This manuscript is currently in press at WIREs: Cognitive Science. Post date: 8/3/21

The effects of repeating false and misleading information on belief

Raunak M. Pillai

&

Lisa K. Fazio

Vanderbilt University

Abstract

False and misleading information is readily accessible in people's environments, oftentimes reaching people repeatedly. This repeated exposure can significantly affect people's beliefs about the world, as has been noted by scholars in political science, communication, and cognitive, developmental, and social psychology. In particular, repetition increases belief in false information, even when the misinformation contradicts prior knowledge. We review work across these disciplines, identifying factors that may heighten, diminish, or have no impact on these adverse effects of repetition on belief. Specifically, we organize our discussion around variations in what information is repeated, to whom the information is repeated, how people interact with this repetition, and how people's beliefs are measured. A key cross-disciplinary theme is that the most influential factor is how carefully or critically people process the false information. However, several open questions remain when comparing findings across different fields and approaches. We conclude by noting a need for more interdisciplinary work to help resolve these questions, as well as a need for more work in naturalistic settings so that we can better understand and combat the effects of repeated circulation of false and misleading information in society.

1. INTRODUCTION

Most of the information people hear on a daily basis is true. However, people are also exposed to false and misleading information from politicians, shady advertisers, misguided friends and others. Some of these falsehoods are only heard once and may be quickly forgotten. Others, however, are repeated multiple times. For example, by the end of his presidency, President Trump had repeated each of his 9 most common false or misleading claims at least 200 times (Washington Post Fact Checker, 2020). In fact, he has repeated one falsehood (that the US economy under his administration was the best in US history) on almost 500 occasions.

In this review, we will examine how those repetitions affect belief across various contexts. Our goal is to start an interdisciplinary discussion by connecting existing literature across the fields of cognitive, developmental, and social psychology, political science and communication. Each field has studied this issue using their own paradigms and methods, but rarely is the knowledge shared across the disciplines. Our hope is that researchers from each discipline can learn something new from this review and that it will help illuminate what we do and do not know about the effects of repetition on belief.¹

While repetition affects belief in both true and false information, we have chosen to focus primarily on false information in this review. We do so for many reasons. The first is methodological. Because false information does not have to be constrained by reality, it is often novel (e.g., it is unlikely that you have ever heard “The capital of the United States is Miami” before). This novelty means that it is unlikely that participants will have differential prior exposure to the information. In addition, studying belief in novel, false information avoids the ceiling effect issues that can occur when studying the effects of repetition on more well-known, true statements (cf. Unkelbach & Speckmann, 2021). The second, more urgent, motivation is that repeating false and misleading information can lead to real-world harms in a way that is unlikely for true information. In the span of just a few months, cell phone towers in the UK were set on fire due to misinformation about a connection between 5G service and COVID-19 (Spring, 2020), election officials were overwhelmed with phone calls asking about voter misinformation in the run-up to the 2020 US presidential election (Browning & Alba, 2020) and a Georgia poll worker went into hiding because of false claims that he destroyed an absentee ballot (Brumback & Joffe-Block, 2020). We can also see the direct impact of misinformation on the January 6th insurrection at the U.S. Capitol (Williamson, 2021), an event that led to numerous injuries

and deaths. Thus, there is a particular importance in understanding how repetition affects belief in false statements.

1.1 Defining belief

Before diving into the review, it is important to clarify what we mean by “belief”. In this manuscript, we are narrowly defining belief as an attribution of truth value associated with a statement, thought, or memory (similar to Damasio, 2000). When we say that repetition of false information “increases belief,” we are suggesting that repetition has a graded effect on belief, such that repeated false claims are attributed a greater degree or level of truth, or are judged to be true with greater frequency, relative to novel claims. Our main focus in this review is on verifiably false or misleading claims that refer to concepts and people external to the believer (e.g., false claims about an animal species, inaccurate descriptions of political events). However, this is not the only kind of content that one can “believe,” nor is it the only kind of information for which repetition may be influential. First, a claim can be *subjective*, like statements of opinion (e.g., “Judges are far too lenient on criminals”; Arkes, Hackett, & Boehm, 1989) or persuasive messages (e.g., an argument in favor of altering sentencing procedures). Repetition can increase belief in statements of opinion, and agreement with persuasive arguments. Additionally, claims can be made *in reference to one’s own experiences* rather than about the external world. Thus, memories of experiences and events (e.g., recalling a car crash) can be considered a kind of “belief about the past” (Schacter, 2000, p. 3). People often make judgements about whether their memories are true, and decide not to report memories believed to be false (e.g., Koriath & Goldsmith, 1996). In this context, too, repetition of false or misleading claims about past events can affect what one remembers (i.e., what one believes about the event).

We do not argue that the processes involved in believing or agreeing with subjective claims are the exact same mental processes as those involved in believing objectively verifiable claims. Nor we do argue that reporting remembering an experience (and, thereby, believing something about one’s own past) is equivalent to believing a claim about the external world. However, we do suggest that repetition plays similar roles in all of these contexts, and so while this review focuses on objectively false statements, we occasionally reference research on people’s belief in subjective claims and in their own memories to add further depth or to prompt new questions.

1.2 Methods of exploring the effects of repetition on belief

The question at the heart of this review has been addressed by researchers across a variety of fields and using a variety of methods. The primary research paradigm focuses on the “illusory truth effect”—the finding that people believe statements more often when they are repeated, regardless of their actual truth status. First described by Hasher, Goldstein, & Toppino in 1977, the illusory truth effect has been replicated in over 100 studies across the past 40 years (see Dechêne, Stahl, Hansen, & Wänke, 2010 for a meta-analysis, and Unkelbach, Koch, Silva, & Garcia-Marques, 2019 for a recent review). A typical experiment starts with an exposure phase where participants read a series of statements (and often make unrelated judgments such as how interested they are in each statement). Then, in the judgement phase, they rate the truth of both novel statements and statements repeated from the exposure phase (often using a scale ranging from definitely false to definitely true). Repeated statements are consistently given higher truth ratings than novel statements. See Box 1 for descriptions of the current theoretical accounts of the illusory truth effect.

Box 1: Cognitive processes implicated in the effects of repetition on belief

The effects of repetition on belief have been explained with reference to a variety of cognitive processes, primarily in the “illusory truth” literature (see Unkelbach, Koch, Silva, & Garcia-Marques, 2019 for a review). Examples include:

Familiarity: Repeated information is associated with an imprecise, subjective feeling of being familiar, and this familiarity is interpreted as a signal for truth (e.g., Arkes, Hackett, & Boehm, 1989).

Fluency: Repeated information is subjectively experienced as easy to process and understand. This perceptual fluency has a strong influence on a variety of judgements (Alter & Oppenheimer, 2009), including judged truth (Reber & Schwarz, 1999).

Coherent references in memory: Repetition of a claim enhances the memory associations between the concepts referred to in the claim, and the coherence of this network influences the perceived truth of a claim (Unkelbach & Rom, 2017).

Convergent validity: Repeated information may be misattributed to multiple sources, resulting in the perception that a claim is commonly agreed upon and, therefore, true (Arkes, Boehm, & Xu, 1991).

These accounts also overlap to varying extents (e.g., statements that are coherently represented in memory may be more fluently processed as well), and all similarly suggest that repetition generates readily accessible cues that make statements more subjectively believable. The

goal of the current review, therefore, is to characterize how repetition-based cues (broadly defined) influence people's beliefs under various conditions, and in relation to a variety of other relevant cues, such as their existing knowledge (cf. Brashier & Marsh, 2020).

Other research assesses the impact of repetition on belief through survey data, assessing how belief relates to naturally occurring variation in how often different claims are repeated in society. Typically focused on political rumors, these surveys assess public views on a claim before and after a large event in which the claim is naturally widely circulated (Kim & Kim, 2019) or correlate self-reported prior exposure to a claim with ratings of belief in the claim (Allport & Lepkin, 1945; Greenhill & Oppenheim, 2017). In these naturalistic contexts, too, belief increases along with repetition.

Finally, a few other research methods have been extended to examine the effects of repeated exposure to false or misleading information. For instance, research on the “continued influence effect” shows that initial exposure to false accounts of an event continues to affect what people think and believe about the situation, even when people are provided with updated corrective information (see Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012 for a review). Repetition of the initial information strengthens this effect—false information heard repeatedly is more likely to influence people's thoughts, in spite of a later retraction, than false information heard once (Ecker, Lewandowsky, Swire, & Chang, 2011). One explanation is that repetition strengthens the original information's salience and representation in memory, making it more likely to be relied upon later despite the correction. Another example involves people's memory for statements which elicit pragmatic inferences, or heavily imply an unstated meaning. For example, after encountering “The clumsy chemist had acid on his coat,” people often misremember the implication that the chemist spilled the acid on his coat, but this is not necessarily true (Brewer, 1977). Repetition of such statements can, in some circumstances, exaggerate these misleading memorial effects (McDermott & Chan, 2006). Note that these studies examine the effects of repetition on people's memory for past events, or what people believe about these events. As noted earlier, this is not equivalent to examining our main focus—how repetition may affect belief in statements about the external world—but does provide a useful point of reference for this goal.

1.3 The Theorist's Tetrahedron

To guide our synthesis of the existing literature, we use Jenkins' (1979) Theorist's Tetrahedron.² As shown in Figure 1, the tetrahedron model illustrates the complexity of real-world situations. Imagine you were interested in whether pictures or words are better remembered. That one broad question actually contains an almost infinite number of possible situations – there are multiple different types of pictures and words (abstract/concrete, familiar/unfamiliar), many types of memory tests (recognition/recall, immediate/delayed), different ways to present the stimuli (brief flash/multiple seconds, try to remember/judge pleasantness) and different people who could be remembering the items (child/adult, native speaker/beginning language learner).

