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The citation effect: In-text citations moderately increase belief in trivia claims

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ABSTRACT

Authors use in-text citations to provide support for their claims and to acknowledge work done by others. How much do such citations increase the believability of an author's claims? It is possible that readers (especially novices) might ignore citations as they read. Alternatively, citations ostensibly serve as evidence for a claim, which justifies using them as a basis for a judgment of truth. In six experiments, subjects saw true and false trivia claims of varying difficulty presented with and without in-text citations (e.g., *The cat is the only pet not mentioned in the bible*) and rated the likelihood that each statement was true. A mini meta-analysis summarizing the results of all six experiments indicated that citations had a small but reliable effect on judgments of truth (d = 0.13, 95% CI [0.06, 0.20]) suggesting that subjects were more likely to believe claims that were presented with citations than without. We discuss this *citation effect* and how it is similar and different to related research suggesting that nonprobative photos can increase judgments of truth.

1. Introduction

One foundation of good critical thinking is the ability to evaluate the credibility of claims. “Can sharks swim backwards?” “Was President Obama born in the United States?” “Can vaccines cause autism?” In today's society we are inundated with facts, stories, and claims from myriad online sources that vary widely in credibility. After a tumultuous presidential election, concerns about truth and credibility have become a national issue in 2017 – Time magazine even featured a cover story with the title “Is Truth Dead?” (Scherer, 2017). Fortunately, a goal for many educators is to help their students become better critical thinkers; education should help students learn to critically read texts, skillfully evaluate evidence, and develop habits of skepticism. Such education is important, because research suggests that people accept statements or claims as true unless they are prompted in some way to look deeper into a claim's evidence, believability, or importance (see Gilbert, Krull, & Malone, 1990 for evidence; Gilbert, 1991 for an overview).[1]

In academic writing, one signal of evidence is the use of in-text or parenthetical citations (e.g., the Gilbert references above). Authors use references to acknowledge the work of others and to provide support for their claims. The current experiments were designed to examine how much parenthetical citations affect the believability of trivia claims. On one hand, in-text citations provide useful information. They show that authors have done their research and guide interested readers to external sources that will provide evidence. Thus, in-text citations are a probative source of information; it is rational to use them when forming a judgment of truth. On the other hand, it is unclear how much readers attend to in-text citations. Research suggests that non-experts (aka students) vary widely in the degree to which they look at citations while reading and how they use the information in a citation to draw inferences from the text (Sparks & Rapp, 2011; Strømsø, Bråten, Britt, & Ferguson, 2013).

Complicating matters further, several lines of research have demonstrated that truth judgments can be affected by a variety of factors, many of which are illogical or nonprobative (meaning they do not actually provide any additional diagnostic information). Newman, Garry, Bernstein, Kantner, and Lindsay (2012) use the term “truthiness” (borrowed from the comedian Stephen Colbert) to describe subjective feelings of truth. For example, in one widely read study, McCabe and Castel (2008) had students read science articles that included either pictures of a brain scan, a bar graph, or no accompanying image. The students who saw the brain images while reading rated the passage as having better scientific reasoning compared to students in the other conditions, even though the passages were identical. McCabe and Castel argued that the brain images were persuasive because they provided a

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[1] In case you were wondering, sharks cannot swim backwards, President Obama was born in Hawaii, U.S.A., and the link between vaccines and autism has been discredited (Colgrove & Bayer, 2005).

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physical representation of an abstract cognitive idea. Although this brain image finding has been difficult to replicate (see Michael, Newman, Vuorre, Cumming, & Garry, 2013 for a meta-analysis), it does colorfully demonstrate how irrelevant information might affect someone's judgment.

A second line of research concerns what is called the *truth effect* (or sometimes the *illusory-truth effect*)–the finding that people are more likely to think that a statement is true if they have seen it before than if they are seeing it for the first time (Begg, Anas, & Farinacci, 1992; Hasher, Goldstein, & Toppino, 1977; for a meta-analysis see Dechêne, Stahl, Hansen, & Wänke, 2010). In other words, simply repeating a fact multiple times makes people more likely to believe it. Begg et al. (1992) and others (e.g., Nadarevic & Erdfelder, 2014; Unkelbach, 2007) have suggested that repeated statements are more familiar and that familiarity translates into more fluent processing of the item. The increased fluency is then mistakenly interpreted as a signal of truth. Begg et al. (1992) argued that it is illogical to use repetition in forming a judgment of truth (Unkelbach & Stahl, 2009 cite Wittgenstein as suggesting that using repetition to determine truth is like buying a second copy of a newspaper to see if the first is correct). In contrast, Unkelbach (2007; Reber & Unkelbach, 2010) has argued that repetition may be a valid basis for making a truth judgment; hearing a statement a second time–especially if it comes from a new source–provides converging evidence that the statement is true. Regardless of whether using repetition as a basis for truth is valid, it is clear that simply repeating a statement can increase the degree to which a statement is seen as true.

