our data suggests repetition of trivia statements, both true and false, increases the perceived truth value of these statements. This is in accordance with both findings from Béna et al., (2022), and seems widely supported by previously conducted research (Dechêne et al., 2010). However, while Béna et al., (2022) found there was also a significant illusory truth effect occurring with conspiracy theory statements, we were unable to replicate that finding in our study. Through the usage of the CMQ and CRT tests, we were able to establish that cognitive style and conspiracy mentality did not moderate the size of the illusory truth effect across all presented material in our study. Furthermore, a bias towards analytical thinking (measured with CRT scores) did not predict a negative association with the level of truth judgments of conspiracy theory statements. This is a result that could be seen as surprising, as it stands in contrast to both Béna et al. (2022)'s original study, but also prior research done by Swami et al. (2014). More respondents may have yielded results that are more congruent with these previous studies, as our results do show a distinction between conspiracy theory statements and trivia statements, even though the effect was not sufficiently significant. Finally, a heightened CMQ score was positively associated with increased truth perception towards conspiracy theory statements but not any trivia statements. This seems consistent with prior research done by Imhoff & Bruder (2014), as the purpose of the conspiracy mentality questionnaire is to predict conspiracy theory beliefs.

In the upcoming paragraphs, we will look at the present results, and mention some potential implications, both practical and for research within the domain of conspiracism, as well as limitations of the present research.

We currently cannot conclude that repeating conspiracy theory statements increases the perceived truth of conspiracy statements. Contrarily, while their effect size was also

small, Béna et al. (2022) did note a significant change in conspiracy theory belief in their experiment as a result of the illusory truth effect. As they also noted, because of the study design, statements were repeated only once and fairly quickly after another, which could be considered a conservative approach. In real-life situations, we are bombarded with tweets, news articles, advertisements, and conversations with peers, and repetition is much more frequent and varied. Frequency of repetition is associated with a stronger illusory truth effect (Fazio et al., 2022), and as such, more frequent repetition of conspiracy statements could lead to a significant change in belief, more than what we were able to find.

It should also be considered that in both Béna et al. (2022) and our study, the repetition of statements was investigated in a vacuum. The statements that were shown to respondents were directional - written as if the underlying conspiracy theories were true - but without any examples, evidence, or heuristics to alter belief. This is also dissimilar to real-world exposure, as statements generally are contextualized: the disseminator of information, the credibility of sources, included images, and even levels of interaction (such as likes; Luo et al., 2020; Pehlivanoglu et al., 2021) can have an impact on message credibility and as a result, truth judgment. Therefore, it is possible that conspiracy theory statements require more frequent and contextual repetition than what we experimented on to increase belief among participants. This could be because conspiracy statements, if found to be factual, would be significantly more impactful than trivia statements, where participants are not as invested in knowing the facts. That would be a positive finding, as previous research has made it seem like we are equally susceptible to adopting misinformation to be truthful than any other type of information. Our experiments indicate that may not be the case.

In their closing paragraphs, Béna et al. (2022) call for identifying ways to reduce repetition-induced conspiracism. To build on the conducted research, we created an

experiment that exposed the participants to a repeated debunking of one of the statements they had seen earlier. Previously conducted research suggests that when new information that contradicts previously held beliefs is repeated, the new information's perceived truth value is increased significantly (De Keersmaecker et al., 2019; Brashier et al., 2020). We found that repeating a debunking message has an effect on the truth judgments of both true and false trivia questions. However, we were unable to find this significant effect in the conspiracy statement group. Evidence is awaiting as to why this may be the case, although we have some ideas as to why this could be.

As mentioned previously, debunking has many facets that need to be executed well enough in the right circumstances to cause an effect. An unsupervised online experiment may not be realistic enough to achieve that effect. As with our first experiment, variables such as media platform, source credibility, imagery, and others may play an important role in decreasing belief in conspiracy theories (Luo et al., 2020; Pehlivanoglu et al., 2021). Our debunking messages were shown in a vacuum. Participants were not allowed to search for and verify any information during the experiment. When attempting to debunk, independent fact checking could aid in the debunking process, which participants were not allowed to do in our experiment. One takeaway from our research is therefore that context surrounding a debunking message may be of importance to decrease truth judgments on conspiracy theories (or other controversial statements) compared to other ambiguous statements. Additionally, our experiment was unlikely to be the first exposure to some of the conspiracy theories read by participants. This can lead to an unintended increased initial resistance to changing their beliefs after being exposed to debunking because they had already formed an opinion (e.g., because of the illusory truth effect) on the topic beforehand. As such, creating and debunking fabricated conspiracy theories may lead to different results.