Figure 1. An adapted version of Jenkin's (1979) Theorist's Tetrahedron. Each vertex represents a group of variables. Each edge represents a two-way interaction and each plane a three-way interaction. The entire tetrahedron represents a four-way interaction of all the variables. Note that locations on the pyramid are arbitrary and do not reflect any hierarchy.

In order to start experimentally testing research questions, we need to reduce that complexity. So, researchers often pick one corner (or vertex) and focus on that variable in isolation. Thus, we may discover that when college students actively try to remember concrete nouns that are each presented as either a written word or a picture for $1/16^{\text{th}}$ of a second, they will remember more pictures than words when asked to write down all of the items 5 minutes later (Paivio & Csapo, 1973, Experiment 1). That one experiment expands our knowledge, but it does not mean that the results will be the same with a 1-week delay, or with abstract nouns, or within young children. Sometimes researchers

have theoretical reasons to expect that one situation may or may not lead to similar results, but other times these inferences need to be experimentally tested. Thus, it is only by summarizing multiple experiments, each with their own specific situations, that we can begin to understand the topic as a whole.

For our current topic, we focus on four main categories of variables: the type of misinformation being repeated, the type of person receiving the repeated misinformation, how the misinformation is presented, and how belief is measured (Figure 1).

2. MATERIALS

We begin by discussing the first vertex of the Theorist's Tetrahedron—the materials used across various studies. The effects of repetition on people's beliefs have been examined using a variety of materials including trivia statements (Bacon, 1979), news headlines (Pennycook, Cannon, & Rand, 2018), labelled false claims (Skurnik, Yoon, Park, & Schwarz, 2005), and rumors (DiFonzo, Beckstead, Stupak, & Walders, 2016; Kim & Kim, 2019). False and misleading information can vary in both its subject matter, and along various attributes of the content (e.g., plausibility, valence, argument strength).

2.1 Subject matter

Repetition affects belief in statements across a wide range of subject matters and topics. Within the illusory truth paradigm, repeated false statements (as well as truths) are consistently given higher truth ratings than novel statements across a wide variety of topics, including trivia (Bacon, 1979; Begg, Anas, & Farinacci, 1992; Hasher et al., 1977), consumer product statements (Hawkins & Hoch, 1992), news (Pennycook et al., 2018; Polage, 2012), and rumors (Berinsky, 2017; DiFonzo et al., 2016). Repetition similarly increases belief in and agreement with subjective content such as socio-political opinions (Arkes et al., 1989) and persuasive arguments (Moons, Mackie, & Garcia-Marques, 2009). Repetition is also influential for false information regarding the cause of an event. In research on the continued influence effect, repeated exposure to false information regarding the source of a warehouse fire (that there were volatile materials stored in a closet in the building) that was later retracted was more likely to affect what people believed about the fire than a single exposure prior to retraction (Ecker et al., 2011).

The effects of repetition are also observed with naturally spreading political rumors in survey-based research. For instance, an uptick in media circulation of the “Obama-is-a-Muslim” myth around

September 2008 corresponded with a 4-8% increase in belief of that myth within the American public (Kim & Kim, 2019). Similarly, survey data indicated that prior exposure to rumors about ongoing 2012 political conflicts in Thailand and the Philippines predicted increased belief in these rumors (Greenhill & Oppenheim, 2017) and previously encountered war-related rumors were more greatly believed than rumors heard for the first time among Americans in May 1943 (Allport & Lepkin, 1945).

In sum, across a range of materials, the accuracy of people's beliefs is negatively impacted by the repetition of false and misleading information. At present, there do not appear to be any systematic differences in people's sensitivity to this repetition by subject matter, nor do existing theories predict such differences.

2.2 Information attributes

2.2.1 Statements versus Implications

As discussed above, repetition affects beliefs for a variety of kinds of explicitly false statements. However, people often repeatedly encounter not only claims that are outright false, but also claims that are misleading in their implication. For example, "The clumsy chemist had acid on his coat," strongly implies that the chemist spilled the acid on his coat, but he may not have (Brewer, 1977). Repeatedly encountering such statements can mislead people into believing they actually encountered the implication. People who rely on a general sense of familiarity (i.e., younger adults responding under a time pressure and older adults with impaired memories) are more likely to be misled by these repetitions, but those who more often effortfully recollect the exact details of the original statement (i.e., younger adults not under any time pressure) become more accurate with multiple exposures (McDermott & Chan, 2006). In addition, within the illusory truth paradigm, exposure to false claims about specific product features (e.g., "The manufacturer of ACE locks requires professional installation to ensure proper functioning") increases belief in the related general claim that they suggest (e.g., "When it comes to security, ACE provides the best door locks"), and this effect is heightened when people are exposed to multiple different feature claims that support the same general claim (Hawkins, Hoch, & Meyers-Levy, 2001). Thus, repetition can increase belief in not just the stated claim, but also its implication.

2.2.2 Plausibility

While early research presumed that the effects of repetition were limited to ambiguous, plausible falsehoods (Dechêne et al., 2010), more recent work has directly tested this assumption,

demonstrating that repetition increases belief across the full range of plausibility (Fazio, Rand, & Pennycook, 2019). Importantly, there is a disconnect between the observable change in belief on a rating scale and the underlying, unobservable, psychological process. The larger changes in belief that are observed for more plausible falsehoods are due to measurement issues, while the underlying change in belief is likely equivalent for all statements (Fazio et al., 2019).

Repetition of implausible false information not only affects belief in the falsehood but can also alter people's memory for events (beliefs about one's personal past). For instance, repetition of misleading advertisements and reviews increases belief in having encountered Bugs Bunny in Disneyland – even though he is not a Disney character (Braun-LaTour, Grinley, & Loftus, 2006). Similarly, repeatedly imagining actions increases false recollection of actually performing both familiar (e.g. “flip the coin”) and bizarre (e.g. “sit on the dice”) actions, though the effect is stronger for familiar actions (Thomas & Loftus, 2002). Together, these findings suggest that the misleading effects of repetition are relatively unaffected by variation in the plausibility of the false information itself.

2.2.3 Valence

Information can also differ in its valence (positive/negative). While statement positivity is often correlated with perceived truth, the perceived truth of positive and negative falsehoods is equally boosted by a single repetition (Unkelbach, Bayer, Alves, Koch, & Stahl, 2011). However, there is some evidence that negative political messages may show a different pattern. In one study, factual statements embedded in neutral political messages increased in perceived credibility from one to three and then six repetitions, but the same content in negative messages increased in perceived credibility between one and three repetitions, but decreased from three to six (Ernst, Kühne, & Wirth, 2017). This decrease with higher levels of repetition is consistent with other findings from the communication literature wherein over-exposure to negative messaging results in less favorable evaluations of the communicator of the message (e.g., Fernandes, 2013; Reinhard, Schindler, Raabe, Stahlberg, & Messner, 2014). These aversive processes are one proposed way by which excessive repetition of negative messages may ultimately reduce perceived credibility of the message itself. However, it is important for future work to directly test this hypothesis, particularly with objectively false information, rather than the true statements and persuasive messaging used in past work.

2.2.4 Argument strength

Argument strength, or the favorability with which people respond to the argument, is a critical factor in the processing of persuasive messaging. As noted in the introduction, agreeing with persuasive messaging is not identical to believing objectively false information. However, repetition is thought to affect agreement with persuasive messaging via cognitive processes (e.g., familiarity; see Moons et al., 2009) that are similar to those used to explain how repetition affects belief in verifiably false information. Thus, examining of the factors that qualify the effects of repetition for persuasive messaging may be useful for understanding how people may process repetition of objectively false information.

Most theories of persuasion suggest that repeating a strong argument should increase agreement, but the effect of repetition for weak arguments is less clear. On one hand, weak arguments often lead the audience to notice flaws in a position. Thus, repeating a weak argument may decrease agreement by giving the audience more opportunities to find flaws with the argument (Cacioppo & Petty, 1989). Alternatively, repetition of weak arguments may increase agreement by making the argument feel more familiar, or fluently processed (Garcia-Marques & Mackie, 2001).

The key difference is how people process the information. Repetition of weak arguments decreases belief when they are carefully processed, but increases belief when they are not (in situations where people lack the capacity and/or motivation to fully process the argument). For example, when weak arguments are repeated in a way that does not encourage careful processing (e.g., rate the sound quality or speed of presentation), agreement increases with repetition (Garcia-Marques & Mackie, 2001). In addition, when reading persuasive messages about a different school (reducing motivation to critically process messages), undergraduates' agreement with weak and strong arguments increased with repetition. However, when the arguments were about one's own school (encouraging critical processing), repetition only increased agreement with strong arguments (Moons et al., 2009), see Figure 2. This account is consistent with the elaboration likelihood model of persuasion which suggests that the efficacy of a persuasive message varies, in part, as a function of one's motivation. When individuals are more motivated to process persuasive messaging, they are less likely to rely on peripheral cues such as repetition in forming attitudes, and more likely to rely on central cues such as argument strength (Petty & Cacioppo, 1986). It is important for future research to expand this research to focus on belief in objectively false information, but the findings suggest that

the effects of repetition are most strongly impacted by how people process the information, rather than by attributes of the information itself.

Figure 2. Mean agreement with new and repeated, weak and strong arguments that were highly personally relevant. The rating scale ranged from 1 = strongly disagree to 7 = strongly agree. Figure adapted from Moons et al. (2009) Experiment 1.

2.3 Summary

In sum, there is consistent evidence that repetition of false and misleading information affects people's beliefs across a range of different types of materials including simple trivia statements, news headlines, implicative sentences, rumors, and event descriptions. There is no indication in the literature that the subject matter or the plausibility of the information moderates these effects. However, adjacent literatures on the effects of repetition of persuasive messages suggest that factors like argument strength and valence may have an effect, highlighting areas for future work. In general, the key differences in the effects of repetition on belief are likely not due to the content per se, but rather differences in the kind of processing applied to the content.

