Cognition 242 (2024) 105651

Contents lists available at ScienceDirect

Cognition

journal homepage: www.elsevier.com/locate/cognit

People underestimate the influence of repetition on truth judgments (and more so for themselves than for others)

Simone Mattavelli [a,b,*], Jérémy Béna [c,d], Olivier Corneille [c], Christian Unkelbach [e]

[a] University of Milano-Bicocca, Italy
[b] Vita-Salute San Raffaele University, Italy
[c] UCLouvain, Belgium
[d] Aix-Marseille Université, France
[e] University of Cologne, Germany

ARTICLE INFO

Keywords:
Truth judgments
Truth effect
Repetition
Beliefs
bias blind spot

ABSTRACT

People judge repeated statements as more truthful than new statements: a truth effect. In three pre-registered experiments ($N = 463$), we examined whether people expect repetition to influence truth judgments more for others than for themselves: a bias blind spot in the truth effect. In Experiments 1 and 2, using moderately plausible and implausible statements, respectively, the test for the bias blind spot did not pass the significance threshold set for a two-step sequential analysis. Experiment 3 considered moderately plausible statements but with a larger sample of participants. Additionally, it compared actual performance after a two-day delay with participants' predictions for themselves and others. This time, we found clear evidence for a bias blind spot in the truth effect. Experiment 3 also showed that participants underestimated the magnitude of the truth effect, especially so for themselves, and that predictions and actual truth effect scores were not significantly related. Finally, an integrative analysis focusing on a more conservative between-participant approach found clear frequentist and Bayesian evidence for a bias blind spot. Overall, the results indicate that people (1) hold beliefs about the effect of repetition on truth judgments, (2) believe that this effect is larger for others than for themselves, (3) and underestimate the effect's magnitude, and (4) particularly so for themselves.

1. Introduction

People judge statements they have been exposed to as more truthful than new statements. This "truth effect" is a robust phenomenon (Hasher, Goldstein, & Toppino, 1977; for meta-analysis, see Dechêne, Stahl, Hansen, & Wänke, 2010). This effect is of theoretical and applied relevance. In particular, repeated exposure may increase beliefs in fake news (Pennycook, Cannon, & Rand, 2018) and other forms of misinformation (see Pillai & Fazio, 2021 for a review). Remarkably, the truth effect persists under adverse conditions. It has been found for incentivized truth judgments (Brashier & Rand, 2021; Speckmann & Unkelbach, 2021), when participants are warned about the truth effect and asked to prevent it (Calio, Nadarevic, & Musch, 2020; Nadarevic & Aßfalg, 2017), and even for highly implausible statements (Lacassagne, Béna, & Corneille, 2022).

Here, we examined whether people expect repetition to influence truth judgments more for others than for themselves (see De Keersmaecker, Schmid, Brashier, & Unkelbach, 2022). This possibility is consistent with the literature on the bias blind spot (e.g., Pronin and Kugler, 2007; Pronin, Lin, & Ross, 2002; Scopelliti et al., 2015; West, Meserve, & Stanovich, 2012). Besides this comparative question (i.e., self vs. other), we also examined how people's predictions depart from the actual effect of repetition on their truth judgments. In particular, people may underestimate how much repetition influences truth judgments, and this underestimation may or may not be larger when they make predictions about themselves than predictions about others.

If the truth effect contributes to the endorsement of misinformation (Pennycook et al., 2018; Pillai & Fazio, 2021), raising people's awareness of their susceptibility to this effect may help to mitigate the endorsement of misinformation (e.g., Nadarevic & Aßfalg, 2017). However, this requires an accurate assessment of the influence's strength. To draw an imperfect analogy, just as people need to acknowledge their prejudice to overcome it, people may need to accurately predict the biasing influence of repetition on their beliefs to resist

* Corresponding author at: University of Milan-Bicocca, Department of Psychology, 1, Piazza dell'Ateneo Nuovo, 20126 Milan, Italy.
E-mail address: simone.mattavelli@unimib.it (S. Mattavelli).

https://doi.org/10.1016/j.cognition.2023.105651
Received 7 April 2023; Received in revised form 7 October 2023; Accepted 14 October 2023
Available online 21 October 2023
0010-0277/

misinformation campaigns involving the repetition of untrustworthy statements.

Below, we first delineate the effect of repetition on truth judgments (i.e., the truth effect) and discuss the bias blind spot. Next, we report three pre-registered experiments in which we asked participants to make predictions about their own vs. others' judgments of truth for statements they were informed would be either repeated or new. Across experiments, we used moderately plausible and implausible statements.We explored (1) whether participants estimate a larger effect of repetition on hypothetical truth judgments for others than themselves (Experiments 1 and 2 – i.e., a bias blind spot), and (2) how individuals' predictions about the effect of repetition for the self vs. other' truth judgments correlate with actual performance (Experiment 3). Finally, we elaborate on the implications of the bias blind spot for unwanted influences on truth judgments.

1.1. The truth effect

The truth effect has been repeatedly found across several domains, and with various types of statements. For instance, repetition increases truth judgments in consumer advertising (Johar & Roggeveen, 2007), social-political opinions (Arkes, Hackett, & Boehm, 1989), rumors (DiFonzo, Beckstead, Stupak, & Walders, 2016), health (Unkelbach & Speckmann, 2021), stereotypes (Oğuz Taşbaş & Unkelbach, 2022), and importantly, both fake news (Pennycook et al., 2018) and conspiratorial statements (Béna, Rihet, Carreras, & Terrier, 2023).

The domain generality of truth effect is consequential for issues related to the spread of misinformation. Past studies have even found the truth effect when participants were explicitly told during the exposure phase that the information was false (Begg, Anas, & Farinacci, 1992; Skurnik, Yoon, Park, & Schwarz, 2005; Henkel & Mattson, 2011; but see Unkelbach & Stahl, 2009, Experiment 2). Interestingly, even declarative information provided at the time of judgment regarding the lack of validity of the statements failed to fully eliminate the truth effect (Unkelbach & Greifeneder, 2018). Also supporting the pervasiveness of this effect, recent studies have shown that factual repetition increases truth perceptions even for statements that are known to be false (Fazio, 2020; Fazio, Brashier, Payne, & Marsh, 2015) or highly implausible (Lacassagne et al., 2022; see also Fazio, Rand, & Pennycook, 2019).

Various explanations exist for the truth effect (for an overview, see Unkelbach, Koch, Silva, & Garcia-Marques, 2019). One explanation is that, in most ecologies, people get to learn that statements that have a greater chance of being repeated happen to be true rather than false statements (see Reber & Unkelbach, 2010; Unkelbach & Greifeneder, 2013). Consistent with this framework, Corneille, Mierop, and Unkelbach (2020) found that in specific ecologies associated with fake news (in their experiments, social media), repeated statements are more often judged as "used as fake news" compared to new statements (see also Béna, Corneille, Mierop, & Unkelbach, 2022). These findings suggest that beliefs about the relationship between repetition and truth play a key role in the truth effect.

In support of the role of beliefs, Bacon (1979) showed that erroneous beliefs regarding the repetition status (i.e., whether a statement is repeated or not), in addition to repetition itself, are associated with higher truth judgments (see also Nadarevic & Erdfelder, 2023). More recently, Mattavelli, Corneille, and Unkelbach (2022) studied the truth effect by dissociating repetition from experience; that is, when statements are merely *instructed* to be repeated vs. new (without actually being repeated or not). Of relevance for the present research, the authors looked at how *instructed* repetition influenced individuals' truth judgments in two different scenarios. In an extra-personal paradigm (Experiments 1–2), participants completed a judgment phase purportedly identical to a phase previously undergone by other participants who were also exposed to half of the statements in an initial exposure phase. Thus, the judgment phase comprised 40 statements, 20 told to be present (repeated) in the exposure phase completed by others, and 20 told to be absent (new) in the same exposure phase. Participants rated the truth of each statement based on what they thought other participants would have done. In an intra-personal paradigm (Experiment 3), the authors tested the effect of instructed repetition on participants' own truth judgments. To dissociate repetition from experience, Mattavelli and colleagues designed an exposure phase with 20 statements introduced as unreadable. Next, in the judgment phase, participants were presented with 20 (repeated) statements and 20 (new) statements to rate for truth. The effect of (non-experienced) repetition on truth judgments was significant in both the extra-personal (i.e., truth for others) and intra-personal (truth for self) conditions. However, a combined analysis considering the type of paradigm (intra-personal vs. extra-personal) revealed that the effect was significantly smaller in the intra-personal condition, that is, when the non-experienced effect of repetition was estimated on participants' own judgments (see Supplementary Materials). Notably, Mattavelli and colleagues' results pointed to the possibility of a larger effect for judgments about others than for judgments about the self. However, these authors' reliance on largely different procedures across experiments made it challenging to interpret the self vs. other difference. These findings motivated the present research, based on the notion that people may factually underestimate the influence of repetition on themselves compared to others: a bias blind spot in the truth effect.

1.2. The bias blind spot

Judgment and decision-making can be biased in several ways (for reviews, see Dawes, 1998; Hertwig et al., 2019; Plous, 1993; Tversky & Kahneman, 1974). Whereas biases tend to be readily acknowledged when observed in others, people less readily acknowledge such biases in themselves. This phenomenon is known as the "bias blind spot" (Pronin et al., 2002; Pronin & Hazel, 2023; Scopelliti et al., 2015; West et al., 2012).

In their seminal studies introducing the bias blind spot, Pronin et al. (2002) demonstrated that this phenomenon is ubiquitous and does not depend on the type of "others" that people are asked to compare themselves with. For instance, US college students rated themselves as less susceptible to bias than the average American and their fellow classmates, just like random airport travelers believed they were less biased than other random travelers. Moreover, the bias blind spot occurs whether individuals are directly prompted to compare their biases relative to others or to independently rate the absolute extent of their bias and the extent of bias exhibited by others (Epley & Dunning, 2000; Pronin et al., 2002; Pronin, Gilovich, & Ross, 2004; Van Boven, Dunning, & Loewenstein, 2000).

