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Answers at your fingertips: Access to the Internet influences willingness to answer questions

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ABSTRACT

Recent technological advances have given rise to an information-gathering tool unparalleled by any in human history—the Internet. Understanding how access to such a powerful informational tool influences how we think represents an important question for psychological science. In the present investigation we examined the impact of access to the Internet on the metacognitive processes that govern our decisions about what we "know" and "don't know." Results demonstrated that access to the Internet influenced individuals' willingness to volunteer answers, which led to fewer correct answers overall but greater accuracy when an answer was offered. Critically, access to the Internet also influenced feeling-of-knowing, and this accounted for some (but not all) of the effect on willingness to volunteer answers. These findings demonstrate that access to the Internet can influence metacognitive processes, and contribute novel insights into the operation of the transactive memory system formed by people and the Internet.

1. Introduction

Through the Internet individuals have essentially immediate access to an extraordinarily large amount of information. Interestingly, recent research has demonstrated that this access can impact how we think (Fisher, Goddu, & Keil, in press; Sparrow, Liu, & Wegner, 2011; Ward, 2013a, 2013b, 2013c; for review see Loh & Kanai, in press). For example, some have argued that constant connectivity to the Internet makes people less likely to engage critically with content found online, and more likely to rely on a surface level interpretation of the information sought (Carr, 2008). Others are less skeptical, suggesting that while reliance on the massive amount of E-memory afforded by the Internet is likely, such reliance does not necessarily preclude individuals from incorporating the information found online into their organic memory (Clowes, 2013; see also Michaelian & Sutton, 2013). In the present investigation we examine whether having a wealth of information "at our fingertips" via the Internet can influence the very metacognitive processes (i.e., metacognitive monitoring and control) we use to govern our decisions about what we "know" and "don't know." Specifically, we test the hypothesis that access to the Internet alters our willingness to volunteer answers to general knowledge questions.

Imagine the following scenario: You are sitting across from a friend who asks if you know the capital of Canada. How does your willingness to answer this question change if you have access to the Internet (e.g., via the smartphone in your pocket) or not (e.g., you are hiking in the wilderness with no Internet access)? Deciding to provide an answer reflects the operation of a

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complex set of metacognitive processes that have long been of interest to psychologists (e.g., Corno, 1986; Hart, 1965; Glucksberg & McCloskey, 1981; Koriat, 2007; Koriat & Goldsmith, 1996; Koriat, Ma'ayan, & Nussinson, 2006; Metcalfe, Schwartz, & Joaquim, 1993). Critically, these processes can be influenced by a number of factors other than simply what we "know" and "don't know" (e.g., incentives; Koriat & Goldsmith, 1996; see also Glucksberg & McCloskey, 1981; Klin, Guzmán, & Levine, 1997; Singer & Tiede, 2008). How might access to the Internet influence these processes?

When considering the impact of the Internet on how we think, researchers have proposed that individuals are forming transactive memory systems with the Internet (and computers in general; Fisher et al., in press; Sparrow et al., 2011; Sparrow & Chatman, 2013; Ward, 2013a, 2013b, 2013c). That is, individuals are learning to rely on the Internet for information as they would, for example, a partner in a long-term relationship (Wegner, 1986, 1995). This human-technology coupling suggests two potential competing hypotheses with respect to the influence of access to the Internet on our willingness to volunteer answers to questions. Recent work by Fisher et al. (in press) and Ward (2013a; see also 2013b) suggests that individuals often mistake knowledge located online for their own (i.e., we confuse the knowledge of our transactive partner with our own). If access to the Internet increases feeling-of-knowing, then this should lead to an increase in our willingness to volunteer an answer when we have such access (e.g., Hanczakowski, Pasek, Zawadzka, & Mazzoni, 2013; Koriat & Goldsmith, 1994; Koriat & Goldsmith, 1996). Alternatively, given the disparity in (fact-based) knowledge between an individual and the Internet, we might prefer to offload (Gilbert, 2015; Risko & Dunn, 2015; Risko, Medimorec, Chisholm, & Kingstone, 2014) responsibility for question answering onto the Internet (i.e., lean on the knowledge of our transactive partner). This would lead to a reduction in our willingness to volunteer an answer.

Assuming access to the Internet does not actually alter the amount of knowledge we have (at a given point in time), if it influences the metacognitive processes underlying our decisions about what we "know" and "don't know" it could directly impact the quantity and quality of the information we provide (Koriat & Goldsmith, 1994; Koriat & Goldsmith, 1996; Koriat, Goldsmith, & Pansky, 2000). Specifically, if access to the Internet increases our willingness to volunteer answers, then this should increase the number of correct answers we provide (i.e., memory quantity) but decrease the likelihood that any given answer is correct (i.e., memory quality). Alternatively, if access to the Internet decreases our willingness to volunteer an answer, then we would expect the opposite pattern (i.e., decreased memory quantity and increased memory quality).

2. Experiment 1

In Experiment 1 we examined the extent to which, if at all, access to the Internet affects an individual's willingness to volunteer answers in a question answering paradigm (e.g., Nelson & Narens, 1980; Singer & Tiede, 2008). Participants were presented with general knowledge questions (e.g., "What is the capital of France?") of varying levels of difficulty. In the standard "No-Internet-Access" condition participants responded whether they knew the answer or not and if they did, they provided the answer. To examine the influence of the Internet we extended this paradigm by creating an "Internet-Access" condition. This condition was identical to the "No-Internet-Access" condition except that when participants responded "don't know" they had to look up the answer on the Internet. Thus, we can compare question answering behavior both when individuals have and do not have access to the Internet. We compare three critical dependent measures across these conditions: (1) the number of answers volunteered (2) the number of correct answers (i.e., memory quantity) and (3) the accuracy of the answers provided (i.e., memory quality).

2.1. Method

In all experiments we report how we determined our sample size, all data exclusions (if any), all manipulations and all measures in the study (Simmons, Nelson, & Simonsohn, 2012).

2.1.1. Participants and design

Thirty-eight undergraduate students ($N = 38$) at the University of Waterloo participated in a within-subjects design. The goal was to collect 32 participants based on achieving approximately .80 power to detect a medium sized effect (e.g., *Cohen's* $d = 0.5$) and complete the requisite counterbalancing of conditions and items across conditions (g*power; Erdfelder, Faul, & Buchner, 1996). Participants received credit toward a psychology course.

2.1.2. Stimuli

General knowledge questions were drawn from a list originally compiled by Nelson and Narens (1980), and recently updated by Tauber, Dunlosky, Rawson, Rhodes, and Sitzman (2013). We split the sample normed by Tauber et al. (2013) into thirds based on probability of recall, then randomly drew 15 questions from each third to get two lists of 45 questions.

2.1.3. Procedure

Participants completed each list of questions in two blocks. They were instructed to answer the questions as quickly and accurately as possible. After reading a question, participants indicated whether or not they knew the answer by pressing a key. In both conditions, if participants responded with "I know" they immediately entered the answer. In the