3. INDIVIDUAL DIFFERENCES

We turn now to the second vertex of the Theorist's Tetrahedron—individual differences. The effect of repetition on belief may also vary based on characteristics of the person receiving the repeated information. We focus here on three primary factors: prior knowledge, existing beliefs, and age, before discussing a variety of other individual difference factors.

3.1 Prior knowledge

One might expect repetition to only affect belief in false information when the recipient does not already know the correct information. However, this is not the case. Repeated false statements are given higher truth ratings even when they contradict participants' existing knowledge (Fazio 2020b; Fazio et al. 2015; Brashier et al. 2017). In these studies, participants' existing knowledge is measured either before (Fazio 2020b) or after (Fazio et al. 2015) they participate in a typical illusory truth experiment (e.g., "What is the name for a cyclone that occurs over land? Hurricane, Tornado, or I Don't Know"). As shown in Figure 3, when people had accurate knowledge (e.g., answering "Tornado"), they were more likely to rate these known falsehoods as false, relative to when they answered incorrectly or with "I don't know." However, both known and unknown falsehoods were given higher truth ratings when they were repeated, showing that repetition of falsehoods adversely influences belief even when people have the specific knowledge necessary to respond accurately.

Figure 3. Mean truth ratings for falsehoods as a function of repetition and demonstrated knowledge on the knowledge check. The scale ranged from 1 = Definitely False to 6 = Definitely True. Error bars reflect standard errors. Data from Fazio (2020b).

3.2 Political affiliations

In addition to specific, factual knowledge, people also possess broader views, like political affiliations, that may affect how they process repeated false information. Somewhat surprisingly, repetition increases perceived truth equally for both politically concordant and discordant false news

headlines (Pennycook et al., 2018). For example, repetition increases belief in pro-Republican falsehoods like “Nancy Pelosi’s son arrested for murder” for both Democrats and Republicans. These results underscore that people’s tendency to rely on low-level cues like fluency when judging truth is robust, even in the face of contradictory higher-level cues like political dispositions.

However, political affiliations are not always irrelevant. For instance, when the circulation of an anti-Obama rumor increased among the American public, Republicans showed a larger increase in belief than Democrats (Kim & Kim, 2019). One likely explanation is that such differences are mediated by different consumption patterns, with Republicans being more repeatedly exposed to anti-Obama rumors than Democrats due to, for instance, “selective exposure” to news sources that are pro-attitudinal (e.g., Guess, Nyhan, & Reifler, 2020). However, this difference can also be interpreted as an example of “motivated skepticism,” where people are more skeptical of information that is incongruent with their beliefs (Kim & Kim, 2019; Taber & Lodge, 2006). While this latter account is inconsistent with findings of Pennycook et al. (2018), it is possible that motivated reasoning may play a larger role in real-life settings. Future work should continue to examine how people’s political views impact their processing of repeated false information.

3.3 Age

3.3.1 Children

Repetition of true and false statements increases belief for 5-year-olds, 10-year-olds, and adults alike (Fazio & Sherry, 2020), see Figure 4. Thus, children learn to connect repetition with perceived truth at a young age. However, it is currently unclear if the size of the effect is equivalent across development.³

Figure 4. Proportion of new and repeated statements rated “True” by age group. Error bars reflect standard errors. Figure adapted from Fazio & Sherry (2020).

In addition to the effects of repetition on belief in false statements about the world, researchers have also examined the effects of repeating false information on children’s memories for experienced events. For instance, after reading a story, 5-year-old and 9-year-olds were more misled by repeated exposure to incorrect story details than by a single exposure to incorrect details (Holliday, Douglas, & Hayes, 1999). Misleading information can also come from repeated questions, especially leading questions. Four-year-olds are particularly likely to change their answers to repeated yes-no questions regarding a witnessed event, relative to adults and older children (Poole & White, 1991). One explanation is that repetition may elicit particularly acute social pressures to betray one’s knowledge and comply with authorities in young children (Cassel, Roebbers, & Bjorklund, 1996; though see Howie, Kurukulasuriya, Nash, & Marsh, 2009 for a different interpretation). These repetition-induced social pressures are typically ignored in other fields, yet may play an important role in how children and adults process repeated information.

3.3.2 Adults

In adulthood, there are two prominent age-related cognitive changes that are relevant to the effects of repetition on belief: decreasing memory for details of encountered information (Spencer & Raz, 1995), and increasing general knowledge (Park, 2000). Memory declines can make older adults particularly susceptible to repetition-induced belief in situations where memory for the precise details

of the original context in which information was encountered is crucial. For instance, repeatedly conveying to adults that a claim is false can make the claim seem more true, as they forget the context of encountering the claim as “false” (Skurnik et al., 2005). Similarly, increasing the number of repetitions of statements warranting pragmatic inferences (e.g., “the karate champion *hit* the cinderblock”) elicits more misjudgments (e.g., believing they read “broke” instead of hit) for older adults, but fewer misjudgments in younger adults (McDermott & Chan, 2006). Thus, as people age, they are less able to remember both the source of the encountered information and precise details such as the exact wording of the original information itself, relying instead on low-level cues like repetition-induced familiarity.

However, aging may confer an advantage in other situations. While many cognitive abilities decrease across adulthood, people’s general knowledge and vocabulary increase from age 20 to 60 (e.g., Park, 2000; Salthouse, 2019). This increase may be particularly helpful in the context of false statements that contradict prior knowledge. While younger adults rate repeated false statements as more true than novel statements, even when they have knowledge to the contrary (Fazio, 2020b; Fazio, Brashier, Payne, & Marsh, 2015), older adults do not (Brashier, Umanath, Cabeza, & Marsh, 2017), see Figure 5. Repetition increases older adults’ truth ratings for unknown statements, but not for known falsehoods. This difference may be a function of older adults’ more organized and interconnected knowledge representations or a dispositional tendency among older adults to more frequently rely on knowledge. Future research should examine these age differences more closely to help clarify boundary conditions for the effects of repetition on belief and inform ways of attenuating such effects in other populations.

Figure 5. Mean truth ratings for falsehoods by older adults as a function of repetition and demonstrated knowledge on the knowledge check. The scale ranged from 1 = Definitely False to 6 = Definitely True. Figure adapted from Brashier et al. (2017) Experiment 1.

3.4 Other individual differences

In the illusory truth literature, a variety of other individual difference factors have been examined. For instance, the size of the repetition-induced truth effect is similar regardless of people's cognitive abilities (measured by tests of verbal and fluid intelligence), need for cognitive closure (the inclination to avoid ambiguity and resolve questions) and cognitive style (the tendency to engage in more analytic thinking) (De keersmaecker et al., 2020). Similarly, people who score high and low on need for cognition (a tendency to enjoy and prefer engaging in thinking) display similar illusory truth effects (Boehm, 1994), though those high in need for cognition are more affected when they are not warned about the presence of false information (Newman, Jalbert, Schwarz, & Ly, 2020). Finally, dispositional skepticism (i.e., the tendency to be generally doubtful of claims and seek further information) has been found to play a minor role in attenuating the illusory truth effect for rumors (DiFonzo et al., 2016). In sum, research in the illusory truth paradigm suggests that such repetition effects are relatively robust to a variety of individual difference factors.⁴

3.5 Summary

While people differ in their political affiliations, level of background knowledge, cognitive abilities, and personality factors, the processes underlying the adverse effects of repeating falsehoods

occur independently of most of this variation. One exception to this trend appears to be found in older adults, who may be able to utilize their knowledge to counteract the effects of repetition for known falsehoods. However, aging also typically leads to poorer memory, which may leave older adults more likely to misremember repeated, tagged “false” information as “true,” or to misremember the implications of a repeated suggestive claim, rather than the claim itself.

4. PRESENTATION

Here, we discuss the third vertex of the Theorist’s Tetrahedron—how variations in presentation may directly influence how repeated information is processed. First, we discuss differences at exposure (the type of processing elicited, encountering accuracy labels, source factors, and number of repetitions), then post-exposure differences (later corrections and the timing between repetitions), and, finally, presentation differences while beliefs are measured (having evaluative information available, warnings about the effects of repetition).⁵

4.1 Differences at exposure

4.1.1 Processing differences

Differences in how one encodes repeated information may heighten or weaken the effects of repetition on belief. One common manipulation is to change the level of processing. Decades of memory research has demonstrated that information that is elaborately encoded (e.g., judging pleasantness, usefulness for survival, relevance to self) is better remembered than information that is shallowly processed (e.g., judging lower vs. upper-case letters, location on screen, rhyme) (Craik, 2002; Craik & Lockhart, 1972). Within the illusory truth effect, deeper encoding increases the effect of repetition on belief (Unkelbach & Rom, 2017).

However, not all types of elaborative processing lead to increased effects of repetition. For instance, initially rating the accuracy of information can attenuate the illusory truth effect (Hawkins & Hoch, 1992), and eliminate it all together when one has relevant prior knowledge (Brashier, Eliseev, & Marsh, 2020).⁶ These findings parallel work described earlier on the effects of repeating arguments which show that increasing people’s motivation to process persuasive arguments can eliminate the effects of repetition on agreement, but only when the persuasive argument is weak (Moons et al., 2009).

Similarly, warning participants that some of the statements they are about to read may be false during the exposure phase of a typical illusory truth experiment can shrink the effects of

repetition on belief in false information in half, likely by encouraging more distrustful, evaluative encoding (Jalbert, Newman, & Schwarz, 2020), see Figure 6. Critically, these warnings about the presence of false information are prevalent in illusory truth studies, but rarely present in real-world settings, suggesting that the effects of repetition on belief may in fact be underestimated in the literature (Jalbert et al., 2020).

Figure 6. Mean truth ratings for new and repeated statements with and without warnings that some of the initially encoded information was going to be false. The scale ranged from 1 = Definitely False to 6 = Definitely True. Figure adapted from (Jalbert et al., 2020) Experiment 1.