The bias blind spot reflects the influence of both motivational and cognitive processes (see Mandel, Collins, Walker, Fugelsang, & Risko, 2022, for several possible explanations of the bias blind spot). Based on a motivational account, the bias blind spot can be viewed as an instance of the better-than-average effect (Dunning, Meyerowitz, & Holzberg, 1989). To clarify, the negative connotation of the term "bias" might naturally lead individuals to downplay or underestimate such bias in their own judgments and decisions. In contrast, there might be no motivation to deny a bias in others, except in cases where these others' connections to us, favorable opinion of us, or alignment with our viewpoints provide a reason to do so. Such motivations may be particularly high for obvious and seemingly trivial influences such as the effect of repetition on truth judgments.

From a cognitive perspective, the bias blind spot has been largely theorized as the result of an introspection illusion (Nisbett & Wilson, 1977). Introspection illusion describes the tendency of individuals to place more confidence in introspective information they can access directly (Ross & Ward, 1996). While people rely on introspection to access personal beliefs, intentions, and thoughts when explaining their own behaviors, the same cannot be done when attempting to explain the behavior of others. As others' internal states are inaccessible, people evaluate others primarily based on their observable behaviors. This disparity in information availability leads to differences in how people perceive their own behavior and decision-making process compared to how they perceive others'. Pronin and Kugler, 2007 showed that when participants judged themselves, they relied more on introspection, but when participants judged others, they relied more on considering how well the bias described people in general (but see Mandel et al., 2022 for a recent study challenging this "crossover" pattern).

This asymmetry in the assessment of bias in oneself and in others has been observed across a variety of social and cognitive biases (West et al., 2012). However, no studies investigated whether people believe that they are less vulnerable than others to the impact of repetition on truth judgments (i.e., a bias blind spot in the truth effect). Unlike many other biases in decision making typically examined in the bias blind spot literature, the truth effect does not necessarily lead to fallacious judgments. On the one hand, repetition and the resulting processing experiences should be associated with truth (Reber & Unkelbach, 2010). On the other hand, the link between repetition and truth is neither perfect nor fixed (Béna et al., 2022; Corneille et al., 2020). Thus, people might find good reasons to believe that following the "if repeated, then true" rule is a sound strategy or, alternatively, a bias. However, whether individuals differ in their predictions of the influence of repetition on truth judgments for themselves vs. others has never been previously investigated.

1.3. The present research

In three pre-registered experiments, we investigated people's beliefs regarding the effect of repetition on their own vs. others' truth judgments. To do so, participants read vignettes that depicted a hypothetical study comprising an exposure phase, featuring a list of statements that would be presented consecutively on screen, followed by a judgment phase during which both repeated and new statements would appear on screen. Within-participants, we manipulated whether participants imagined *themselves* undergoing this hypothetical study or *another participant* taking part in the same study. Without actually experiencing repetition, participants estimated the proportion of repeated and new statements they thought they and the other participant would classify as true. Thus, by manipulating both statements' *stated* repetition (repeated vs. new) and hypothetical judge (self vs. other), we tested whether participants predicted a larger truth effect for others than for themselves.

Experiment 1 used uncertain but moderately plausible statements; that is, statements for which participants held little knowledge (e.g., "The largest lithium deposits in the world are located in Bolivia"). Such (unknown trivia) statements are typically used in truth effect studies. Experiment 2 used highly implausible statements (e.g., "Smoking cigarettes is good for your lungs"). Highly implausible statements address the criticism that under specific conditions (i.e., statements' moderated plausibility), participants might consider repetition as a legitimate cue for truth (see Grice's maxim of quality, 1975; Reber & Unkelbach, 2010). If this is the case, the truth effect would not constitute a bias but a valid strategy. By undermining the validity of the link between statements' repetition and statements' truth (via reduced plausibility), Experiment 2 allowed for a stronger test of a bias blind spot in the truth effect when the latter should be seen as a bias. Finally, Experiment 3 tested the bias blind spot with increased statistical power for plausible statements. Additionally, it compared predictions regarding the effect of repetition on truth with participants' actual performance in the standard truth-by-repetition paradigm (TBR paradigm hereafter). In doing so, Experiment 3 provided an assessment of individuals' accuracy in the estimation of the truth effect.

1.4. Open science

All studies were pre-registered. The links for the time-stamped pre-registrations are available at https://osf.io/s3vn5 (Experiment 1), https://osf.io/c7guw (Experiment 2), and https://osf.io/qs2yx (Experiment 3). The pre-registration protocols, materials, experiment scripts, data, and analysis code for the three experiments are available on Open Science Framework (Experiment 1: osf.io/c4tx2; Experiment 2: osf.io/9xebh; Experiment 3: osf.io/sw7jk). We have conducted no other experiments on this research question so far. We reported all manipulations and measures used in all three experiments. All studies received formal approval from the local ethics committee.

2. Experiment 1

Experiment 1 tested the joint influence of statements' stated repetition and hypothetical judge (i.e., self vs. other) on the estimated proportion of "true" judgments using unknown statements. Experiment 1 used plausible statements for which participants had little prior knowledge (e.g., "The largest lithium deposits in the world are located in Bolivia"). If participants hold beliefs regarding the repetition-truth association, then they should estimate a higher proportion of "true" categorizations for hypothetically repeated statements compared to hypothetically new ones. Moreover, if there is a bias blind spot in the truth effect, participants should report a larger truth effect (i.e., the difference between hypothetically repeated vs. new statements categorized as "true") for others compared to themselves. This difference would provide initial evidence for a bias blind spot in the truth effect.

2.1. Method

We used a 2 (statements' stated repetition: repeated vs. new) × 2 (hypothetical judge: self vs. other) within-participant design. The dependent variable was the estimated proportion of "true" categorizations.

2.2. Sample size determination

The target effect considered in our power analysis was the difference in proportions of "true" categorizations for statements stated to be repeated vs. stated to be new for oneself vs. another participant; that is, the interaction between statements' stated repetition (i.e., repeated vs. new) and hypothetical judge (self vs. other). To determine our sample size, we set α to 0.05, and we aimed for a statistical power of 90% to detect an effect as small as Cohen's $d = 0.25$ ($f = 0.125$, small effect size) in a repeated measures ANOVA design (correlation among repeated measures: $r = 0.50$). An analysis with G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that we needed 115 participants. We increased this estimate by approximately 10% to avoid a final sample size smaller than the targeted sample size due to exclusion criteria, resulting in a targeted sample of 130 participants.

We adopted a sequential analysis approach (Lakens, 2014), planning a single interim analysis. In such a sequential analysis, data are analyzed intermittently while adjusting the relevant α level based on the number of planned analytical steps to control for Type I errors (Simmons, Nelson, & Simonsohn, 2011). We opted for a two-step sequential analysis. To estimate the α adjustment, the Pocock boundary is a standard method that returns the p-value threshold that researchers should consider at each intermittent stage. In a two-step sequential analysis ($n = 65$ in our experiment), the threshold is $\alpha = 0.0294$ for the interim and final analyses. If the target test is not significant at $\alpha = 0.0294$ in the interim analysis, the other half of the sample is collected. If the targeted test is significant at $\alpha = 0.0294$ in the interim analysis, one may stop collecting data. Thus, using the Pocock boundary to set the α level, we stopped data collection when data from 65 participants were collected, and conducted our analysis. As we did not find evidence for a significant interaction between statements' stated repetition and hypothetical judge ($p < 0.0294$) in the interim analysis, we collected data from the remaining 65 participants.

2.3. Procedure

We recruited 130 participants (79 females, 51 males, $M_{age} = 39.10$, $SD_{age} = 11.54$, *age range* = [19, 72]) on Prolific Academic. The experiment took approximately three minutes to complete. We paid £0.63 for their participation. We applied five screening criteria: participants declared to be English speakers, live in the United States, have an approval rate of at least 95%, have at least 100 previous submissions on Prolific, and did not take part in previous related studies conducted by the members of our research group.

We programmed the experiment in Inquisit6. Upon clicking the study link and giving their consent to participate, the program introduced participants to two consecutive hypothetical scenarios. The hypothetical judge in each scenario (self vs. other) constituted our first IV. In one hypothetical scenario, participants had to imagine *themselves* undergoing a study. This study would consist of an exposure phase, with a list of 20 statements presented on the screen consecutively, followed by another phase in which the same 20 'old' ('repeated') statements plus 20 'new' ('unrepeated') statements would have been presented on the screen. Then, we asked participants to indicate the proportion (in percentage: 0% - 100%) of repeated and new statements they thought they would have rated as "true". The stated repetition (i.e., repeated vs. new) constituted our second IV.

The other hypothetical scenario was almost identical, but participants had to imagine *another* participant completing the study. Then, participants indicated the proportion of repeated and new statements they thought the other participant would have rated as "true".

For each hypothetical scenario, we provided two sample statements, one factually true and one factually false, for statements described to be repeated and those described to be new, leading to four statements. The statements were taken from Corneille et al. (2020, see Supplementary Materials for the selected sample statements). We counterbalanced across participants (a) the assignment of each statements' set to each statements' stated repetition condition; (b) the assignment of each statements' set to each hypothetical judge condition; (c) the order of the scenarios (i.e., hypothetical judge: self vs. other).

2.4. Results

We conducted a 2 (statements' stated repetition: repeated vs. new) × 2 (hypothetical judge: self vs. other) repeated measures ANOVA on the estimated proportion of "true" judgment predictions. We used the 'ezANOVA' function in R.[1] We also conducted a default Bayesian ANOVA (Rouder, Morey, Speckman, & Province, 2012) with the 'BayesFactor' R package (Morey & Rouder, 2022). We used the default medium r scale (1/2) for the fixed effects (stated repetition, hypothetical judge, and their interaction). As we were interested in Bayes Factors (BF_{10}) for the main effects and the two-way interaction between stated repetition and hypothetical judge, we computed the Bayes Factor of each model against the null hypothesis (of no effect) and contrasted the models of interest to the relevant model omitting the targeted effect. To interpret Bayes Factors, we used conventional cut-off values (e.g., Dienes, 2014). A Bayes Factor above 3 yields evidence for H1 compared with H0, a Bayes Factor below 1/3 yields evidence for H0 compared with H1, and a Bayes Factor between 1/3 and 3 indicates inconclusive data.