Moreover, fluency has been shown to influence truth judgments in a variety of ways, not just through increased familiarity. For example, people are more likely to believe that a trivia statement is true if it is presented in an easy to read format–a dark blue font against a white background–than a difficult to read format–a yellow font against a white background (Reber & Schwarz, 1999). Schwarz (2015) has argued that when people are deciding whether a claim is true they evaluate it against a set of five criteria (is the belief shared by others; is the belief supported by evidence; is the belief compatible with other things that one believes; does the belief have internal coherence; and is the source of the claim credible). Importantly, while people will evaluate different types of information for each of those criteria, fluency can affect the conclusions drawn from all of them. Information that is presented in an easy to process manner can inflate truth ratings via any of the above mechanisms.

One final striking example of how fluency can inflate truth ratings comes from a recent line of research that shows that presenting a photo along with a trivia claim makes subjects more likely to believe a statement, even when the photo does not provide any diagnostic information about the veracity of the claim (Cardwell, Henkel, Garry, Newman, & Foster, 2016; Fenn, Newman, Pezdek, & Garry, 2013; Newman et al., 2012; Newman et al., 2015). In one study (Newman et al., 2012, Experiment 3), for example, subjects saw a series of true and false trivia claims presented with or without an accompanying photo and were asked to judge whether the statements were true or false. Critically, all the photos were nonprobative – they were topically related to the claims, but did not provide any additional evidence about the truth of the claim. For example, the claim "Macadamia nuts are in the same evolutionary family as peaches" would appear with a picture of macadamia nuts. Despite not providing additional useful information, the photos led to a truth bias–subjects were more likely to accept a statement as true if it was presented with a photo than without. Newman et al. suggested that the photos helped people create "pseudoevidence"–subjects attributed the fluency of processing the photo as an indicator of truth, or used ambiguous information in the photo to confirm a hypothesis. Additional studies have shown that this truth bias persists over time (Fenn et al., 2013), that the photo has to be topically related to the trivia claim (e.g., the picture can't be completely unrelated, Newman et al., 2015), and that the presence of photos can even lead people to falsely remember past experiences (Cardwell et al., 2016).

In sum, truth judgments can be influenced by many factors, including ones that are nonprobative or irrational. Despite the research described above, no studies (to our knowledge) have examined whether in-text citations increase the perceived truthfulness of statements. Our interest in this question was partially inspired by an anonymous reviewer from a different paper (Putnam, Sungkhasettee, & Roediger, 2016) who suggested that including more references in a review on effective study strategies would make students more likely to believe the claims we made in our paper. We were skeptical that undergraduates would be persuaded by additional in-text citations and decided to investigate the question ourselves.

In the current experiments subjects saw true and false trivia statements presented with or without parenthetical citations and judged the truth of each statement. Across the experiments we used materials of varying difficulty, provided different instructions that sometimes emphasized what an in-text citation was, and manipulated the presence of citations both within and between subjects. Finally, we combined the evidence from each experiment in a mini meta-analysis to provide a more precise estimate of the effects of citations on truth judgments. Overall, we had two competing predictions. In contrast to the nonprobative photos used by Newman et al. (2012), citations are probative–they provide evidence or support for a claim. If nonprobative information can increase truth ratings, then probative information should as well. Therefore, our first hypothesis was that presenting in-text citations would increase the perceived truthfulness of the statements. Alternatively, parenthetical citations lack the visual appeal of photos and readers might ignore citations unless prompted to examine them (e.g., Gilbert, 1991). Thus, our second hypothesis was that subjects would provide similar truth ratings for statements presented with and without a citation.

2. Experiment 1A

Experiments 1A and 1B were identical, except that the variable *citations* was manipulated between-subjects in 1A and within-subjects in 1B. We expected that highlighting the difference between a statement with a citation and a statement without a citation (i.e., using a within-subjects design) would be more likely to show that citations affected truth ratings, whereas the between-subjects design would provide a stronger test for the same hypothesis. Experiment 1A and 1B were preregistered on the Open Science Framework (OSF, http://dx.doi.org/10.17605/OSF.IO/J64SB; Putnam, 2016); the preregistration contains our target sample size, stopping and data exclusion rules, hypotheses, predictions, and analysis plan.

2.1. Method

2.1.1. Subjects

Eighty Amazon Mechanical Turk workers (43 male, 36 female, and 1 other; *M* Age = 34.16; MTurk; www.mturk.com; Buhrmester, Kwang, & Gosling, 2011) received $0.70 for participating in the 15 min experiment. As noted in our preregistration, we planned to omit subjects who reported being non-fluent in English, reported using external resources during the experiment, or who showed a pattern of data that indicated they were not following instructions. However, no subjects met these criteria in Experiment 1A. All subjects were treated in line with the APA ethical guidelines, and the Carleton College IRB approved all of the experiments in this study.

2.1.2. Materials

The materials were a set of 40 trivia claims (20 true and 20 false) adapted from previous research (Fenn et al., 2013; Newman et al., 2012). For each statement we wrote an in-text citation that plausibly supported the claim. For example, "The largest European glacier is Vatnajökull on Iceland (Gudmundsson, 1997)" is a true statement presented with a citation whereas "Baghdad is the capital of Iran" is a