Thus, while depth of processing is important in shaping the effects of repetition, what may be most crucial is the *nature* of that processing. Deeper encoding of repeated material can compound the adverse effects of repetition by making the false statements more familiar. However, if the deeper encoding is evaluative or skeptical in nature (e.g., rating truth, expecting to encounter untrustworthy information), the effects of repetition on belief are often diminished.

4.1.2 Accuracy labels

Sometimes, false information is initially encountered with an evaluative label of “false,” such as when reading a fact-check about a newly circulating falsehood. An important question is whether repetition can make people erroneously believe even these debunked claims, or whether the presentation of accuracy labels can override the effects of repetition. Ultimately, the answer appears to depend on context. Repetition can increase belief in labeled, false claims when the accuracy label

is not closely tied to the claim (e.g., Skurnik et al., 2005) or when the label itself is weak or indecisive (e.g., Pennycook et al., 2018). However, strongly worded labels that closely accompany the false claim can mitigate these negative effects of repetition (Ecker, Lewandowsky, & Chadwick, 2020).

The importance of a close association between the accuracy label and the claim is illustrated by studies where the label and the claim are presented at different times. For instance, when told before or after encountering a sequence of statements that information from one of the two sources was consistently false and the other consistently true, repetition increases belief, even in false claims (Begg et al., 1992). Additionally, older adults in particular may come to believe false product claims as more true after multiple encounters when claims are followed by a “true” or “false” tag shortly after each repetition (Skurnik et al., 2005). The influence of accuracy labels in these situations requires effortful recollection of the label associated with each item (Unkelbach & Stahl, 2009). Thus, labels presented with a delay from their associated claims may be more difficult for people to later recall, allowing low-level repetition-induced cues such as familiarity with the claim to increase belief unimpeded. Accordingly, a month after exposure, repetition increases belief in repeated false claims when feedback about the truth of each claim is provided at the end of a long list of claims (and hence easily forgotten), but not when feedback is provided immediately after each claim (Brown & Nix, 1996).

Another critical factor for the efficacy of accuracy labels is the clarity and strength of their phrasing. For example, repetition increases belief in false news headlines, even when these headlines are accompanied by a “Disputed by 3rd party fact-checkers” tag (Pennycook et al., 2018). This “disputed” phrasing, while representative of real-life strategies previously used on social media sites like Facebook, is likely not strong enough to counteract the effects of repetition. Explicitly stating that information is “rated false” is more effective at reducing perceived accuracy than indicating that it is “disputed” (Clayton et al., 2020), and so more explicit phrasing may be more impactful in context of repetition as well.

Under more “ideal” conditions, the adverse effects of repeating false information are not evident. For instance, when a claim is presented directly alongside a decisive “false” label, repetition does not increase belief in the initially fact-checked claim (Ecker, Lewandowsky, & Chadwick, 2020). More generally, recent research suggests that concerns about a familiarity-driven “backfire effect” when repeating false information in the context of corrective messaging may be overblown (Swire-

Thompson, DeGutis, & Lazer, 2020). Thus, repeating labelled false content should not necessarily be avoided altogether. Rather, fact-checks and other evaluations should be carefully constructed, presenting an unambiguous label that closely accompanies the false claim. If these conditions are met, fears about the possible harms of repetition may be unfounded.

4.1.3 Information source

Another important dimension is the number of sources from which information is repeated. One hypothesis is that encountering statements from multiple sources will contribute to the perceived convergent validity of the statement, heightening the effects of repetition on belief in the statement (cf. Arkes et al., 1991). However, repeated, plausible statements from multiple sources are not perceived as any more true than claims repeated from a single source (though a difference is apparent for low-plausibility claims) (Roggeveen & Johar, 2002). Similarly, people's memory for witnessed events are equally susceptible to the misleading effects of repeated false descriptions whether the repetition comes from one or multiple sources (Foster, Huthwaite, Yesberg, Garry, & Loftus, 2012).

One possibility is that people do not reliably create accurate mental representations of the variation in sources of encountered information. Instead, repetition influences both truth and source related judgements. For instance, people tend to misattribute repeated statements to more credible sources (Fragale & Heath, 2004) and believe a repeated opinion to be more representative of social consensus, even when the repetitions come from a single source (Weaver, Garcia, Schwarz, & Miller, 2007). Thus, perceptions of social consensus may be correlated with truth judgements (as both are influenced by cues like repetition-induced familiarity), but these perceptions may have little to no causal role in increasing perceived truth. However, more work is needed to more accurately characterize the relationship between repetition, perceived social consensus, and perceived truth, especially in more naturalistic contexts where source variation occurs over a greater number of sources than the one to three sources typically used in laboratory experiments.

One other source dimension is the medium through which the information is presented. While we are not aware of any experiments directly comparing the effects of repetition across different modalities, repetition has been observed to affect belief when repetition occurs via audio (Fazio & Sherry, 2020; Gigerenzer, 1984; Hasher et al., 1977), via written text (De keersmaecker et al., 2020; Hawkins & Hoch, 1992), as well as via posters (Boehm, 1994; Ernst et al., 2017). Further, in a meta-analytic review of the literature, illusory truth effect sizes were unaffected by the modality of statement

presentation (including cases where modalities are mixed between initial and repeated exposures; Dechêne et al., 2010).

4.1.4 Number of repetitions

Most studies only examine the effects of a single repetition on belief. However, understanding the effect of multiple repetitions is crucial, especially when attempting to understand the effects of repetition in more naturalistic contexts. Survey data suggests belief in misleading information continues to increase with greater numbers of repetitions. For example, belief in political conflict-related rumors was positively predicted by reported frequency of prior exposure (on a scale from 0 (never) to 4 (very often)) in a survey conducted in the Philippines (Greenhill & Oppenheim, 2017). In experimental studies, repetition also increases perceived truth for false statements and rumors monotonically, but with a diminishing increase (DiFonzo et al., 2016; Hassan & Barber, 2021; Hawkins et al., 2001), see Figure 7. Thus, the increase between one and two presentations is larger than the increase in perceived truth from four to five repetitions. In practice, this pattern means that the initial repetitions of false information are the most harmful.

Figure 7. Mean belief ratings as a function of the number of prior repetitions. The rating scale ranged from 1 = not at all believable to 9 = completely believable. Figure adapted from DiFonzo et al. (2016) Experiment 3.

In contrast, there may be limits to the effects of multiple repetitions when the messaging is persuasive. Excessive claim repetition from a single source can indirectly counteract repetition-induced increases in truth by decreasing the credibility of the communicator (Koch & Zerback, 2013). Further, in one study, factual statements in negative political messages increased in credibility with three repetitions, but subsequently decrease in credibility with six repetitions (Ernst et al., 2017). The difference likely comes down to how the statements are processed. When people rely on low-level cues like familiarity and fluency, perceived truth will increase with repetition. However, multiple repetitions of persuasive messaging may elicit an aversion to the message that overrides these cues. This aversion process is often interpreted as “reactance,” a restorative response to a perceived attempt at persuasion (Koch & Zerback, 2013; Miller, 1976). Future work in this area should investigate if excessive repetition of objectively true or false information may also promote this aversion process.

4.2 Differences after exposure

4.2.1 Post-exposure correction

Once false information has been encountered, can an intervening correction undo the effects on belief? Research on the “continued influence effect” suggests that encountering false information affects people’s reasoning even in the face of later retractions (see Lewandowsky et al., 2012 for a review), and that these effects are magnified when false information was initially encountered multiple times (Ecker et al., 2011). Similarly, providing information about whether information sources were credible or uncredible after initial exposure fails to eliminate the illusory truth effect (Begg et al., 1992; Henkel & Mattson, 2011) and receiving feedback about the truth of repeated statements reduces belief in repeated false statements immediately, but not one month later (Brown & Nix, 1996). In sum, people have difficulty retroactively correcting or discounting repeated false information.

Despite this, there are multiple ways that corrections can be made more effective. One approach is simply through repetition itself; repeated retractions are more effective than single retractions at reducing the influence of repeated exposure to false information (Ecker et al., 2011). A second is by providing details of why the information is wrong, rather than simply stating that it is wrong (Ecker, O’Reilly, Reid, & Chang, 2020; Swire, Ecker, & Lewandowsky, 2017). Finally, corrections are more effective when they encourage people to recollect both the inaccurate and accurate information. For instance, corrections of false information are more effective when they

explicitly repeat the false information being refuted (Ecker, Hogan, & Lewandowsky, 2017; Swire-Thompson et al., 2020), and refutations of repeated advertising claims are more effective when they include elements that remind people of the repeated claim (e.g., a logo; Johar & Roggeveen, 2007).

4.2.2 Delay between repetitions

Repetition of false information increases perceived truth when the repetitions are separated by as little as a few minutes (Fazio & Sherry, 2020) to as long as three weeks (Bacon, 1979) or a month (Brown & Nix, 1996), suggesting that the processes mediating these effects of repetition are robust over a variety of timescales. While early experimental (Gigerenzer, 1984) and meta-analytic (Dechêne et al., 2010) evidence suggested that the timing of the repetitions does not affect this illusory truth effect, recent evidence suggests that these effects do diminish in size from immediate to day-long, week-long, and month-long delays (Henderson, Simons, & Barr, 2021).

In cases where effortfully recalling the originally encountered information is critical, timing plays an even larger role. For example, shortly after encountering a statement, people rate direct contradictions as less true, but, one week later, rate them as more true (Garcia-Marques, Silva, Reber, & Unkelbach, 2015). Similarly, when older adults repeatedly hear labelled false claims, they believe the claim less than novel claims on immediate tests, but more after three days (Skurnik et al., 2005), and younger adults demonstrate similar patterns over a month-long delay (Brown & Nix, 1996). Thus, when repetitions are close together, the ability to explicitly remember that a claim was previously disputed may counteract the effects of repetition. With time, however, this ability fades, leaving only the influence of repetition on belief described above.