We found a significant effect of statements' stated repetition, $F(1, 129) = 36.71$, $p < 0.001$, $\eta^2_G = 0.092$, which was also supported by the Bayesian analysis; $BF_{10} = 1.41^{12} \pm 2.68\%$: participants estimated a higher proportion of "true" judgments for repeated ($M = 57.8$, $SD = 17.4$) than new statements ($M = 47.2$, $SD = 14.1$). This effect indicates a belief about the association between truth and repetition. There was no significant effect of hypothetical judge, $F(1, 129) = 0.07$, $p = 0.80$, $\eta^2_G < 0.001$, and the Bayesian analysis yielded evidence against the main effect of hypothetical judge, $BF_{10} = 0.10 \pm 2.62\%$. The interaction between statements' stated repetition and hypothetical judge was not significant, $F(1, 129) = 3.79$, $p = 0.054$, $\eta^2_G = 0.003$, and the Bayesian analysis was inconclusive, $BF_{10} = 0.37 \pm 3.54\%$.[2] Thus, we found no evidence for a bias blind spot (see Fig. 1, left panel).[3]

2.5. Discussion

Participants predicted a higher proportion of "true" judgments for repeated than for new statements. These results suggest that participants hold beliefs regarding the association between repetition and truth. This truth effect prediction was not significantly qualified by the hypothetical judge. Descriptively, participants tended to estimate a higher proportion of repeated (vs. new) statements judged as "true" for others than for themselves. However, this differential effect was not statistically significant (i.e., hypothetical judge × stated repetition; $p = 0.054$). Thus, we replicated the effect of stated repetition on truth estimations (see Mattavelli et al., 2022), but found no support for a bias blind spot.

However, at least two possibilities for this lack of support deserve attention. First, the effect may be smaller than anticipated, and the experiment may have been underpowered to detect it as a result. We will return to this possibility in Experiment 3. Second, people may believe that repetition is a valid cue for truth (Reber & Unkelbach, 2010) rather than a bias in the typical sense. If so, using repetition to judge the truth status of plausible statements may not be seen as a strategy that leads to fallacy. If this were the case, the motivational component that should account for the bias blind spot would be substantially reduced.

To address this point, we used highly implausible statements in Experiment 2 (e.g., "The earth is a perfect square."). Here, the fallacy of using repetition as a cue for truth is highly apparent because repeated exposure clearly does not add credibility to the statements, and it is obviously unrelated to truth in the specific context of the hypothetical study participants have to think about. In this case, a difference between statements stated to be repeated or new would constitute a bias. Therefore, Experiment 2 tested if a bias blind spot in the truth effect emerges for highly implausible statements.

3. Experiment 2

Experiment 2 tested if there is a bias blind spot in the truth effect when people consider highly implausible statements. Recent studies found that repetition increases truth judgments even for statements that contradict one's knowledge (Lacassagne et al., 2022; see Fazio et al., 2019; but see Pennycook et al., 2018). It is unknown, however, whether (1) people hold beliefs relating repetition to truth judgments for highly implausible statements and (2) if they do, whether such beliefs apply equally to their own judgments and to judgments made by others.

[1] From the R package *ez* (Lawrence, 2016).

[2] Repeating the same analysis by including the three counterbalancing factors did not alter the results: the effect of statements' stated repetition remained significant, $F(1,122) = 36.49$, $p < 0.001$, $\eta^2_G = 0.096$, the effect of hypothetical judge was not significant, $F(1, 122) = 0.06$, $p = 0.799$, $\eta^2_G < 0.001$, and the interaction term was not significant either, $F(1, 122) = 3.74$, $p = 0.055$, $\eta^2_G = 0.003$. None of the effects involving the counterbalanced factors was significant ($ps > 0.09$).

[3] Although not included in our pre-registered analyses, for both 'self' and 'other' estimates, we computed for each participant a truth effect score (i.e., the proportion of true categorizations for repeated minus new statements – see Figure 1, right panel) and explored the distribution of participants showing positive, negative, and null effects. For 'self' estimates, 53% of the participants had a positive truth effect, 28% showed a null effect, and 19% showed a negative effect. For 'others' estimates, 55% of the participants showed a positive truth effect, 23% showed a null effect, and 22% showed a negative effect.

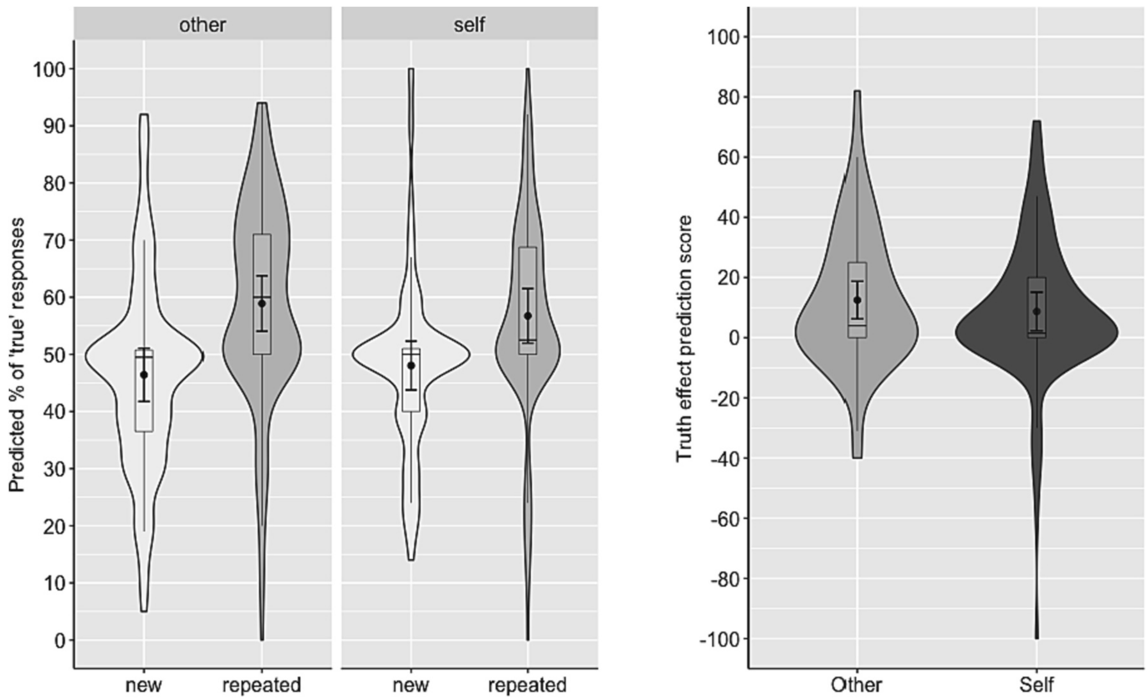

Fig. 1. Predicted percentage of "true" judgments on statements said to be new and said to be repeated separately for self vs. other (left panel), and corresponding predicted truth effect (positive scores indicate a higher predicted percentage of "true" judgments for statements said to be repeated vs. new) for self and others (right panel) - Experiment 1. The grey boxes are the interquartile range, and the bars represent the median; the black dots represent the mean with 95% confidence intervals (error bars). The distributions are the kernel probability density of the data.

3.1. Method

The experimental design and the sample size determination closely followed Experiment 1.

3.2. Procedure

We recruited 130 participants via Prolific Academic (74 females, 56 males, $M_{age} = 39.10$, $SD_{age} = 13.90$, *age range* = [19, 71]) and paid £ 0.60 for their participation. The experiment took approximately three minutes to complete. We applied the same screening criteria as those used in Experiment 1 and also ensured that participants who took part in Experiment 1 were excluded from participating in Experiment 2. The procedure closely resembled that of Experiment 1, except for the type of statements the vignettes referred to (i.e., highly implausible). For each hypothetical scenario resulting from crossing statements' stated repetition and hypothetical judge, we provided two highly implausible statements as examples of statements told to be repeated, and two highly implausible statements as examples of statements told to be new (see Supplementary Materials for the provided statements). We borrowed the sample statements from Fazio et al. (2019; see also Lacassagne et al., 2022). All the sample statements presented in each scenario were factually false (we will return to this point in the General Discussion).

3.3. Results

We conducted a 2 (statements' stated repetition: repeated vs. new) × 2 (hypothetical judge: self vs. other) repeated measures ANOVA on the proportion of "true" judgment predictions. We also conducted a default Bayesian ANOVA, similar to the analyses of Experiment 1. Different from Experiment 1, we found no significant main effect of statements' stated repetition, $F(1, 129) = 0.35$, $p = 0.557$, $\eta^2_G < 0.001$. The Bayesian analysis supported the hypothesis of no effect better than the hypothesis of an effect, $BF_{10} = 0.12 \pm 2.63\%$. There was also no significant main effect of hypothetical judge, $F(1, 129) = 2.19$, $p = 0.141$, $\eta^2_G = 0.002$. The Bayesian analysis indicated inconclusive evidence for this main effect, $BF_{10} = 0.38 \pm 2.57\%$.

The interaction between statements' stated repetition and hypothetical judge was not statistically significant at $\alpha = 0.0294$ (the Pocock threshold we used as we relied on sequential analyses), although it was very close to it, $F(1, 129) = 4.81$, $p = 0.030$, $\eta^2_G = 0.002$. The Bayesian analysis yielded no conclusive evidence, $BF_{10} = 0.47 \pm 3.56\%$ (see Fig. 2, left panel).[4,5]

3.4. Discussion

Experiment 2 examined beliefs about the effect of repetition on self vs. others' judgments of truth for highly implausible statements. The results diverged from Experiment 1, as participants did not generally predict a higher proportion of "true" judgments for repeated statements compared to new ones. Similarly to Experiment 1, we found no significant interaction between stated repetition and hypothetical judge. At the typical 5% α level, one would consider this interaction statistically significant (as the *p*-value of the test was 0.030). However, as we used a sequential analysis approach with the Pocock boundary, the appropriate α level was adjusted to 0.0294 for both the interim and final analyses. Based on this non-significant interaction, the non-significant tests for the simple effect of stated repetition in each hypothetical judge condition,

[4] Repeating the same analysis by including the three counterbalancing factors revealed that neither the main effect of statements' stated repetition nor that of hypothetical judge were significant (*ps* > 0.12). The interaction effect was statistically significant when compared with $\alpha = 0.0294$, $F(1, 122) = 5.01$, $p = 0.027$, $\eta^2_G = 0.002$.

