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Uninformative Photos Can Increase People's Perceived Knowledge of Complicated Processes

Brittany A. Cardwell
Victoria University of Wellington, New Zealand

D. Stephen Lindsay
University of Victoria, Canada

Katharina Förster
University of Münster, Germany

Maryanne Garry*
Victoria University of Wellington, New Zealand

To what extent can photos influence people's evaluations of their own knowledge? For example, can photos affect how well people think they understand processes? To answer this question, in six experiments we asked people to indicate how well they understood various processes (such as how rainbows form). Sometimes the processes that were described appeared after a related photo (such as a photo of a rainbow) whereas other times the processes appeared alone. People tended to report that they understood processes that appeared with photos better than processes that appeared alone. This pattern fits with the idea that photos make it easier to generate relevant thoughts and images—an experience people tend to interpret as evidence that they know or understand related information.

General Audience Summary

Do you understand how rainbows form? Would seeing a photo of a rainbow influence how you evaluated your knowledge? It seems obvious that such a photo would not influence you because it does not reveal the complex processes involved in rainbow formation. The photo should merely remind you of a phenomenon you have seen countless times. Yet when we asked people to evaluate their knowledge of several complicated processes, we found that seeing related, but uninformative, photos (a photo of a rainbow) led people to believe they knew more about the processes. We suspect that photos caused these effects by making it feel easier for people to bring related thoughts and images to mind—a feeling people might have taken as evidence they knew about the processes at hand. This finding has implications for education. When people are considering what they know about a scientific process, for example, uninformative photos might increase perceived knowledge and affect how much effort people put into learning related information.

Keywords: Photos, Cognitive fluency, Metacognition, Knowledge, Understanding

Author Note.

Brittany A. Cardwell, School of Psychology, Victoria University of Wellington, New Zealand. D. Stephen Lindsay, Department of Psychology, University of Victoria, Canada. Katharina Förster, Psychology Department, University of Münster, Germany. Maryanne Garry, School of Psychology, Victoria University of Wellington, New Zealand.

Brittany A. Cardwell is now at the Department of Psychology, University of Otago, New Zealand. Maryanne Garry is now at the School of Psychology, University of Waikato, New Zealand.

* Correspondence concerning this article should be addressed to Maryanne Garry, School of Psychology, University of Waikato, Box 3105, Hamilton, New Zealand. Contact: maryanne.garry@waikato.ac.nz.

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How well do you know how rainbows form? Take a moment to rate your knowledge on a scale from 1, meaning you know nothing about that process, to 6, meaning you know everything about it. Assuming you played along, how did you go about assessing your knowledge of rainbow formation? Perhaps you attempted to retrieve related thoughts and images from memory, then determined whether those thoughts and images passed as knowledge of the process (Graesser & Hemphill, 1991). Now consider the image in Figure 1. Would viewing that photo change your assessment? The photo is, of course, uninformative in this situation. It does not reveal the physics of light refraction; instead, it merely reminds you of a phenomenon you have seen countless times. Nonetheless, in the following six experiments, we show that uninformative photos can encourage people to report that they know how complicated processes work.

One mechanism by which photos could affect judgments of knowledge is by providing semantic context, making related thoughts and images come to mind more easily (Collins & Loftus, 1975). And when information feels easy to bring to mind, people tend to interpret that feeling as evidence they are familiar with the information, that it is accurate or true, and that they know or understand it well (Alter & Oppenheimer, 2009; Jacoby, Kelley, & Dywan, 1989; Kelley & Lindsay, 1993; Rawson & Dunlosky, 2002; Whittlesea, 1993). This interpretation makes sense, considering the real-world association between the ease with which people process information and their familiarity with it: after all, having recently and/or frequently encountered something in the past does make it easier to bring it to mind in the present (Halberstadt, 2010; Jacoby & Dallas, 1981; Rawson & Dunlosky, 2002; Unkelbach, 2006).