4.3 Differences at response

In typical illusory truth studies, most differences at the time of judgement relate to the measurement of belief (e.g., even vs odd Likert scales); these will be examined in the Measurement section below. However, some work has examined other variations during the final belief responses. For instance, unlike warnings prior to initial exposure, providing general warnings that some to-be-rated claims may be false does not alter the effects of repetition (Jalbert et al., 2020). Similarly, providing item-by-item credibility information during the test (e.g., by saying a to-be-rated claim comes from a source that is correct 50% of the time) affects people's judgements, but it does not alter the effects of repetition. Statements from 70% credible sources are believed more than statements from 50% credible sources, but statements from both sources show an equivalent increase in perceived

truth due to repetition (Unkelbach & Greifeneder, 2018). More promisingly, warning people about the effects of repetition on belief right before truth judgements can reduce (though not eliminate) the illusory truth effect (Calio, Nadarevic, & Musch, 2020; Nadarevic & Aßfalg, 2017). In sum, the effects of repetition on belief may be attenuated by some response conditions (i.e., providing warnings about the effect itself) but not others (i.e., general warnings about the possible presence of false information, presence of information regarding source credibility), though current evidence is limited. Judgements of truth are constructed in the moment on the basis of various cues (see Brashier & Marsh, 2020 for a review), so identifying contextual factors that may influence how repetition-based cues are integrated into these judgements is a promising area for future work.

4.4 Summary

Differences in how people encounter and later respond to false information have the greatest influence on the effects of repetition, likely because such manipulations directly elicit varied processing of the repeated information. Encountering false information with well-constructed “false” labels, encountering effective corrective messaging, and processing information more critically can combat the otherwise harmful effects of repetition of false information. By contrast, factors that increase the strength of repetition-induced cues (such as encountering multiple repetitions and deeper, but uncritical, processing) can compound the effect. Finally, other factors such as the passage of time since exposure, the medium through which the information is conveyed, and even information regarding the credibility of the source have little to no effect, speaking to the relative robustness of the effects of repetition on perceived truth in people’s lives. Overall, the key areas in need of further attention include better characterization of the role of source variability, excessive numbers of repetitions, and differences in response conditions in shaping the effects of repetition on belief.

5. MEASUREMENT

We consider now the fourth vertex on the Theorist’s Tetrahedron—the effects of different ways of measuring belief. In addition to variation in how belief is measured, we also briefly discuss the downstream consequences of repetition on other relevant outcomes.

5.1 Belief-based measures

The effects of repetition on belief are typically measured using some behavioral report of the truth value attributed to presented information, such as perceived truth (e.g., definitely false to

definitely true; Fazio et al., 2015), perceived believability (e.g., not believable to completely believable; DiFonzo et al., 2016), or, perceived credibility (e.g., right to wrong; Koch & Zerback, 2013). While we are not aware of any systematic examinations regarding potential differences in the size of the illusory truth effect across these measures, the presence of illusory truth effects across such a range of measures speaks to the robustness of the effects of repetition on a variety of belief-related judgements. Similarly, the effect occurs when belief is measured dichotomously (i.e., “true” or “not true” Fazio et al., 2019; Fazio & Sherry, 2020) or with multipoint scales with four (Pennycook et al., 2018), six (Fazio, 2020b; Fazio et al., 2015), or nine (DiFonzo et al., 2016) options. However, effect sizes are larger on scales without a neutral midpoint (e.g. 1-6 as opposed to 1-7), suggesting that repetition has larger effects in contexts that preclude indecisiveness (Dechêne et al., 2010).

Other aspects of the test construction are also important. For instance, illusory truth effect sizes are larger when comparing ratings for repeated and new statements in a mixed list (as opposed to comparing ratings on initial and later exposures) (Dechêne et al., 2010). This suggests a comparative component to the illusory truth effect. An increase in perceived truth stems not only from repetition-induced fluency, but also from a comparison between this fluency and an expected baseline. Thus, illusory truth effects often disappear for lists of exclusively repeated statements, where all statements are processed similarly (Dechêne, Stahl, Hansen, & Wänke, 2009).

Additionally, the effects of repetition can be observed not just for verbatim repetitions, but also for paraphrased repetitions. A meta-analysis suggests that the effect sizes are smaller for gist than for verbatim repetitions (Dechêne et al., 2010), but some studies have found no difference (Silva, Garcia-Marques, & Reber, 2017; Toppino & Luipersbeck, 1993). Overall, as the meaning of the repeated information grows more distant from what was originally encountered, the effects of repetition grow weaker. For instance, repetition does not increase perceived truth for different false claims concerning a single repeated product (e.g., reading “The manufacturer of ACE locks requires professional installation to ensure proper functioning” does not increase truth ratings for “ACE locks have hardened iron pins embedded above the keyhole, which make the locks drill-resistant;” Hawkins et al., 2001). Similarly, repetition does not increase belief when the “repeated” statement is modified to be directly contradictory (e.g., reading “The Vatican has the lowest crime rate” does not increase belief in “The Vatican has the highest crime rate”; Unkelbach & Rom, 2017). In fact, for immediate judgements with only minutes between exposures, encountering a statement and then judging its contradiction

results in *decreased* belief, though these effects appear to wear off with longer delays, as people are less able to recollect the exact details of the original statement (Garcia-Marques et al., 2015; Silva et al., 2017).

Finally, belief can also be indexed by other means, such as by asking open-ended questions and measuring the frequency of references to repeatedly encountered false information. In this context too, repeatedly reading false information elicits greater belief in the information than one or no readings (Ecker et al., 2011). Similarly, asking participants a multiple-choice question related to a rumor regarding Obama (i.e., What is Obama's religion?) reveals differences based on repetition of the "Obama-is-a-Muslim" myth (Kim & Kim, 2019). Finally, repeatedly reading stories containing false pieces of trivia increases production of those incorrect answers on later open-ended tests (Marsh, Meade, & Roediger, 2003). Thus, repetition does not only have adverse effects when people are asked to judge encountered false information, but also when people are asked to produce or choose information from among options.

A critical question for future research is the extent to which these different measures reflect a shared, underlying belief representation. The degree to which people rate a statement as "true" and the frequency with which they reference the information when answering an open-ended test question, for example, both provide indication to an external observer of the extent to which people think some information is "true." However, the underlying cognitive processes involved in producing both types of responses may differ, and, similarly, the mechanisms by which repetition affect both outcomes may also differ. Future research should attend to these differences to paint a more complete picture of how repetition influences what people believe.

5.2 Other outcomes

A key area for further research is examining how repetition of false and misleading information influences not just belief in the repeated assertion, but also people's broader attitudes and behavior. Recent work on single encounters with untrustworthy political websites demonstrates that, while such exposure reliably elicits misperceptions and even increases reported intent to vote in an upcoming election, it does not affect attitudes towards the media or political parties (Guess, Lockett, et al., 2020). Similarly, while exposure to fact-checks of claims made by President Trump increases the accuracy of people's factual beliefs, it has little impact on people's attitudes towards Trump himself (Nyhan, Porter, Reifler, & Wood, 2020). However, people's views of political figures may be

more impacted by information about how frequently that person is fact-checked, rather than just exposure to any one fact-check or series of fact-checks (e.g., Agadjanian et al., 2019; Aird, Ecker, Swire, Berinsky, & Lewandowsky, 2018; Swire-Thompson, Ecker, Lewandowsky, & Berinsky, 2020). These findings underscore that researchers should not make assumptions about the connection between specific false beliefs and people's broader attitudes or behaviors. While repetition increases belief in false information, it is unclear what, if anything, these changes in beliefs correspond to in terms of other views or real-world behaviors, such as voting or getting vaccinated.

One example of a real-world consequence of repetition is the decision to share false information with others. In the context of social media, encountering false news headlines five times increases people's willingness to share said headlines relative to those encountered only once, possibly by making such sharing appear more ethically acceptable (Effron & Raj, 2020). These effects may be contingent on the number of repetitions, as similar effects do not appear for information encountered only twice (Fazio, 2020a). However, even such low levels of repetition may interfere with interventions designed to minimize sharing of false news. A simple prompt asking people to explain why a headline is true or false can selectively reduce people's willingness to share false (but not true) headlines, but this prompt is less effective when the headline was previously repeated (Fazio, 2020a). Overall, while the current evidence base is limited, the effects of repetition in this context warrant further study, as sharing behavior itself constitutes a means by which information can then become repeated to others.

5.3 Summary

In sum, the repetition of false information has adverse effects across various measures of belief, including belief rating scales, open-ended questions, and multiple-choice questions. Though the majority of current research has focused on various rating scales. On these rating scales, the effects of repetition are stronger in contexts where the difference between repeated and new information is more salient, and when people are encouraged to avoid indecision. By contrast, these effects become weaker or non-existent as the difference in meaning between the original and judged information grows larger, sketching a limit to the extent to which repetition may boost belief in related information. Finally, more work is needed to characterize how repetition may influence people's views and actions more broadly. One promising direction would be to build on existing research regarding how repetition of information influences sharing of the information.

6. CONCLUSION

In general, repetition increases belief in false information. Research from cognitive, social and developmental psychology, political science, and communication all support this general pattern. However, as shown in Figure 8, there are factors that increase or decrease the effects of repetition on belief. The factors on top such as deep, but uncritical, processing and multiple repetitions all increase these effects, while the factors below such as an initial focus on accuracy and corrective messaging can decrease the effects of repetition on belief. Overall, there is a clear pattern where the type of cognitive processing is most important, not the type of information or the medium through which it is presented (the oval at the bottom). When people rely on peripheral cues for truth such as familiarity and fluency, they are more susceptible to believing false information, particularly when that information is repeated. In contrast, when people rely on effortful cues like remembering the original context of the claim (e.g., as coming from an unreliable voice) or consulting their prior knowledge, the negative effects of repetition are lessened.