[5] Inspecting the distribution of participants exhibiting positive, null, or negative truth effect predictions revealed that for 'self' estimates, 32% of the participants had a positive truth effect, 38% showed a null effect, and 30% showed a negative effect. For 'other' estimates, 42% of the participants showed a positive truth effect, 30% showed a null effect, and 28% showed a negative effect. Truth effect predictions are displayed on Figure 2 (right panel).

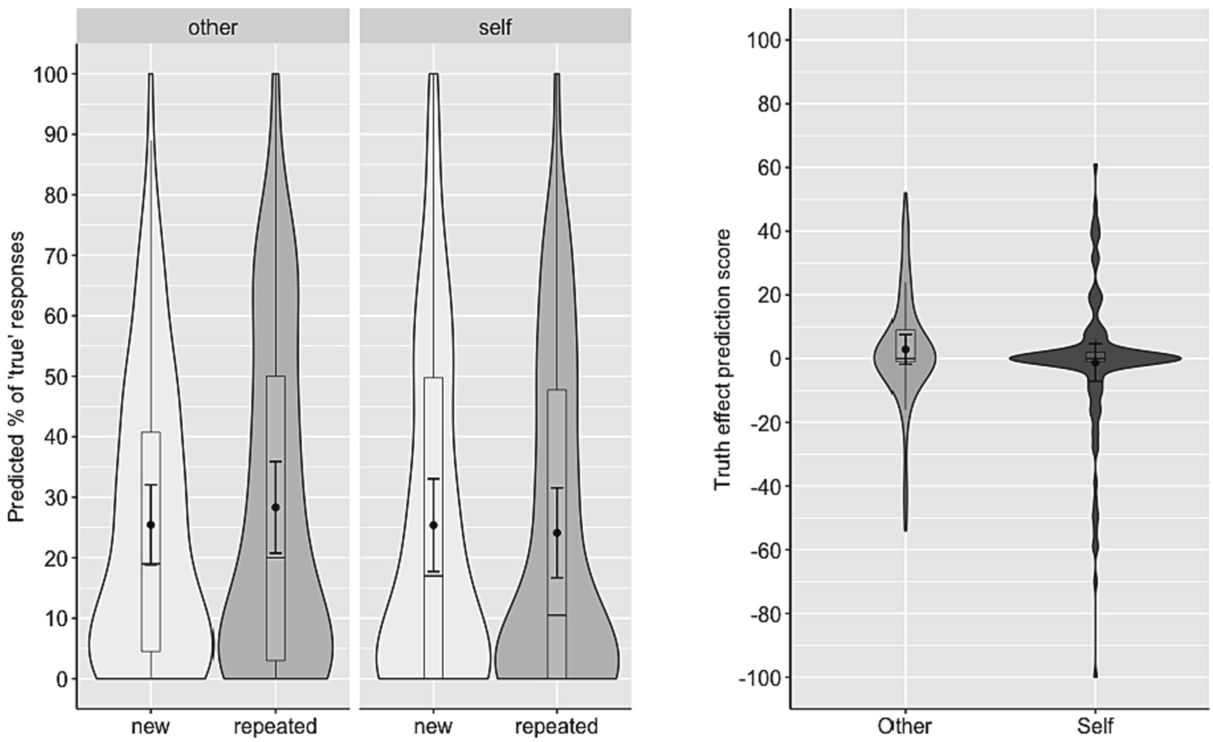

Fig. 2. Predicted percentage of "true" judgments on statements said to be new and said to be repeated separately for self vs. other (left panel), and corresponding predicted truth effect (positive scores indicate a higher predicted percentage of "true" judgments for statements said to be repeated vs. new) for self and others (right panel) - Experiment 2. The grey boxes are the interquartile range, and the bars represent the median; the black dots represent the mean with 95% confidence intervals (error bars). The distributions are the kernel probability density of the data.

and the inconclusive Bayesian analysis, we did not find evidence for a bias blind spot in the truth effect.

Interestingly, however, the interaction between stated repetition and hypothetical judge was close to the specified α level in both Experiments 1 ($p = 0.054$) and 2 ($p = 0.030$). Although the observed effect sizes were small (Experiment 1: $\eta^2_G = 0.003$; Experiment 2: $\eta^2_G = 0.002$), one possibility is that we lacked the statistical power required to detect the interaction. As noted in the discussion of Experiment 1, the present experiments are the first, to our knowledge, to investigate the bias blind spot in the truth effect, potentially indicating that the effect is smaller than we originally anticipated. Therefore, Experiment 3 was designed to provide a highly powered test of the bias blind spot in the truth effect using plausible statements. In addition, we assessed participants' performance in an actual truth effect experiment. If there is a bias blind spot in the truth effect, it is conceivable that participants accurately estimate their own bias due to high self-knowledge, while overestimating such a bias for others, for whom their knowledge is limited.

4. Experiment 3

Based on the findings from Experiments 1 and 2, Experiment 3 addressed two important questions. First, is there a bias blind spot in the truth effect with plausible statements when the experiment is adequately powered? Second, how do predictions relate to the actual truth effect? In Experiments 1 and 2, we relied on vignettes to investigate participants' predictions about the effect of repetition on self vs. others' truth judgments. How accurately people can predict their (and others') susceptibility to the effect of repetition on truth judgments is unknown.

In Experiment 3, we increased statistical power to test the presence of a bias blind spot in the effect of repetition on truth judgments using plausible statements. In addition, we delved into the relationship between predictions and actual performances. To address the latter question, we compared participants' beliefs about the effect of repetition for self and others' truth judgments with both individual and others' performance in a standard TBR paradigm. A comparison between (self and other) predictions about the effect repetition on truth judgments and actual performances in the TBR paradigm would yield insights into (i) whether participants *underestimate* or *overestimate* the effect of repetition on truth and (ii) whether any potential discrepancy between predictions and performances varies when considering predictions for the self vs. others. For instance, participants might underestimate the effect of repetition on their own truth judgments but not on those of others.

In addition, we examined associations between predictions and performances (see Mandel et al., 2022; West et al., 2012). Three possible relationships were plausible. First, individuals who are more affected by repetition may be less aware of their own bias. Based on the idea that metacognitive insight necessitates the same skill as task performance, less competent individuals may experience more difficulties in accurately assessing their skills. (Dunning, Johnson, Ehrlinger, & Kruger, 2003; Kruger & Dunning, 1999; but see McIntosh, Fowler, Lyu, & Della Sala, 2019 for a clarification on the metacognitive nature of the Dunning-Kruger effect). In this case, the bias blind spot should be positively correlated with the self-others gap in the actual effect of repetition on truth judgments (i.e., higher gap indicates a stronger truth effect for self vs. other). Second, individuals may accurately assess their degree of bias relative to others. In this case, the bias blind spot should negatively correlate with the actual self-others gap. Thirdly, the bias blind spot may be unrelated to the actual self-others gap.

4.1. Method

We used a 2 (statements' stated repetition: repeated vs. new) × 2 (hypothetical judge: self vs. other) × 2 (truth estimates: Predictions vs. Actual responses) within-participant design. To streamline the design due to the inclusion of an additional factor (i.e., predictions vs. actual responses), we used the *difference* in the proportion of "true" judgments for repeated vs. new statements (i.e., the truth effect) as our main outcome variable, rather than the proportion of "true" judgments per se. This difference is equivalent to the truth effect, with zero indicating no truth effect.[6]

Thus, for each participant, we computed this difference (i.e., truth effect) for self-predictions, other-predictions, self-actual scores, other-actual scores. Given this design, a bias blind spot would be reflected by a higher truth effect prediction for others than for the self (i.e., a main effect of hypothetical judge on truth effect predictions). The other-actual scores were computed by calculating the average score observed in the actual TBR paradigm across the entire sample but excluding one's individual score. In other words, the other-actual score for a given participant (say, Participant *x*) reflected the average score calculated on the other 202 participants (excluding Participant *x*).

As in Experiments 1 and 2, in the prediction phases, we counterbalanced across participants (a) the assignment of each statement set to each stated repetition condition (i.e., repeated vs. new); (b) the assignment of each statement set to each hypothetical judge condition (i.e., self vs. other); (c) the order in which self vs. other judgments (and scenarios) will be expressed (presented).

4.2. Sample size determination

The study was powered to test (i) the difference in prediction for self and others (i.e., bias blind spot) and (ii) the difference between predictions and actual scores for both self and others. We conducted a Monte Carlo simulation with the R package Superpower (Lakens & Caldwell, 2021). We used a 2 (hypothetical judge: self vs. other) × 2 (truth estimates: predictions vs. actual scores) repeated measures ANOVA. The difference in proportion of "true" judgments for repeated vs. new statements (i.e., a truth effect) was the outcome variable. We assumed a small effect (Cohen's $d = 0.20$) and a null difference in actual scores for self vs. other. Setting $\alpha = 0.05$, the analysis (number of simulations = 2000) revealed that with 400 participants, we would get (i) a 98% statistical power to observe a self-other difference in predictions, and (ii) a 81% power to find a 2 × 2 interaction between hypothetical judge and truth estimates. As we estimate approximately a 5% dropout rate (i.e., participants who will complete only the first session), we planned to recruit a total of 420 participants. We adopted a sequential analysis approach (Lakens, 2014; see description above) and stopped data collection when 200 participants completed the two sessions and conducted our analysis. As the critical tests (i.e., on the main effect of hypothetical judge on predictions and the hypothetical judge × truth estimates interaction) were $p < 0.0294$, we stopped our data collection.