When looking at the total sum of our research, one striking similarity is that conspiracy theory statement opinions were significantly unchanged as a result of repetition in both experiments. Conspiracy theories may thus be more resistant to the illusory truth effect, both in terms of increased belief after repetition as well as decreased belief after debunking. Trivia statements may not be resistant to this phenomenon, as also shown in many previously conducted studies where the truth judgment of trivia statements were significantly changed (Henkel & Mattson., 2011; Reber & Schwarz., 1999).

Limitations and Future Research

The present research, while providing useful insight into illusory truth and conspiracism, has a few limitations worth discussing. First, many of our trivia statements were ambiguous, and as such, participants had most often never interacted with these statements before. In contrast, (some) conspiracy theory statements may have already been well known to respondents, creating a bias that was difficult to account for on an individual level in our study. Additionally, our experiments were conducted with as little context surrounding the statements as possible, as we were solely interested in the causal effect of illusory truth. Further research could create experiments closer to real-life contexts, or control for individual differences of exposure prior to the study by creating fabricated conspiracy theories to ensure no prior knowledge has an effect on the results of the study.

Furthermore, we made a concerted effort to gather data representative for the Dutch population (through flyers in supermarkets and town halls, links in various social media groups on Twitter and Facebook), and despite this, our participants most frequently completed education level was “Bachelor’s degree”. Thirty-one percent of the Dutch population has a Bachelor’s degree or higher as of 2018 (CBS, 2018). As a result, our sample qualifies as highly educated. Consequently, it is hard to generalize our findings to the entire Dutch population, especially when taking into consideration previous research that finds that

increased education level predicts decreased levels of conspiracism (van Prooijen, 2016). Our findings may have been different with a sample more representative of the population. Additionally, our sample size was of insufficientl size(145 participants) which may have further decreased the validity and effect size of our results as well. As Béna et al. (2022), did not include all details about their sampling method (except that 57% of their sample was a student at the time), it is difficult to compare the two samples and their potential impact on the outcomes of our studies. Future studies could improve on this by adjusting the sampling method to be more representative of a general population, through sampling methods such as quota sampling. Unfortunately, our research did not have the resources to allow for this type of participant recruitment.

Finally, as our second experiment attempted to initiate the exploration of the illusory truth effect on debunking, the generalizability of our results is small. Debunking, similar to the spreading of conspiracy theories, can be done through many media and various contexts. Our experiment was non-contextual by design, and other more immersive and contextual methods of debunking may show different effects from repetition. Additionally, pre-bunking has often proven to be an efficient way of debunking (Compton et al., 2021; Lewandowsky & van der Linden, 2021). It would especially be of interest to see whether a technique such as repeated pre-bunking could also significantly improve resistance towards misinformation, more than traditional debunking would.

Additionally, if repeated debunking is not the most effective way of countering conspiracy theory belief, the process of countering misinformation may need to start earlier. While we were not able to statistically confirm prior research that found low-critical thinking to be related to conspiracism (Lantian et al., 2021), and analytical thinking improved resistance against conspiracy theories (Swami et al., 2014), it appears that critical thinking ability plays a crucial role in being susceptible to conspiracism. Research could focus on

improving critical thinking ability in individuals from a young age so that they are able to counter misinformation on their own without needing (repeated) debunking to change their beliefs. Critical thinking development could also be repeated over time, as the illusory truth effect may help in creating a persistent skill among individuals.

Conclusion

Repetition on its own may not induce or, in the case of debunking, reduce conspiracism. Our first study showed that the effect of repetition on truth judgments is limited to trivia statements when compared to conspiracy theory statements, regardless of cognitive thinking style bias and level of conspiracy mentality. This is contrary to prior experiments conducted by Béna et al., (2022) that directly inspired this research. Similar to their research, we attempted to study the illusory truth effect with no context to influence the results. In our second study, we exposed participants to a debunking condition twice in a row and compared the truth judgment with the results from our first experiment. Results were similar: trivia statements were rated as more true (in the case of true trivia statements) or less true (in the case of false statements) after debunking than before, but conspiracy statements were resistant against this effect. We conclude that conspiracy theory statements may require more context than other ambiguous statements for the illusory truth effect to effectively take place. This also seems to hold true for the debunking of conspiracy theories. Future research may study the truth effect on conspiracy theories with more and varied repetition, exposing participants to a more natural context, where other variables may have a strengthening or weakening effect, such as different types of media and source credibility. The same research would be useful to conduct for debunking. Finally, researching how to bolster individuals' cognitive processes in a way that reduces susceptibility to the conspiracy mentality from a young age may yield many benefits, as our research highlights that the illusory truth effect may have less less effect on more deeply held beliefs than trivia statements. Ensuring

conspiracy theory beliefs never become deeply engrained (through improved critical thinking) may be crucial in that process.