Figure 8. Factors that have been shown to influence how repetition affects belief. Factors that have been shown to heighten the effects of repetition on belief in information are listed above, and factors that have been shown to reduce these effects are listed below the time course of repeated exposure. Factors for which there is no evidence of impact are in the oval at the bottom.

We hope that researchers interested in the effects of repetition will focus on two areas moving forward. The first is to examine how these effects occur in more naturalistic settings. There is a clear need to better understand how belief is shaped by larger numbers of repetition and more naturalistic presentations. We also know little about the cognitive processes involved in the repetition of general ideas or themes rather than verbatim statements. For example, people in the United States are often exposed to false narratives connecting immigrants with higher crime rates, but rarely is the exact same story or statement repeated. It is important to understand how repetitions of these broader themes affect belief. We also know relatively little about how the trustworthiness of the source affects the impact of repetition on belief. The general public often believes that they can ignore repeated falsehoods if they are from an untrustworthy source, but current evidence suggests that may not be the case. We need more research examining the interaction of source and belief. Finally, we know little about the downstream consequences of repetition for people's thoughts and actions in real-world settings. While it is of course noteworthy that repetition may strongly mislead people about a political candidate's record, we also need to know how that repetition may eventually impact whether people vote for that candidate or their party. More work is needed on this front.

The second area is to further explore areas of conflict between different fields and literatures. For example, cognitive psychologists often ignore the social factors underlying belief, but research on children's susceptibility to repeated questions indicates that these social pressures can play a large role in what people come to believe is true. In addition, we see contrasting findings across fields in the role of message valence, prior beliefs, and motivated reasoning. For example, research from cognitive psychology suggests that repetition increases belief equally for happy and sad false trivia statements (Unkelbach et al., 2011), but work from political communication suggests that the repetition of falsehoods within negative political messages can eventually decrease belief (Ernst et al., 2017). We need more crosstalk between disciplines to better understand how misinformation is affecting society and the role of repetition in increasing belief in false information.

Funding Information

This material is based upon work supported by the National Science Foundation Graduate Research Fellowship Program under Grant No. 1937963 to Raunak Pillai. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Acknowledgments

The authors would like to thank the Vanderbilt University Research on Individuals, Politics and Society group for helpful comments on an earlier version of this manuscript. The authors declare no conflicts of interest.

Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Notes

1. For an relevant, up-to-date consensus guide on how a single exposure to false information may affect people's beliefs, we recommend The Debunking Handbook 2020 (Lewandowsky et al., 2020).
2. See Marsh, Butler, & Umanath (2012) for another example of a review driven by Jenkin's model.
3. Fazio & Sherry (2020) was designed to detect if repetition affected truth judgments within each age group, but is underpowered for comparing the size of the effect across age groups.
4. Schnuerch, Nadarevic, & Rouder (2020) recently reported that a small subset of participants may exhibit a "negative" illusory truth effect, consistently rating repeated statements as less "true." However, it currently remains unclear what factors distinguish these individuals or what processes may be involved in such an effect.
5. For a discussion of a number of other experimental factors that moderate the effects of repetition on belief in illusory truth studies (e.g., presentation time, proportion of items repeated) we recommend the meta-analysis by Dechêne et al. (2010).

6. The benefits of initially assessing accuracy in reducing the effects of repetition on belief have also been demonstrated for true and false statements about recently learned fictional beings (Gilbert, Krull, & Malone, 1990, Experiment 3). However, in educational settings, initially assessing the accuracy of information on true-false and multiple choice tests fails to eliminate the illusory truth effect (Toppino & Brochin, 1989; Toppino & Luipersbeck, 1993).

References

- Agadjanian, A., Bakhru, N., Chi, V., Greenberg, D., Hollander, B., Hurt, A., ... Woodruff, A. (2019). Counting the Pinocchios: The effect of summary fact-checking data on perceived accuracy and favorability of politicians. *Research & Politics*, 6(3), 1–10.
<https://doi.org/10.1177/2053168019870351>
- Aird, M. J., Ecker, U. K., Swire, B., Berinsky, A. J., & Lewandowsky, S. (2018). Does truth matter to voters? The effects of correcting political misinformation in an Australian sample. *Royal Society Open Science*, 5(12), 180593. <http://dx.doi.org/10.1098/rsos.180593>
- Allport, F. H., & Lepkin, M. (1945). Wartime rumors of waste and special privilege: Why some people believe them. *The Journal of Abnormal and Social Psychology*, 40(1), 3–36.
<https://doi.org/10.1037/h0058110>
- Alter, A. L., & Oppenheimer, D. M. (2009). Uniting the tribes of fluency to form a metacognitive nation. *Personality and Social Psychology Review*, 13(3), 219–235.
<https://doi.org/10.1177/1088868309341564>
- Arkes, H. R., Boehm, L. E., & Xu, G. (1991). Determinants of judged validity. *Journal of Experimental Social Psychology*, 27(6), 576–605. [https://doi.org/10.1016/0022-1031\(91\)90026-3](https://doi.org/10.1016/0022-1031(91)90026-3)
- Arkes, H. R., Hackett, C., & Boehm, L. (1989). The generality of the relation between familiarity and judged validity. *Journal of Behavioral Decision Making*, 2(2), 81–94.
<https://doi.org/10.1002/bdm.3960020203>
- Bacon, F. T. (1979). Credibility of repeated statements: Memory for trivia. *Journal of Experimental Psychology: Human Learning and Memory*, 5(3), 241–252. <https://doi.org/10.1037/0278-7393.5.3.241>
- Begg, I. M., Anas, A., & Farinacci, S. (1992). Dissociation of processes in belief: Source recollection, statement familiarity, and the illusion of truth. 121(4), 446–458. <https://doi.org/10.1037/0096-3445.121.4.446>
- Berinsky, A. J. (2017). Rumors and health care reform: Experiments in political misinformation. *British Journal of Political Science*, 47(2), 241–262. <https://doi.org/10.1017/S0007123415000186>
- Boehm, L. E. (1994). The validity effect: A search for mediating variables. *Personality and Social Psychology Bulletin*, 20(3), 285–293. <https://doi.org/10.1177/0146167294203006>

- Brashier, N. M., Eliseev, E. D., & Marsh, E. J. (2020). An initial accuracy focus prevents illusory truth. *Cognition*, 194, 104054. <https://doi.org/10.1016/j.cognition.2019.104054>
- Brashier, N. M., & Marsh, E. J. (2020). Judging truth. *Annual Review of Psychology*, 71, 499–515. <https://doi.org/10.1146/annurev-psych-010419-050807>
- Brashier, N. M., Umanath, S., Cabeza, R., & Marsh, E. J. (2017). Competing cues: Older adults rely on knowledge in the face of fluency. *Psychology and Aging*, 32(4), 331–337. <https://doi.org/10.1037/pag0000156>
- Braun-LaTour, K. A., Grinley, M. J., & Loftus, E. F. (2006). Tourist memory distortion. *Journal of Travel Research*, 44(4), 360–367. <https://doi.org/10.1177/0047287506286721>
- Brewer, W. F. (1977). Memory for the pragmatic implications of sentences. *Memory & Cognition*, 5(6), 673–678. <https://doi.org/10.3758/BF03197414>
- Brown, A. S., & Nix, L. A. (1996). Turning lies into truths: Referential validation of falsehoods. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 22(5), 1088–1100. <https://doi.org/10.1037/0278-7393.22.5.1088>
- Browning, K., & Alba, D. (2020, October 29). “Tsunamis of Misinformation” Overwhelm Local Election Officials. *New York Times*. Retrieved from <https://www.nytimes.com/2020/10/29/technology/misinformation-local-election-officials.html>
- Brumback, K., & Joffe-Block, J. (2020, November 6). Georgia poll worker in hiding after false claims online. *Associated Press*. Retrieved from <https://apnews.com/article/fact-check-georgia-poll-worker-in-hiding-aa0f256ec21de96fd5a41da703c4b443>
- Cacioppo, J. T., & Petty, R. E. (1989). Effects of message repetition on argument processing, recall, and persuasion. *Basic and Applied Social Psychology*, 10(1), 3–12. https://doi.org/10.1207/s15324834basp1001_2
- Calio, F., Nadarevic, L., & Musch, J. (2020). How explicit warnings reduce the truth effect: A multinomial modeling approach. *Acta Psychologica*, 211, 103185. <https://doi.org/10.1016/j.actpsy.2020.103185>
- Cassel, W. S., Roebbers, C. E., & Bjorklund, D. F. (1996). Developmental patterns of eyewitness responses to repeated and increasingly suggestive questions. *Journal of Experimental Child Psychology*, 61(2), 116–133. <https://doi.org/10.1006/jecp.1996.0008>