This literature suggests, then, that photos could increase people's perceived knowledge of a process by enhancing the ease with which thoughts and images related to that process come to mind. Indeed, people sometimes make mistakes about why information feels easy to bring to mind, concluding that it is familiar or known when it really is not (Alter & Oppenheimer, 2009; Jacoby et al., 1989; Schwarz & Clore, 2007; Unkelbach & Greifeneder, 2013). In one study, people saw several lists of words and, after each list, decided whether they had seen a target word on the list. People thought they had seen target words (*boat*) more often when they appeared after highly related sentence fragments (*The stormy seas tossed the. . .*) compared to loosely related sentence fragments (*He saved up his money and bought a. . .*; Whittlesea, 1993; see also Lee & Labroo, 2004). That is, even though the semantic context provided no evidence that target words had actually been on the list, it biased people toward saying that words were old. Why? Presumably because, compared to the loosely related sentence fragments, the highly related sentence fragments made it surprisingly easy to bring target words to mind—a feeling people interpreted as evidence words were familiar (Dechene, Stahl, Hansen, & Wanke, 2009; Hansen, Dechene, & Wanke, 2008; Whittlesea & Williams, 1998, 2001a, 2001b).

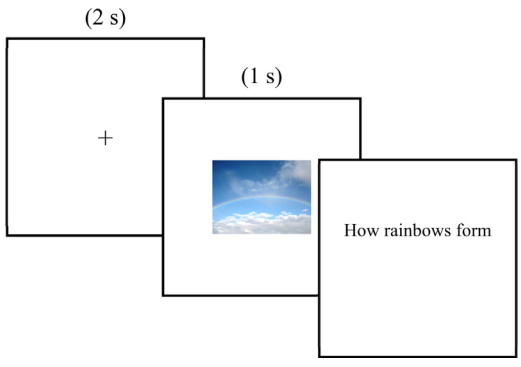

Figure 1. Example of how processes appeared with photos.

Recent work shows that photos can produce similar effects when they provide semantic context. In one study, people decided whether trivia claims (such as "Macadamia nuts are in the same evolutionary family as peaches") were true or false (Newman, Garry, Bernstein, Kantner, & Lindsay, 2012). Sometimes those claims appeared with related photos (a photo of macadamia nuts) and other times the claims appeared alone. Even though the photos were uninformative about the truth of the claims, they made people more likely to say claims were true. As with the highly related sentence fragments, photos might have made it feel easier to bring related thoughts and images to mind, an experience people interpreted as evidence of truth (see Alter & Oppenheimer, 2009; Reber & Schwarz, 1999; Unkelbach, 2007).

If photos can operate through such a mechanism, then their effects should extend to situations in which people evaluate their knowledge of complex processes, such as how rainbows form. After all, the feelings of ease that cause people to think words are familiar, or that claims are true, also cause people to believe they know or have learned information well. For example, in a series of experiments, people studied a list of words for a later recall test; some of the words appeared in a font that was large and easy to read, and other words appeared in a font that was small and more difficult to read. As people studied, they rated their confidence that they would be able to recall each word on a later test. People were more confident they would recall the easy words than the difficult words, but they actually recalled the two types of words at a similar rate (Rhodes & Castel, 2008; cf. Mueller, Dunlosky, Tauber, & Rhodes, 2014).

Similar effects arise when people judge their ability to recall words presented in crisp versus blurry font, to recall passages of text that are complete versus missing words, and to remember the meaning of Swahili words (such as "kelb") presented with a picture (of a dog) versus the English translation ("dog"; Carpenter & Olson, 2012; Rawson & Dunlosky, 2002; Yue, Castel, & Bjork, 2012). Put differently, people rely on feelings of ease as evidence that they know information well, even if those feelings are actually uninformative about their state of knowledge. So even though easily bringing the concept of rainbow to mind does not mean you know how they form, you may interpret that feeling of ease to mean that you do.

Taken together, these literatures suggest that uninformative photos should increase the extent to which people believe they know how complicated processes work. To examine that possibility, in six experiments we asked people to rate their knowledge of various processes. Before evaluating their knowledge, people either saw a photo that related to the process, or saw no photo.

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