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Appendix A

Experiment Statements (Trivia and Conspiracy Theory)

True Trivia Statements

Lemuel Gulliver's tweede reis was naar Brobdingnag.
Groene thee heeft een capaciteit om zuurstofradicalen op te vangen van 1253 µmol TE/100g.
In de Griekse mythologie is Demeter de godin van de landbouw.
Het schilderij 'Bal du Moulin de la Galette' werd geschilderd door Auguste Renoir.
De eerste officiële basketbalwedstrijd werd in Springfield gespeeld.
Dr Jonas Salk ontwikkelde het poliovaccin.
De kleinste bloem ter wereld wordt in Japan gevonden en meet een halve millimeter.
Het Russell-Einstein manifest werd in 1955 gepubliceerd om te waarschuwen voor het gevaar van kernwapens.
Het hoofdkantoor van het bedrijf Braun is gevestigd in Kronberg, Taunus, Duitsland.[3]
De eerste vlag van de confederatie van de Verenigde Staten heette 'Stars and Lines'.

False Trivia Statements

De schrijver Ronald Schernikau ligt begraven in het St. Georg district van Hamburg.
Karel de Grote werd op eerste paasdag door de paus tot keizer van het Westen gekroond.
Spinnenzijde werd ooit gebruikt om gitaarsnaren te maken.
Er zijn van nature geen slangen in beide Schotland en Groenland.[4]
De eerste moderne Olympische kampioen is Alvin Kraenzlein.

[3] This statement was used for the debunking experiment.
[4] This statement was used for the debunking experiment.

Zeus en Leda zijn in de griekse mythologie de ouders van de drie vrouwen van het lot.
Mark Twain vertaalde Till Eulenspiegel ('Tijl Uilenspiegel') in het Engels.
De muzikante Fiona Apple groeide op in Los Angeles.
Georg Friedrich Händel deed er ongeveer drie jaar over om 'Messiah' te componeren.
Berkeley Software Distribution is een Amerikaanse detailhandelsketen.

Conspiracy Theory Statements

De CIA is betrokken bij de moord op president John F Kennedy in Dallas.
Het ministerie van Volksgezondheid spant samen met de medische industrie om de realiteit van de schadelijkheid van vaccins verborgen te houden.
De Amerikanen zijn nog nooit naar de maan gegaan en de NASA heeft de bewijzen en beelden verzonnen.
Het AIDS-virus werd in een laboratorium gecreëerd en getest op de Afrikaanse bevolking voordat het zich over de hele wereld verspreidde.
Jihadistische terreurgroepen zoals Al Qaeda zijn in de handen van Westerse inlichtingendiensten.
Het is mogelijk dat de aarde plat is en niet rond, zoals ons altijd word geleerd.
De Franse Revolutie van 1789 en de Russische Revolutie van 1917 zouden nooit hebben plaatsgevonden zonder het beslissende optreden van een geheime elite die in de schaduw aan de touwtjes trokken.
Er is een geheim project genaamd de 'New World Order' om een wereldwijde oligarchische dictatuur te vestigen.
Sommige van de witte strepen die door vliegtuigen in de lucht komen, zijn samengesteld uit chemische stoffen die om geheime redenen opzettelijk worden vrijgelaten.
De VS heeft een krachtig geheim wapen ontwikkeld dat overal ter wereld cyclonen, aardbevingen en tsunami's kan veroorzaken.
Het auto-ongeluk waarbij Lady Diana stierf was eigenlijk een in scène gezette moordaanslag.
De Illuminati is een geheime organisatie die de bevolking wil manipuleren.
Immigratie wordt doelbewust georganiseerd door onze politieke en media-elites om

uiteindelijk te leiden tot de vervanging van de Europese bevolking door een immigrantenbevolking.
Slechts een paar personen zijn in staat de geheime tekens te ontcijferen die op bankbiljetten, bepaalde merklogo's en muziekvideo's zijn geplaatst.
Er is een wereldwijde Zionistische samenzwering.
De internationale drugshandel is eigenlijk in handen van de CIA.
De Amerikaanse regering was betrokken bij de uitvoering van de aanslagen van 11 september 2001.[5]
Het COVID-19 coronavirus is opzettelijk in een laboratorium gecreëerd.
De moordenaar van Pim Fortyun handelde niet alleen.
Wetenschappers die beweren dat de opwarming van de aarde bestaat, verbergen eigenlijk de echte data en handelen uit eigenbelang, voor geld, macht, of prestige.

[5] This statement was used for the debunking experiment

Appendix B

Survey Information

The full .qsf file (Qualtrics survey file) can be found here.