- Clayton, K., Blair, S., Busam, J. A., Forstner, S., Glance, J., Green, G., ... Nyhan, B. (2020). Real Solutions for Fake News? Measuring the Effectiveness of General Warnings and Fact-Check Tags in Reducing Belief in False Stories on Social Media. *Political Behavior*, 42(4), 1073–1095. <https://doi.org/10.1007/s11109-019-09533-0>
- Craik, F. I. M. (2002). Levels of processing: Past, present... And future? *Memory*, 10(5–6), 305–318. <https://doi.org/10.1080/09658210244000135>
- Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior*, 11(6), 671–684. [https://doi.org/10.1016/S0022-5371\(72\)80001-X](https://doi.org/10.1016/S0022-5371(72)80001-X)
- Damasio, A. R. (2000). Thinking about belief: Concluding remarks. In D. L. Schacter & E. Scarry (Eds.), *Memory, brain, and belief* (pp. 325–333). Cambridge, MA: Harvard University Press.
- De keersmaecker, J., Dunning, D., Pennycook, G., Rand, D. G., Sanchez, C., Unkelbach, C., & Roets, A. (2020). Investigating the robustness of the illusory truth effect across individual differences in cognitive ability, need for cognitive closure, and cognitive style. *Personality and Social Psychology Bulletin*, 46(2), 204–215. <https://doi.org/10.1177/0146167219853844>
- Dechêne, A., Stahl, C., Hansen, J., & Wänke, M. (2009). Mix me a list: Context moderates the truth effect and the mere-exposure effect. *Journal of Experimental Social Psychology*, 45(5), 1117–1122. <https://doi.org/10.1016/j.jesp.2009.06.019>
- Dechêne, A., Stahl, C., Hansen, J., & Wänke, M. (2010). The truth about the truth: A meta-analytic review of the truth effect. *Personality and Social Psychology Review*, 14(2), 238–257. <https://doi.org/10.1177/1088868309352251>
- DiFonzo, N., Beckstead, J. W., Stupak, N., & Walders, K. (2016). Validity judgments of rumors heard multiple times: The shape of the truth effect. *Social Influence*, 11(1), 22–39. <https://doi.org/10.1080/15534510.2015.1137224>
- Ecker, U. K. H., Hogan, J. L., & Lewandowsky, S. (2017). Reminders and repetition of misinformation: Helping or hindering its retraction? *Journal of Applied Research in Memory and Cognition*, 6(2), 185–192. <https://doi.org/10.1016/j.jarmac.2017.01.014>
- Ecker, U. K. H., Lewandowsky, S., & Chadwick, M. (2020). Can corrections spread misinformation to new audiences? Testing for the elusive familiarity backfire effect. *Cognitive Research: Principles and Implications*, 5(1), 41. <https://doi.org/10.1186/s41235-020-00241-6>

- Ecker, U. K. H., Lewandowsky, S., Swire, B., & Chang, D. (2011). Correcting false information in memory: Manipulating the strength of misinformation encoding and its retraction. *Psychonomic Bulletin & Review*, 18(3), 570–578. <https://doi.org/10.3758/s13423-011-0065-1>
- Ecker, U. K. H., O'Reilly, Z., Reid, J. S., & Chang, E. P. (2020). The effectiveness of short-format refutational fact-checks. *British Journal of Psychology*, 111(1), 36–54. <https://doi.org/10.1111/bjop.12383>
- Effron, D. A., & Raj, M. (2020). Misinformation and morality: Encountering fake-news headlines makes them seem less unethical to publish and share. *Psychological Science*, 31(1), 75–87. <https://doi.org/10.1177/0956797619887896>
- Ernst, N., Kühne, R., & Wirth, W. (2017). Effects of message repetition and negativity on credibility judgments and political attitudes. *International Journal of Communication*, 11, 3265–3285.
- Fazio, L. K. (2020a). Pausing to consider why a headline is true or false can help reduce the sharing of false news. *Harvard Kennedy School Misinformation Review*, 1(2). <https://doi.org/10.37016/mr-2020-009>
- Fazio, L. K. (2020b). Repetition increases perceived truth even for known falsehoods. *Collabra: Psychology*, 6(1), 38. <https://doi.org/10.1525/collabra.347>
- Fazio, L. K., Brashier, N. M., Payne, B. K., & Marsh, E. J. (2015). Knowledge does not protect against illusory truth. *Journal of Experimental Psychology: General*, 144(5), 993–1002. <https://doi.org/10.1037/xge0000098>
- Fazio, L. K., Rand, D. G., & Pennycook, G. (2019). Repetition increases perceived truth equally for plausible and implausible statements. *Psychonomic Bulletin & Review*, 26(5), 1705–1710. <https://doi.org/10.3758/s13423-019-01651-4>
- Fazio, L. K., & Sherry, C. L. (2020). The effect of repetition on truth judgments across development. *Psychological Science*, 31(9), 1150–1160. <https://doi.org/10.1177/0956797620939534>
- Fernandes, J. (2013). Effects of negative political advertising and message repetition on candidate evaluation. *Mass Communication and Society*, 16(2), 268–291. <https://doi.org/10.1080/15205436.2012.672615>
- Foster, J. L., Huthwaite, T., Yesberg, J. A., Garry, M., & Loftus, E. F. (2012). Repetition, not number of sources, increases both susceptibility to misinformation and confidence in the accuracy of

- eyewitnesses. *Acta Psychologica*, 139(2), 320–326.
<https://doi.org/10.1016/j.actpsy.2011.12.004>
- Fragale, A. R., & Heath, C. (2004). Evolving informational credentials: The (mis)attribution of believable facts to credible sources. *Personality and Social Psychology Bulletin*, 30(2), 225–236. <https://doi.org/10.1177/0146167203259933>
- Garcia-Marques, T., & Mackie, D. M. (2001). The feeling of familiarity as a regulator of persuasive processing. *Social Cognition*, 19(1), 9–34. <https://doi.org/10.1521/soco.19.1.9.18959>
- Garcia-Marques, T., Silva, R. R., Reber, R., & Unkelbach, C. (2015). Hearing a statement now and believing the opposite later. *Journal of Experimental Social Psychology*, 56, 126–129.
<https://doi.org/10.1016/j.jesp.2014.09.015>
- Gigerenzer, G. (1984). External validity of laboratory experiments: The frequency-validity relationship. *The American Journal of Psychology*, 97(2), 185–195. <https://doi.org/10.2307/1422594>
- Gilbert, D. T., Krull, D. S., & Malone, P. S. (1990). Unbelieving the unbelievable: Some problems in the rejection of false information. *Journal of Personality and Social Psychology*, 59(4), 601–613.
- Greenhill, K. M., & Oppenheim, B. (2017). Rumor has it: The adoption of unverified information in conflict zones. *International Studies Quarterly*, 61(3), 660–676.
<https://doi.org/10.1093/isq/sqx015>
- Guess, A. M., Lockett, D., Lyons, B., Montgomery, J. M., Nyhan, B., & Reifler, J. (2020). “Fake news” may have limited effects on political participation beyond increasing beliefs in false claims. *Harvard Kennedy School Misinformation Review*, 1(1). <https://doi.org/10.37016/mr-2020-004>
- Guess, A. M., Nyhan, B., & Reifler, J. (2020). Exposure to untrustworthy websites in the 2016 US election. *Nature Human Behaviour*, 4(5), 472–480. <https://doi.org/10.1038/s41562-020-0833-x>
- Hasher, L., Goldstein, D., & Toppino, T. (1977). Frequency and the conference of referential validity. *Journal of Verbal Learning and Verbal Behavior*, 16(1), 107–112.
[https://doi.org/10.1016/S0022-5371\(77\)80012-1](https://doi.org/10.1016/S0022-5371(77)80012-1)
- Hassan, A., & Barber, S. J. (2021). The effects of repetition frequency on the illusory truth effect. *Cognitive Research: Principles and Implications*, 6(1), 6–38. <https://doi.org/10.1186/s41235-021-00301-5>

- Hawkins, S. A., & Hoch, S. J. (1992). Low-involvement learning: Memory without evaluation. *Journal of Consumer Research*, 19(2), 212–225. <https://doi.org/10.1086/209297>
- Hawkins, S. A., Hoch, S. J., & Meyers-Levy, J. (2001). Low-involvement learning: Repetition and coherence in familiarity and belief. *Journal of Consumer Psychology*, 11(1), 1–11. https://doi.org/10.1207/S15327663JCP1101_1
- Henderson, E. L., Simons, D. J., & Barr, D. J. (2021). The trajectory of truth: A longitudinal study of the illusory truth effect. *Journal of Cognition*, 4(1), 1–23. <https://doi.org/10.5334/joc.161>
- Henkel, L. A., & Mattson, M. E. (2011). Reading is believing: The truth effect and source credibility. *Consciousness and Cognition*, 20(4), 1705–1721. <https://doi.org/10.1016/j.concog.2011.08.018>
- Holliday, R. E., Douglas, K. M., & Hayes, B. K. (1999). Children's eyewitness suggestibility: Memory trace strength revisited. *Cognitive Development*, 14(3), 443–462. <https://doi.org/10.1002/acp.973>
- Howie, P., Kurukulasuriya, N., Nash, L., & Marsh, A. (2009). Inconsistencies in children's recall of witnessed events: The role of age, question format and perceived reason for question repetition. *Legal and Criminological Psychology*, 14(2), 311–329. <https://doi.org/10.1348/135532508X383879>
- Jalbert, M., Newman, E., & Schwarz, N. (2020). Only half of what i'll tell you is true: Expecting to encounter falsehoods reduces illusory truth. *Journal of Applied Research in Memory and Cognition*, 9(4), 602–613. <https://doi.org/10.1016/j.jarmac.2020.08.010>
- Jenkins, J. J. (1979). Four points to remember: A tetrahedral model of memory experiments. In L. S. Cermak & F. I. M. Craik (Eds.), *Levels of Processing in Human Memory* (pp. 429–446). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Johar, G. V., & Roggeveen, A. L. (2007). Changing false beliefs from repeated advertising: The role of claim-refutation alignment. *Journal of Consumer Psychology*, 17(2), 118–127. [https://doi.org/10.1016/S1057-7408\(07\)70018-9](https://doi.org/10.1016/S1057-7408(07)70018-9)
- Kim, J. W., & Kim, E. (2019). Identifying the effect of political rumor diffusion using variations in survey timing. *Quarterly Journal of Political Science*, 14(3), 293–311. <https://doi.org/10.1561/100.00017138>