4.3. Procedure

Participants were recruited on Prolific Academic and paid £ 1.35 for their participation in a two-session study (session 1: three minutes; session two: six minutes). We applied the same screening criteria as for Experiments 1 and 2. We programmed the experiment in Inquisit6. The experiment consisted of two sessions to minimize the chance that predictions (Time 1) could influence the actual performance (Time 2). Due to attrition, based on participants' ability to complete both sessions, the data collection required two separate waves. In the first wave, we recruited 210 participants for session 1. Out of these participants, 159 participants completed session 2 (two days later), but 3 were excluded due to duplicated data. This left us with 156 valid participants (44 less than indicated by the power analysis). Hence, three days later, we opened a second wave of data collection. Given the 26% attrition rate observed in the first wave, we recruited 60 additional participants for session 1. Out of these participants, 47 participants completed session 2 (two days later). This brought the final sample size to a total of 203 participants (75 females, 128 males, $M_{age} = 41.65$, $SD_{age} = 12.80$, *age range* = [21, 75]).

Across the two waves of data collection for each study session, we recruited 270 participants in session 1, among which 203 participants completed both study sessions. As a result, we had a 25% attrition rate (see Supplementary Materials, Table 1, for a comparison between the 67 dropped-out participants and the 203 participants included in the analyses[7]).

The first session was highly similar to Experiment 1. Participants read vignettes about repeated and new trivia statements and estimated the proportion of repeated vs. new statements that they vs. others would judge as "true". In each vignette, two sample statements were presented, leading to a total of eight statements. These statements were the same as those used in Experiment 1.

In the second session, administered two days later, the same participants went through a standard TBR paradigm. They were first exposed to 20 trivia statements (half factually true; half factually false) and were simply asked to read the statements. Then, in a judgment phase, participants rated the truth of 20 (repeated) trivia statements plus 20 other (new; half true) trivia statements (binary response: false vs. true). The 40 statements used in the second session were all different from those presented as sample statements in the first session and included 32 statements from Corneille et al. (2020) and eight statements from Newman, Jalbert, Schwarz, and Ly (2020) (see Supplementary Materials for the 40 statements used in the TBR paradigm).

4.4. Results

We first conducted 2 (hypothetical judge: self vs. other) × 2 (truth effect: predictions vs. actual scores) repeated measures frequentist and default Bayesian ANOVAs, with the difference in the proportion of "true" answers for repeated vs. new statements as the outcome variable. We used the same R packages as described above. We found a significant effect of truth estimates, $F(1,202) = 44.33$, $p < 0.001$, $\eta^2_G = 0.060$, $BF_{10} = 8.02^{10} \pm 2.71\%$, indicating that the actual truth effect (i.e., resulting from the truth-by-repetition procedure) was larger than the predicted truth effect. Both the actual truth effect and the predicted truth effect were highly significant, $t(202) = 23.24$, $p < 0.001$, $d = 1.63$, $BF_{10} > 10^5$ and $t(202) = 9.36$, $p < 0.001$, $d = 0.66$, $BF_{10} > 10^5$, respectively. Thus, participants showed a belief that repetition influences truth, but they significantly underestimated the factual influence.

We also found a main effect of hypothetical judge, $F(1, 202) = 6.11$, $p = 0.014$, $\eta^2_G = 0.006$, but the Bayesian analysis yielded inconclusive evidence, $BF_{10} = 1.02 \pm 2.64\%$. Across predictions and actual

[6] Repeating the analyses of Experiments 1 and 2 considering a composite truth effect *prediction* score (difference in the predicted proportion of "true" responses for statements stated to be repeated vs. new) as the outcome variable and hypothetical judge as the single factor produced the same result as the one reported in the main text. This is because testing the interaction in a 2 (hypothetical judge) x 2 (stated repetition) repeated measures ANOVA on the predicted proportions of "true" judgments and testing the effect of hypothetical judge on truth effect predictions in a paired samples *t*-test are equivalent.

[7] In additional analyses comparing age, gender, predictions of "true" judgments and truth effect predictions between the dropped-out participants and participants who completed both study sessions, some tests were statistically significant. Participants who dropped out tended to be younger, predicted a higher proportion of 'true' judgments for new statements for others, and exhibited a reduced predicted truth effect for others. We speculate that dropped-out participants may have been less engaged in the task, resulting in more careless responses (e.g., responses provided in part without considering whether they were said to be new or repeated). This possibility accounts for the smaller truth effect prediction scores we found for dropped-out participants than participants who completed both study sessions.

performances, the proportion of "true" judgments for repeated vs. new statements was higher for others, $t(202) = 22.87$, $p < 0.001$, $d = 1.61$, $BF_{10} > 10^5$, than for the self, $t(202) = 12.89$, $p < 0.001$, $d = 0.90$, $BF_{10} > 10^5$. Focusing solely on predictions, we found a stronger effect of stated repetition on truth judgment predictions for others than for the self, $t(202) = 3.84$, $p < 0.001$, $d = 0.27$, $BF_{10} > 10$. This result indicated a bias blind spot.

These main effects were qualified by a significant interaction between hypothetical judge and truth estimates, $F(1, 202) = 5.94$, $p = 0.016$, $\eta^2_G = 0.006$.[8] However, the Bayesian analysis was inconclusive, $BF_{10} = 1.38 \pm 3.57\%$. We decomposed this significant interaction by looking at the effect of truth estimates separately on self and others. The difference between predictions and actual scores was larger for self, $t(202) = 5.80$, $p < 0.001$, $d = 0.41$, $BF_{10} > 10^5$, than for others, $t(202) = 4.43$, $p < 0.001$, $d = 0.31$, $BF_{10} > 10^2$.[9] Participants were more likely to underestimate the effect of repetition on the proportion of "true" judgments for themselves than for others. Three separate one-sample *t*-tests revealed that the effect of repetition was significant for predictions about the self, $t(202) = 6.45$, $p < 0.001$, $d = 0.45$, $BF_{10} > 10^3$, predictions about others, $t(202) = 9.21$, $p < 0.001$, $d = 0.65$, $BF_{10} > 10^5$, and self-scores, $t(202) = 11.56$, $p < 0.001$, $d = 0.81$, $BF_{10} > 10^5$ (see Fig. 3).

The analyses so far relied on an average to estimate the performance of others. However, averages tend to regress towards the mean (see Fiedler & Unkelbach, 2014). To address this issue of comparing actual scores for others computed from average scores, we repeated the same analysis with a bootstrapping method. We yoked each participant with another participant randomly selected from the entire sample (drawing without replacement). Thus, each participant's actual score (i.e., self-actual score) was compared with another participant's score (i.e., other-actual score). To account for random error, we repeated this procedure 5000 times and took the average effects. The same 2 (hypothetical judge: self vs. other) x 2 (truth estimates: predictions vs. actual scores) repeated measures ANOVA was used for this analysis. We found a significant effect of truth estimates, $F(1, 202) = 32.06$, $p < 0.001$, $\eta^2_G = 0.042$. The effect of hypothetical judge and the interaction between hypothetical judge and truth estimates were not significant, $F(1, 202) = 3.87$, $p = 0.051$, $\eta^2_G = 0.004$ and $F(1, 202) = 3.80$, $p = 0.054$, $\eta^2_G = 0.006$, respectively.[10]

Finally, we found no significant correlation between participants' bias blind spot (i.e., the difference in predictions for the self vs. other) and the one's actual truth effect for self, $r = 0.01$, $p = 0.846$. Participants' actual truth effect was not associated with predictions about themselves, $r = 0.05$, $p = 0.520$, nor with predictions about others, $r = 0.05$, $p = 0.463$. We did observe a positive correlation between the predicted effect for the self and for others, $r = 0.44$, $p < 0.001$.

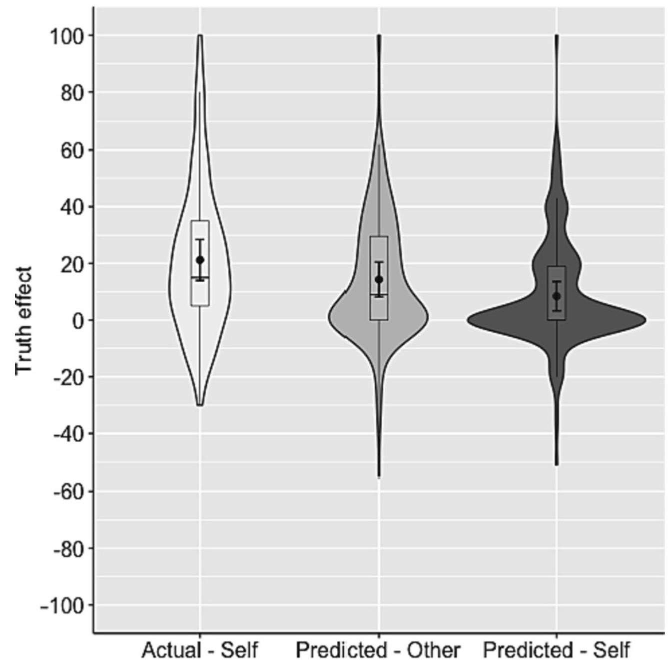

Fig. 3. Truth effect reflected by actual performances in the TBR paradigm, predictions for others, and predictions for self – Experiment 3. The grey boxes are the interquartile range, and the bars represent the median; the black dots represent the mean with 95% confidence intervals (error bars). The distributions are the kernel probability density of the data. Due to how other actual scores were calculated (average score across the entire sample but excluding one's individual score), we decided not to report them in this figure.

4.5. Discussion

In Experiment 3, we found that participants relied on beliefs relating repetition to truth judgments. We also found evidence for a bias blind spot: participants predicted that a higher proportion of repeated (vs. new) statements would be classified as "true" by others than by themselves. Comparing such predictions with actual performances revealed a general underestimation of the effect of repetition on perceived truth. This gap between predictions and actual performances was stronger for the self than for others (although some of the pre-registered analyses were not statistically significant). Correlational analyses further failed to demonstrate an association between participants' predictions about the effect of repetition on truth either for themselves or others and their actual performances.