- Koch, T., & Zerback, T. (2013). Helpful or harmful? How frequent repetition affects perceived statement credibility. *Journal of Communication*, 63(6), 993–1010.
<https://doi.org/10.1111/jcom.12063>
- Koriat, A., & Goldsmith, M. (1996). Monitoring and control processes in the strategic regulation of memory accuracy. *Psychological Review*, 103(3), 490–517.
- Lewandowsky, S., Cook, J., Ecker, U., Albarracín, D., Amazeen, M. A., Kendeou, P., ... Zaragoza, M. S. (2020). *The Debunking Handbook 2020*. <https://doi.org/10.17910/b7.1182>
- Lewandowsky, S., Ecker, U. K. H., Seifert, C. M., Schwarz, N., & Cook, J. (2012). Misinformation and its correction: Continued influence and successful debiasing. *Psychological Science in the Public Interest*, 13(3), 106–131. <https://doi.org/10.1177/1529100612451018>
- Marsh, E. J., Butler, A. C., & Umanath, S. (2012). Using fictional sources in the classroom: Applications from cognitive psychology. *Educational Psychology Review*, 24(3), 449–469.
<https://doi.org/10.1007/s10648-012-9204-0>
- Marsh, E. J., Meade, M. L., & Roediger, H. L., III. (2003). Learning facts from fiction. *Journal of Memory and Language*, 49(4), 519–536. [https://doi.org/10.1016/S0749-596X\(03\)00092-5](https://doi.org/10.1016/S0749-596X(03)00092-5)
- McDermott, K. B., & Chan, J. C. K. (2006). Effects of repetition on memory for pragmatic inferences. *Memory & Cognition*, 34(6), 1273–1284. <https://doi.org/10.3758/BF03193271>
- Miller, R. L. (1976). Mere exposure, psychological reactance and attitude change. *Public Opinion Quarterly*, 40(2), 229–233. <https://doi.org/10.1086/268290>
- Moons, W. G., Mackie, D. M., & Garcia-Marques, T. (2009). The impact of repetition-induced familiarity on agreement with weak and strong arguments. *Journal of Personality and Social Psychology*, 96(1), 32–44. <https://doi.org/10.1037/a0013461>
- Nadarevic, L., & Aßfalg, A. (2017). Unveiling the truth: Warnings reduce the repetition-based truth effect. *Psychological Research*, 81(4), 814–826. <https://doi.org/10.1007/s00426-016-0777-y>
- Newman, Eryn. J., Jalbert, M. C., Schwarz, N., & Ly, D. P. (2020). Truthiness, the illusory truth effect, and the role of need for cognition. *Consciousness and Cognition*, 78, 102866.
<https://doi.org/10.1016/j.concog.2019.102866>
- Nyhan, B., Porter, E., Reifler, J., & Wood, T. J. (2020). Taking fact-checks literally but not seriously? The effects of journalistic fact-checking on factual beliefs and candidate favorability. *Political Behavior*, 42, 939–960. <https://doi.org/10.1007/s11109-019-09528-x>

- Paivio, A., & Csapo, K. (1973). Picture superiority in free recall: Imagery or dual coding? *Cognitive Psychology*, 5(2), 176–206. [https://doi.org/10.1016/0010-0285\(73\)90032-7](https://doi.org/10.1016/0010-0285(73)90032-7)
- Park, D. C. (2000). The basic mechanisms accounting for age-related decline in cognitive function. In D. C. Park & N. Schwarz (Eds.), *Cognitive aging: A primer* (pp. 3–21). Philadelphia: Psychology Press.
- Pennycook, G., Cannon, T. D., & Rand, D. G. (2018). Implausibility and illusory truth: Prior exposure increases perceived accuracy of fake news but has no effect on entirely implausible statements. *Journal of Experimental Psychology: General*, 147(12), 1865–1880.
- Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 19, pp. 123–205). New York: Academic Press.
- Polage, D. C. (2012). Making up history: False memories of fake news stories. *Europe's Journal of Psychology*, 8(2), 245–250. <https://doi.org/10.5964/ejop.v8i2.456>
- Poole, D. A., & White, L. T. (1991). Effects of question repetition on the eyewitness testimony of children and adults. *Developmental Psychology*, 27(6), 975–986. <https://doi.org/10.1037/0012-1649.27.6.975>
- Reber, R., & Schwarz, N. (1999). Effects of perceptual fluency on judgments of truth. *Consciousness and Cognition*, 8(3), 338–342. <https://doi.org/10.1006/ccog.1999.0386>
- Reinhard, M.-A., Schindler, S., Raabe, V., Stahlberg, D., & Messner, M. (2014). Less is sometimes more: How repetition of an antismoking advertisement affects attitudes toward smoking and source credibility. *Social Influence*, 9(2), 116–132. <https://doi.org/10.1080/15534510.2013.790839>
- Roggeveen, A. L., & Johar, G. V. (2002). Perceived source variability versus familiarity: Testing competing explanations for the truth effect. *Journal of Consumer Psychology*, 12(2), 81–91. https://doi.org/10.1207/S15327663JCP1202_02
- Salthouse, T. A. (2019). Trajectories of normal cognitive aging. *Psychology and Aging*, 34(1), 17–24. <http://dx.doi.org/10.1037/pag0000288>
- Schacter, D. L. (2000). Introduction. In D. L. Schacter & E. Scarry (Eds.), *Memory, brain, and belief* (pp. 1–10). Cambridge, MA: Harvard University Press.

- Schnuerch, M., Nadarevic, L., & Rouder, J. N. (2020). The truth revisited: Bayesian analysis of individual differences in the truth effect. *Psychonomic Bulletin & Review*.
<https://doi.org/10.3758/s13423-020-01814-8>
- Silva, R. R., Garcia-Marques, T., & Reber, R. (2017). The informative value of type of repetition: Perceptual and conceptual fluency influences on judgments of truth. *Consciousness and Cognition*, 51, 53–67. <https://doi.org/10.1016/j.concog.2017.02.016>
- Skurnik, I., Yoon, C., Park, D. C., & Schwarz, N. (2005). How warnings about false claims become recommendations. *Journal of Consumer Research*, 31(4), 713–724.
<https://doi.org/10.1086/426605>
- Spencer, W. D., & Raz, N. (1995). Differential effects of aging on memory for content and context: A meta-analysis. *Psychology and Aging*, 10(4), 527–539. <https://doi.org/10.1037/0882-7974.10.4.527>
- Spring, M. (2020, May 27). Coronavirus: The human cost of virus misinformation. *BBC News*. Retrieved from <https://www.bbc.com/news/stories-52731624>
- Swire, B., Ecker, U. K. H., & Lewandowsky, S. (2017). The role of familiarity in correcting inaccurate information. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 43(12), 1948–1961. <https://doi.org/10.1037/xlm0000422>
- Swire-Thompson, B., DeGutis, J., & Lazer, D. (2020). Searching for the backfire effect: Measurement and design considerations. *Journal of Applied Research in Memory and Cognition*. Advance online publication. <https://doi.org/10.1016/j.jarmac.2020.06.006>
- Swire-Thompson, B., Ecker, U. K. H., Lewandowsky, S., & Berinsky, A. J. (2020). They Might Be a Liar But They're My Liar: Source Evaluation and the Prevalence of Misinformation. *Political Psychology*, 41(1), 21–34. <https://doi.org/10.1111/pops.12586>
- Taber, C. S., & Lodge, M. (2006). Motivated skepticism in the evaluation of political beliefs. *American Journal of Political Science*, 50(3), 755–769. <https://doi.org/10.1111/j.1540-5907.2006.00214.x>
- Thomas, A. K., & Loftus, E. F. (2002). Creating bizarre false memories through imagination. *Memory & Cognition*, 30(3), 423–431. <https://doi.org/10.3758/BF03194942>

- Toppino, T. C., & Brochin, H. A. (1989). Learning from tests: The case of true-false examinations. *The Journal of Educational Research*, 83(2), 119–124.
<https://doi.org/10.1080/00220671.1989.10885940>
- Toppino, T. C., & Luipersbeck, S. M. (1993). Generality of the negative suggestion effect in objective tests. *The Journal of Educational Research*, 86(6), 357–362.
<https://doi.org/10.1080/00220671.1993.9941229>
- Unkelbach, C., Bayer, M., Alves, H., Koch, A., & Stahl, C. (2011). Fluency and positivity as possible causes of the truth effect. *Consciousness and Cognition*, 20(3), 594–602.
<https://doi.org/10.1016/j.concog.2010.09.015>
- Unkelbach, C., & Greifeneder, R. (2018). Experiential fluency and declarative advice jointly inform judgments of truth. *Journal of Experimental Social Psychology*, 79, 78–86.
<https://doi.org/10.1016/j.jesp.2018.06.010>
- Unkelbach, C., Koch, A., Silva, R. R., & Garcia-Marques, T. (2019). Truth by repetition: Explanations and implications. *Current Directions in Psychological Science*, 28(3), 247–253.
<https://doi.org/10.1177/0963721419827854>
- Unkelbach, C., & Rom, S. C. (2017). A referential theory of the repetition-induced truth effect. *Cognition*, 160, 110–126. <https://doi.org/10.1016/j.cognition.2016.12.016>
- Unkelbach, C., & Speckmann, F. (2021). Mere Repetition Increases Belief in Factually True COVID-19-Related Information. *Journal of Applied Research in Memory and Cognition*, S2211368121000085. <https://doi.org/10.1016/j.jarmac.2021.02.001>
- Unkelbach, C., & Stahl, C. (2009). A multinomial modeling approach to dissociate different components of the truth effect. *Consciousness and Cognition*, 18(1), 22–38.
<https://doi.org/10.1016/j.concog.2008.09.006>
- Washington Post Fact Checker. (2020). Tracking all of President Trump's false or misleading claims. *The Washington Post*. Retrieved from
<https://www.washingtonpost.com/graphics/politics/trump-claims-database/>
- Weaver, K., Garcia, S. M., Schwarz, N., & Miller, D. T. (2007). Inferring the popularity of an opinion from its familiarity: A repetitive voice can sound like a chorus. *Journal of Personality and Social Psychology*, 92(5), 821–833. <https://doi.org/10.1037/0022-3514.92.5.821>

Williamson, E. (2021, January 27). Rioters Followed a Long Conspiratorial Road to the Capitol. *New York Times*. Retrieved from <https://www.nytimes.com/2021/01/27/us/politics/capitol-riot-conspiracies.html>