5. Bias blind spot with hypothetical judge (self vs. other) between participants

The analytic outcomes did not consistently support our predictions. In addition, as noted by a reviewer, measuring the bias blind spot with participants predicting the effect of repetition on truth judgments both for themselves and others raises the concern that participants might have adjusted the ratings in a comparative manner, possibly adjusting their responses based on a belief that "others are more biased than me". This within-participant hypothetical judge manipulation may have inflated the difference in predictions made for the self vs. other. Thus, readers may wonder whether the bias blind spot would still emerge in the context of a more conservative test: when hypothetical judge (self vs. other) is manipulated between rather than within participants. Because the order of administration of the self vs. other scenario was counterbalanced in the three experiments (the first scenario was about the self for some participants, and about others for some participants), and instructions presented before the first scenario were silent with respect to the second one, we could analyze our data in a virtual between-subject

[8] We repeated the same analysis by including the three counterbalancing factors. Including such factors did not alter the main findings. There was a significant effect of truth estimates, $F(1, 195) = 46.94$, $p < 0.001$, $\eta^2_G = 0.063$, a significant effect of hypothetical judge, $F(1, 195) = 5.99$, $p = 0.015$, $\eta^2_G = 0.006$, and significant interaction, $F(1,202) = 5.83$, $p = 0.017$, $\eta^2_G = 0.016$.

[9] Upon reflection, we realized that whereas estimates derived from actual performances were necessarily multiples of 5, predictions were not. To account for this discrepancy, we rounded predictions (i.e., proportion of "true" answers for repeated vs. new statements) to the nearest 0.05 (e.g., 0.12 would be 0.10) and re-ran the same analysis. We confirmed the significant effect of estimates, $F(1, 202) = 38.16$, $p < 0.001$, $\eta^2_G = 0.052$, as well as the significant interaction, $F(1, 202) = 8.52$, $p = 0.004$, $\eta^2_G = 0.009$. The main effect of hypothetical judge was not significant, $F(1, 202) = 3.77$, $p = 0.054$, $\eta^2_G = 0.003$.

[10] We inspected the proportion of participants showing positive, negative, and null truth effects in their predictions. For 'self' predictions, 45% of the participants had a positive truth effect, 37% showed a null effect, and 18% showed a negative effect. For 'others' estimates, 59% of the participants showed a positive truth effect, 28% showed a null effect, and 14% showed a negative effect.

design. Namely, we conducted an aggregated analysis considering only predictions participants made in the first scenario (self vs. other). We tested the effect of hypothetical judge on the difference in the proportion of "true" judgments for statements described as repeated vs. new (the target dataset and the analytical code are available at osf.io/sw7jk). However, this analysis was not pre-registered.

Participants from the three experiments were included in the analyses ($N = 463$). We conducted 2 (hypothetical judge: self vs. other) x 2 (statements' plausibility: moderately plausible vs. highly implausible) between-subjects frequentist and default Bayesian ANOVAs on the difference in the proportion of "true" judgments for statements described as repeated vs. new. Importantly, the analyses showed a main effect of hypothetical judge, $F(1, 459) = 20.97$, $p < 0.001$, $\eta^2_G = 0.044$, $BF_{10} = 2179.38 \pm 0.81\%$, indicating that participants estimated a lower difference in the proportions of "true" judgments for repeated than new statements in the self scenario ($M = 4.07$; $SD = 21.33$, $t(231) = 2.91$, $p = 0.004$, $d = = 0.19$, $BF_{10} = 4.45$) than in the other scenario ($M = 13.03$; $SD = 22.27$, $t(230) = 8.89$, $p < 0.001$, $d = 0.59$, $BF_{10} = 2.98^{13}$).

We also found a main effect of plausibility, $F(1, 459) = 16.01$, $p < 0.001$, $\eta^2_G = 0.034$, $BF_{10} = 225.59 \pm 0.81\%$: participants estimated a lower difference in the proportion of "true" judgments for repeated vs new statements for implausible statements ($M = 2.32$; $SD = 20.55$; $t(129) = 1.28$, $p = 0.201$, $d = 0.11$, $BF_{10} = 0.22$) than for plausible statements ($M = 10.98$; $SD = 22.43$; $t(332) = 8.93$, $p < 0.001$, $d = 0.49$, $BF_{10} = 1.55^{14}$). The interaction between hypothetical judge and plausibility was not significant, $F(1, 459) = 2.17$, $p = 0.142$, $\eta^2_G = 0.005$, and the Bayesian analysis yielded inconclusive evidence, $BF_{10} = 0.45 \pm 3.00\%$. This analysis clarifies that the bias blind spot in the truth effect is robust even when hypothetical judge is manipulated between participants, so that it cannot be explained in terms of adjustment in comparative ratings. In addition, it supports the bias blind spot with much stronger statistical evidence in the context of a more conservative test.

6. General discussion

In three pre-registered experiments, we investigated the bias blind spot in beliefs about the impact of repetition on truth judgments. In two vignette experiments, participants estimated the proportion of statements stated to be repeated or new that they and another individual would have classified as "true". Experiment 1 used plausible statements. A significant effect of statements' stated repetition indicated that participants estimated a higher proportion of "true" judgments for repeated than for new statements. This is consistent with the notion that people uphold the belief of a positive relationship between repetition and truth (Reber & Unkelbach, 2010). The interaction between statements' stated repetition and hypothetical judge was not statistically significant, although it was close to the α level ($p = 0.054$, with $\alpha = 0.0294$ based on the Pocock boundary we used in the present sequential analysis approach). Descriptively, participants tended to predict a higher proportion of 'true' judgments for another participant than themselves.

Experiment 2 extended this test by considering highly implausible statements (cf., Lacassagne et al., 2022). While people may consider repetition as a valid cue for judging truth in general (Reber & Unkelbach, 2010), it is clearly not a truth cue for highly implausible statements. No main effect of statements' stated repetition emerged. However, we cannot clarify whether this non-significant effect is due to implausibility or factual truth. Despite not disclosing the factual truth of the implausible statements to participants, we provided only examples of highly implausible and false statements. Yet, in real-life contexts, highly implausible statements are not necessarily false (e.g., "A hippo's jaw opens wide enough to fit a sports car inside"). We remain uncertain whether participants imagined only false implausible statements or, alternatively, if they also thought of any true ones. Thus, establishing whether failing to find an effect of stated repetition was due to statements' plausibility rather than statements' factual truth would be premature at this stage. More central for the present research, the interaction between statements' stated repetition and hypothetical judge was not significant. As in Experiment 1, this interaction was not significant, $p = 0.03$ instead of $\alpha = 0.0294$.

Experiment 3 tested the bias blind spot in the truth effect with plausible statements, but this time with higher statistical power than in Experiments 1 and 2. In addition, it compared the bias blind spot (participants' estimates for themselves and others) with actual performance. We are not the first to measure both (self vs. other) predicted and actual vulnerability to bias (Mandel et al., 2022; West et al., 2012). Yet, whereas prior investigations rested on a correlational approach (e.g., is the bias blind spot positively/negatively related to actual vulnerability to the bias at issue?), our analyses focused primarily on the *comparison* between estimates of the effect of repetition and the actual effect. First, contrary to Experiment 1, Experiment 3 demonstrated a bias blind spot: participants estimated a higher proportion of 'true' judgments for repeated (vs. new) statements, and this effect was stronger for estimates about others than themselves. Second, comparing predictions with actual truth ratings indicated that participants underestimated the real impact of repetition on truth judgments both for self and others' judgments, and that this underestimation was more pronounced for the self. Notably, we found no evidence for a correlation between the bias blind spot and actual performances in the TBR paradigm.

Extending research by Mattavelli et al. (2022), the present findings indicate that participants do not just merely associate repetition with truth; they also hold knowledge about the causal impact of experimentally induced repetition on truth judgments. This causal knowledge may also be at play in the standard truth effect paradigm, which raises the possibility that demand effects contribute to the truth effect (see Corneille & Béna, 2023). For instance, in a standard TBR paradigm, participants may assume that the experimenter expects them to rate repeated statements as more truthful than novel statements (see Corneille & Lush, 2022; Orne, 1962). Likewise, in the present procedures, participants may have assumed that the experimenter expected them to rate themselves as less susceptible to cognitive biases than others. Demand effects are notoriously difficult to control (e.g., Corneille & Lush, 2022). One option for decreasing demand effects is to weaken participants' incentives for complying with the experimental hypothesis. This can be done by giving them monetary incentives for accurate truth judgments. The truth effect has been shown to resist such incentives (Speckmann & Unkelbach, 2021), which alleviates concerns that the truth effect is merely driven by experimental demands. Likewise, the between-participants replication of the bias blind spot established here alleviates concerns of mere compliance with a "better-than-others" hypothesis elicited by demand characteristics.

To the best of our knowledge, the present experiments are the first to investigate whether people see their own truth judgments as less vulnerable than others' to repetition-induced effects. Importantly, our procedure minimized the influence of blatant factors on the target self-other asymmetry. In fact, classic bias blind spot paradigms often provide participants with a description of the bias before predicting how the bias affects them and others (e.g., Pronin and Kugler, 2007). Under such conditions, a bias blind spot might reflect the influence of conversationally pragmatic processes triggered by an experimental artifact: as participants are informed about people's behavior, they may reasonably come to believe that the average survey respondent is biased. In contrast, the very same information does not provide sufficient reasons to believe that people are biased themselves (Mandel et al., 2022). Moreover, our aggregated analysis offered clear evidence that the observed bias blind spot cannot be explained in terms of mere response adjustment due to comparative ratings: the effect was robust even in a between-subject design, wherein some participants made predictions for the self and other participants did so for others. This finding, together with the fact that we observed a bias blind spot of similar magnitude for plausible and implausible statements (see section 5), runs against an account of the current comparative effects in terms of impression management motives (Sweldens, Puntoni, Paolacci, & Vissers, 2014).

Different explanations have been proposed to account for the bias blind spot. Motivational theories explain the bias blind spot as an expression of individuals' motives for superiority (see Pronin, 2007). Introspection illusion (Pronin et al., 2004; Pronin and Kugler, 2007) suggests that people overvalue thoughts and internal mental states relative to behavior when assessing their own behavior. More recently, Oeberst and Imhoff (2023) proposed that the bias blind spot can be explained by considering individuals' general and simple belief that their assessment is correct; a belief that, as the authors argued, does not apply to others (see also McPherson Frantz, 2006).

Determining what explanation can account for a bias blind spot in the truth effect would be premature at this stage. However, each explanation provides important insights for interventions aimed at reducing (or even eliminating) the truth effect. While resistant to many types of interventions, including monetary incentives (Speckmann & Unkelbach, 2021; see also Brashier & Rand, 2021), the truth effect can be mitigated (Brashier, Eliseev, & Marsh, 2020; Calio et al., 2020; Nadarevic & Aßfalg, 2017; Nadarevic & Erdfelder, 2014). Importantly, Nadarevic and Aßfalg (2017, Study 2) reduced (but did not eliminate) the truth effect via warnings that presented the truth effect as an illusion leading to inaccurate judgments. This suggests that when participants are explicitly informed by an external source that the truth effect leads to fallacy in judgments of truth, they see it as an unwanted influence that should be contrasted. Building on our findings, we propose that such information can also be internally generated by asking participants to make predictions about the effect of repetition on their own judgments of truth. If predicted truth effects reflect people's belief in the link between repetition and truth, and predictions concerning the truth effect on one's own judgments consistently underestimate the actual truth effect, then making predictions salient just before the TBR paradigm could steer participants to align their action with their beliefs and exert control over the effect of repetition. In our study, we introduced a two-day delay between the two sessions (i.e., predictions and actual performance in the TBR paradigm) to minimize potential effects of predictions on real scores. Following this reasoning, we anticipate that the discrepancy between one's belief and performance should be attenuated under a no-delay condition, meaning that the truth effect should be reduced.

Another important finding was the non-significant (and very close to 0) correlation between bias blind spot and actual performance in the TBR paradigm observed in Experiment 3 ($r = 0.01$). This finding challenges two opposing notions that have been proposed in the bias blind spot literature. One suggests that more biased participants (i.e., those showing a stronger truth effect) are less able to assess their vulnerability to the bias (Dunning et al., 2003; Kruger & Dunning, 1999). The other one (i.e., cognitive sophistication hypothesis) posits that participants showing a higher bias blind spot are, indeed, those who display better cognitive performances and are less biased. Results from West et al. (2012) partially disconfirmed this claim: whereas the authors found evidence for a positive (although modest) correlation between six instances of the bias blind spot and measures of cognitive ability (e.g., the Cognitive Reflection Test) and thinking dispositions (e.g., Need For Cognition), such positive correlations emerged even though people with higher cognitive abilities were not actually less biased than those with low cognitive abilities (see also Mandel et al., 2022 for similar results with different biases and cognitive sophistication measures). Our findings extend prior evidence and suggest that the bias blind spot in the truth effect does not relate to actual susceptibility to the bias: participants showing higher bias blind spot were neither more nor less biased by the effect of repetition on their truth judgments. This independence between the bias blind spot and actual vulnerability to the effect of repetition on truth aligns with recent evidence that the truth effect is unaffected by cognitive ability and cognitive style: people high in intelligence or with high analytical skills are just as vulnerable to the truth effect as everyone else (De Keersmaecker et al., 2020). This suggests that overconfidence is unjustified when it comes to the truth effect. Rather, people might benefit from acknowledging and accepting that they are not immune to the truth effect to prevent falling prey to it.

Finally, our findings have implications for the broader debate on accurately detecting truth in information. This ability is relevant not only at the individual level, but it also has important societal implications. For instance, inaccuracy in important beliefs has been particularly highlighted by the widespread consumption of fake news during the 2016 US Presidential Election and during the Brexit vote in the United Kingdom. Recent studies showed that, when it comes to misinformation and fake news shared on social media, people deem themselves less gullible than others (Jang & Kim, 2018; Ştefăniţă, Corbu, & Buturoiu, 2018; Yoo, Kim, & Kim, 2022). Our study echoes this idea by examining whether people make different predictions on the impact of another contextual variable that has reliably been shown to bias truth judgments, that is, repetition. The link between repetition and truth has been used to conceptualize susceptibility to misinformation and fake news (Pennycook et al., 2018; Pillai & Fazio, 2021; Vellani, Zheng, Ercelik, & Sharot, 2023). Our results converge with prior research indicating that people tend to perceive themselves as less vulnerable to bias. Yet, recent research examining the bias blind spot in the context of fake news pointed to the fact that the perceptions about the ability of other people to spot misinformation might reflect a pessimistic view not justified by evidence (Acerbi, Altay, & Mercier, 2022; Altay & Acerbi, 2023). In other words, people might overestimate gullibility, ignoring the general ability to spot fake news. We clarify that this is not the case for the effect of repetition on truth. To get a clear idea, Experiment 3 documented that even predictions about the truth effect on others were more optimistic when compared to the actual truth effect observed in participants two days later. This direct comparison between predictions and actual performance – one that is rarely, if ever, investigated in blind bias spot research - suggests that people underestimate their own susceptibility to biased truth judgments.

7. Conclusions

In the present studies, we found evidence for a bias blind spot in judging the influence of repetition on truth judgments: participants predicted a stronger effect of repetition on truth judgments for others than for themselves. This evidence was strongly supported by both frequentist and bayesian tests in an integrative analysis that relied on a more conservative between-participants analytic approach. As a further insight, comparing predictions with actual performance in a truth by repetition paradigm revealed that participants underestimated the influence of repetition on truth judgments, and that this underestimation was more pronounced when making predictions about themselves than about others. The present findings extend truth effect research by (1) further establishing the existence of beliefs about the effect of repetition on judgments of truth, and by indicating that (2) people consider that others are more susceptible to the bias than themselves, (3) underestimate the impact of repetition on judgments of truth, (4) particularly so for self-related judgments. In doing so, the present research delivers insights for interventions aimed at reducing the truth effect. Finally, our findings carry significant implications for the bias blind spot literature. In addition to expanding evidence for a bias blind spot to the truth effect, our study indicates that the judgment asymmetry we found here may be considered a cognitive bias, as people's estimations were compared with actual performances.

Funding

This research was supported by a grant awarded to Olivier Corneille by IPSY (Psychological Sciences Research Institute), UCLouvain.

CRediT authorship contribution statement

Simone Mattavelli: Conceptualization, Methodology, Software, Data curation, Formal analysis, Writing – original draft. **Jérémy Bena:** Conceptualization, Methodology, Data curation, Formal analysis, Writing – review & editing. **Olivier Corneille:** Conceptualization, Methodology, Writing – review & editing, Funding acquisition. **Christian Unkelbach:** Conceptualization, Methodology, Writing – review & editing.

Declaration of Competing Interest

None.

Data availability

We have shared the links to all the data and codes within the manuscript.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cognition.2023.105651.

References

Acerbi, A., Altay, S., & Mercier, H. (2022). Research note: Fighting misinformation or fighting for information? Harvard Kennedy school (HKS) misinformation. *Review*. https://doi.org/10.37016/mr-2020-87

Altay, S., & Acerbi, A. (2023). People believe misinformation is a threat because they assume others are gullible. *New Media & Society.*. https://doi.org/10.1177/14614448231153379

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. *Journal of Experimental Psychology: General, 121*(4), 446–458. https://doi.org/10.1037/0096-3445.121.4.446

Béna, J., Corneille, O., Mierop, A., & Unkelbach, C. (2022). Robustness Tests Replicate Corneille et al.'s (2020) Fake News by Repetition Effect. *International Review of Social Psychology, 35*(1). https://doi.org/10.5334/irsp.683

Béna, J., Rihet, M., Carreras, O., & Terrier, P. (2023). Repetition could increase the perceived truth of conspiracy theories. *Psychonomic Bulletin & Review.*. https://doi.org/10.3758/s13423-023-02276-4

Brashier, N. M., Eliseev, E. D., & Marsh, E. J. (2020). An initial accuracy focus prevents illusory truth. *Cognition, 194*, Article 104054. https://doi.org/10.1016/j.cognition.2019.104054

Brashier, N. M., & Rand, D. G. (2021). *Illusory truth occurs even with incentives for accuracy*. preprint. https://doi.org/10.31234/osf.io/83m9y.

Calio, F., Nadarevic, L., & Musch, J. (2020). How explicit warnings reduce the truth effect: A multinomial modeling approach. *Acta Psychologica, 211*, Article 103185.

Corneille, O., & Béna, J. (2023). Instruction-based replication studies raise challenging questions for psychological science. *Collabra Psychology, 9*(1), 82234. https://doi.org/10.1525/collabra.82234

Corneille, O., & Lush, P. (2022). Sixty years after Orne's American psychologist article: A conceptual analysis of "demand characteristics". *Personality and Social Psychology Review, 27*(1), 83–101. https://doi.org/10.1177/10888683221104368

Corneille, O., Mierop, A., & Unkelbach, C. (2020). Repetition increases both the perceived truth and fakeness of information: An ecological account. *Cognition, 205*, Article 104470. https://doi.org/10.1016/j.cognition.2020.104470

Dawes, R. M. (1998). Behavioral decision making and judgment. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *Vol. 1. The handbook of social psychology* (pp. 497–548). Boston: McGraw-Hill.

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

De Keersmaecker, J., Schmid, K., Brashier, N., & Unkelbach, C. (2022). The cognitive shortcut that clouds decision-making. *MIT Sloan Management Review, 64*(1), 44–48.

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

Dienes, Z. (2014). Using Bayes to get the most out of non-significant results. *Frontiers in Psychology, 5*. https://doi.org/10.3389/fpsyg.2014.00781

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

Dunning, D., Johnson, K., Ehrlinger, J., & Kruger, J. (2003). Why people fail to recognize their own incompetence. *Current Directions in Psychological Science, 12*(3), 83–87. https://doi.org/10.1111/1467-8721.01235

Dunning, D., Meyerowitz, J. A., & Holzberg, A. D. (1989). Ambiguity and self-evaluation: The role of idiosyncratic trait definitions in self-serving assessments of ability. *Journal of Personality and Social Psychology, 57*(6), 1082–1090. https://doi.org/10.1037/0022-3514.57.6.1082

Epley, N., & Dunning, D. (2000). Feeling" holier than thou": Are self-serving assessments produced by errors in self-or social prediction? *Journal of Personality and Social Psychology, 79*(6), 861–875. https://doi.org/10.1037/0022-3514.79.6.861

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175–191. https://doi.org/10.3758/BF03193146

Fazio, L. K. (2020). Repetition increases perceived truth even for known falsehoods. *Collabra. Psychology, 6*(1). 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*, 1705–1710. https://doi.org/10.3758/s13423-019-01651-4

Fiedler, K., & Unkelbach, C. (2014). Regressive judgment: Implications of a universal property of the empirical world. *Current Directions in Psychological Science, 23*, 361–367. https://doi.org/10.1177/0963721414546330

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

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

Hertwig, R., Pleskac, T. J., Pachur, T., & The Center for Adaptive Rationality. (2019). *Taming uncertainty*. MIT Press.

Jang, S. M., & Kim, J. K. (2018). Third person effects of fake news: Fake news regulation and media literacy interventions. *Computers in Human Behavior, 80*, 295–302. https://doi.org/10.1016/j.chb.2017.11.034

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

Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology, 77*(6), 1121–1134. https://doi.org/10.1037/0022-3514.77.6.1121

Lacassagne, D., Béna, J., & Corneille, O. (2022). Is earth a perfect square? Repetition increases the perceived truth of highly implausible statements. *Cognition, 223*, Article 105052. https://doi.org/10.1016/j.cognition.2022.105052

Lakens, D. (2014). Performing high-powered studies efficiently with sequential analyses. *European Journal of Social Psychology, 44*(7), 701–710. https://doi.org/10.1002/ejsp.2023

Lakens, D., & Caldwell, A. R. (2021). Simulation-based power analysis for factorial analysis of variance designs. *Advances in methods and practices in Psychological Science, 4*(1). https://doi.org/10.1177/2515245920951503

Lawrence, M. A. (2016). ez: easy analysis and visualization of factorial experiments. R package version 4.4-0. https://CRAN.R-project.org/package=ez.

Mandel, D. R., Collins, R. N., Walker, A. C., Fugelsang, J. A., & Risko, E. F. (2022). Hypothesized drivers of the bias blind spot—Cognitive sophistication, introspection bias, and conversational processes. *Judgment and Decision making, 17*(6), 1392–1421. https://doi.org/10.1017/S1930297500009475

Mattavelli, S., Corneille, O., & Unkelbach, C. (2022). Truth by repetition… without repetition: Testing the effect of instructed repetition on truth judgments. *Journal of Experimental Psychology: Learning, Memory, and Cognition.*. https://doi.org/10.1037/xlm0001170

McIntosh, R. D., Fowler, E. A., Lyu, T., & Della Sala, S. (2019). Wise up: Clarifying the role of metacognition in the Dunning-Kruger effect. *Journal of Experimental Psychology: General, 148*(11), 1882–1897. https://doi.org/10.1037/xge0000579

McPherson Frantz, C. (2006). I AM being fair: The bias blind spot as a stumbling block to seeing both sides. *Basic and Applied Social Psychology, 28*(2), 157–167. https://doi.org/10.1207/s15324834basp2802_5

Morey, R. D., & Rouder, J. N. (2022). BayesFactor: Computation of Bayes Factors for Common Designs. R package version 0.9.12-4.4. https://CRAN.R-project.org/package=BayesFactor.

Nadarevic, L., & Aßfalg, A. (2017). Unveiling the truth: Warnings reduce the repetition-based truth effect. *Psychological Research, 81*, 814–826. https://doi.org/10.1007/s00426-016-0777-y

Nadarevic, L., & Erdfelder, E. (2014). Initial judgment task and delay of the final validity-rating task moderate the truth effect. *Consciousness and Cognition, 23*, 74–84. https://doi.org/10.1016/j.concog.2013.12.002

Nadarevic, L., & Erdfelder, E. (2023). On the relationship between recognition judgments and truth judgments: Memory states moderate the recognition-based truth effect. *PsyArXiv.*. https://doi.org/10.31234/osf.io/2vzpx

Newman, E. 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*. https://doi.org/10.1016/j.concog.2019.102866

Nisbett, R. E., & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review, 84*(3), 231–259. https://doi.org/10.1037/0033-295X.84.3.231

Oeberst, A., & Imhoff, R. (2023). Toward parsimony in Bias research: A proposed common framework of belief-consistent information processing for a set of biases. *Perspectives on Psychological Science.*. https://doi.org/10.1177/17456916221148147

Oğuz Taşbaş, E. H., & Unkelbach, C. (2022). Repeating stereotypes: Increased belief and subsequent discrimination. *European Journal of Social Psychology, 52*(3), 528–537. https://doi.org/10.1002/ejsp.2835

Orne, M. T. (1962). On the social psychology of the psychological experiment: With particular reference to demand characteristics and their implications. *American Psychologist, 17*(11), 776–783. https://doi.org/10.1037/h0043424

Pennycook, G., Cannon, T. D., & Rand, D. G. (2018). Prior exposure increases perceived accuracy of fake news. *Journal of Experimental Psychology: General, 147*(12), 1865–1880. https://doi.org/10.1037/xge0000465

Pillai, R. M., & Fazio, L. K. (2021). The effects of repeating false and misleading information on belief. *Wiley interdisciplinary reviews. Cognitive Science, 12*(6). https://doi.org/10.1002/wcs.1573

Plous, S. (1993). *The psychology of judgment and decision making.* Mcgraw-Hill Book Company.

Pronin, E. (2007). Perception and misperception of bias in human judgment. *Trends in Cognitive Sciences, 11*(1), 37–43. https://doi.org/10.1016/j.tics.2006.11.001

Pronin, E., Gilovich, T., & Ross, L. (2004). Objectivity in the eye of the beholder: Divergent perceptions of bias in self versus others. *Psychological Review, 111*(3), 781–799. https://doi.org/10.1037/0033-295X.111.3.781

Pronin, E., & Hazel, L. (2023). Humans' Bias blind spot and its societal significance. *Current Directions in Psychological Science.*. https://doi.org/10.1177/09637214231178745

Pronin, E., & Kugler, M. B. (2007). Valuing thoughts, ignoring behavior: The introspection illusion as a source of the bias blind spot. *Journal of Experimental Social Psychology, 43*(4), 565–578. https://doi.org/10.1016/j.jesp.2006.05.011

Pronin, E., Lin, D. Y., & Ross, L. (2002). The bias blind spot: Perceptions of bias in self versus others. *Personality and Social Psychology Bulletin, 28*(3), 369–381. https://doi.org/10.1177/0146167202286008

Reber, R., & Unkelbach, C. (2010). The epistemic status of processing fluency as source for judgments of truth. *Review of Philosophy and Psychology, 1*(4), 563–581. https://doi.org/10.1007/s13164-010-0039-7

Ross, L., & Ward, A. (1996). Naive realism in everyday life: Implications for social conflict and misunderstanding. *Values and Knowledge*, 103–135.

Rouder, J. N., Morey, R. D., Speckman, P. L., & Province, J. M. (2012). Default Bayes factors for ANOVA designs. *Journal of Mathematical Psychology, 56*(5), 356–374. https://doi.org/10.1016/j.jmp.2012.08.001

Scopelliti, I., Morewedge, C. K., McCormick, E., Min, H. L., Lebrecht, S., & Kassam, K. S. (2015). Bias blind spot: Structure, measurement, and consequences. *Management Science, 61*(10), 2468–2486. https://doi.org/10.1287/mnsc.2014.2096

Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology: Undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological Science, 22*(11), 1359–1366. https://doi.org/10.1177/0956797611417632

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

Speckmann, F., & Unkelbach, C. (2021). Monetary incentives do not reduce the repetition-induced truth effect. *Psychonomic Bulletin & Review, 1-8*. https://doi.org/10.3758/s13423-021-02046-0

Ştefăniţă, O., Corbu, N., & Buturoiu, R. (2018). Fake news and the third-person effect: They are more influenced than me and you. *Journal of Media research, 11*(3). https://doi.org/10.24193/jmr.32.1

Sweldens, S., Puntoni, S., Paolacci, G., & Vissers, M. (2014). The bias in the bias: Comparative optimism as a function of event social undesirability. *Organizational Behavior and Human Decision Processes, 124*(2), 229–244. https://doi.org/10.1016/j.obhdp.2014.03.007

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases: Biases in judgments reveal some heuristics of thinking under uncertainty. *Science, 185*(4157), 1124–1131. https://doi.org/10.1126/science.185.4157.1124

Unkelbach, C., & Greifeneder, R. (2013). A general model of fluency effects in judgment and decision making. In *The experience of thinking* (pp. 11–32). Psychology Press.

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., & Speckmann, F. (2021). Mere repetition increases belief in factually true COVID-19-related information. *Journal of Applied Research in Memory and Cognition, 10*(2), 241–247. 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

Van Boven, L., Dunning, D., & Loewenstein, G. (2000). Egocentric empathy gaps between owners and buyers: Misperceptions of the endowment effect. *Journal of Personality and Social Psychology, 79*(1), 66–76. https://doi.org/10.1037/0022-3514.79.1.66

Vellani, V., Zheng, S., Ercelik, D., & Sharot, T. (2023). The illusory truth effect leads to the spread of misinformation. *Cognition, 236*. https://doi.org/10.1016/j.cognition.2023.105421

West, R. F., Meserve, R. J., & Stanovich, K. E. (2012). Cognitive sophistication does not attenuate the bias blind spot. *Journal of Personality and Social Psychology, 103*(3), 506–519. https://doi.org/10.1037/a0028857

Yoo, J., Kim, D., & Kim, W. G. (2022). Fake news on you, not me: The third-person effects of fake news in South Korea. *Communication Research Reports, 39*(3), 115–125. https://doi.org/10.1080/08824096.2022.2054790