



Commentary

Routine Processes of Cognition Result in Routine Influences of Inaccurate Content



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Whether watching news programs, perusing blogs, reading novels, or talking with colleagues, you have been exposed to a mix of accurate information, informed opinions, partial truths, unknowable conjectures, uninformed claims, and even blatant lies. Concerns about the validity of what we read, hear, and see have grown in popularity, no doubt driven by political disputes, criticisms of journalists and news outlets, the ease of online publishing, trolling behavior, the social media landscape, and a host of other contemporary considerations and practices (e.g., Del Vicario et al., 2015; Kahne & Bower, 2017; Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012), as outlined in the target article by Lewandowsky, Ecker, and Cook (2017). These concerns have fueled interest in articulating the predictors of, consequences of, and mechanisms underlying experiences with “fake news,” “alternative facts,” and “post-truth” presentations. Misinformation research exemplifies such interest, some of which examines what happens when people are presented with information that contradicts what they know or believe to be true. But even when intended to support more valid understandings, these presentations can meet with limited success, as has been articulated in a variety of empirical projects and review papers (e.g., Ecker, Lewandowsky, & Tang, 2010; Marsh & Fazio, 2006; Marsh, Cantor, & Brashier, 2016; Rapp, 2008).

One method that *has* demonstrated benefits involves providing accurate accounts accompanied by supporting information (e.g., explanations, examples, data; Danielson, Sinatra, & Kendeou, 2016; Guzzetti et al., 1993; Tippett, 2010). For example, refutation texts that point out, dispute, and explain inaccurate conceptions have proven effective in helping readers overcome previously held misunderstandings about STEM topics (e.g.,

physics principles and climate change; Diakidoy, Kendeou, & Ioannides, 2003; Lombardi, Danielson, & Young, 2016) and historical pre- and misconceptions (e.g., the civil rights movement; Donovan, Zhan, & Rapp, 2017). However, the long-term implications of refutations, and how any benefits might best be maintained, remain unclear and challenging. For example, individuals show an overall reluctance to completely disregard previously acquired knowledge (diSessa, 1993; Limon, 2002).

Accurate information intended to help clarify issues and concepts, unfortunately, often represents a best-case scenario. People also encounter inaccurate information that can influence their judgments and decisions (Gerrig & Prentice, 1991; Rapp & Braasch, 2014). For example, based on knowledge norms (Tauber, Dunlosky, Rawson, Rhodes, & Sitzman, 2013), many people are unlikely to know that Marie Curie was the scientist who discovered radium. So after reading an inaccurate statement claiming that Pasteur was responsible for the discovery, they might answer related questions (e.g., “What is the name of scientist that discovered Radium?”) with the false information (Marsh, Meade, & Roediger, 2003). This is not that surprising when people might not know any better. But what is surprising is that participants in these studies also reproduce false information they *already know* is wrong. Based on knowledge norms, people should be well aware that the pilgrims traveled to America on the Mayflower. After reading a statement indicating the ship was the Godspeed, some participants nevertheless answer related questions (e.g., “What ship brought the pilgrims to America?”) with the incorrect lure. The negative consequences of being presented with “alternative facts” obtain even when participants should have existing knowledge about what is and is not correct.

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These examples represent inaccurate, declarative statements, similar to the news headlines, tweets, and provocative proclamations that have incurred claims of “fake news,” or as often, been clear cases of it. People also exhibit an analogous influence of assertions that inaccurately describe information that is less objectively derived and certain. For example, based on direct experience and/or as learned from external sources, and as confirmed by norming studies, people agree with the assertions “seat belts save lives” and “mental illnesses are not contagious” (Prentice, Gerrig, & Bailis, 1997). Nevertheless, when people read inaccurate assertions that indicate seat belts can be safety hazards and mental illnesses are communicable, there are problematic consequences. Following exposures to these inaccuracies, participants take longer to judge the validity of related assertions and are more likely to misidentify inaccurate claims as true, as compared to after exposures to accurate assertions (Rapp, Hinze, Kohlhepp, & Ryskin, 2014). Of course, one could easily construct an imagined case or obtain an anecdote in which seat belts were restrictively harmful, or could reflect on how mental illnesses impact people in a variety of ways. But the malleability of people’s judgments with respect to whether inaccurate assertions are *generally* true, in the face of years of direct and indirect evidence to the contrary, indicates clear, problematic consequences of “post-truth” experiences.

Routine Cognition and Inaccurate Understandings

“Alternative facts,” “fake news,” and misinformation are commonplace (while acknowledging those labels can be also inappropriately applied). Across these cases and others, people seem to exhibit insufficient skepticism or evaluative monitoring in deciding whether to rely on information they have experienced (Rapp, 2016). Several accounts, including core ideas underlying the target article, have indicated that emerging ideologies, developing epistemologies, social media behaviors, and political biases influence the likelihood that individuals will take up and use misinformation, disinformation, and inaccuracies (e.g., Garrett, Weeks, & Neo, 2016; Lewandowsky & Oberauer, 2016; Nyhan & Reifler, 2010). For example, there is growing concern that people reside in filter bubbles, only interacting with viewpoints and ideas consistent with their existing beliefs and failing to engage with alternative perspectives and approaches. But alongside these sociopolitical and technological considerations, it is worth taking stock of whether and how routine cognitive processes play a crucial role in coping with post-truth presentations. The ordinary operations and characteristics of memory, comprehension, and decision-making that help us make sense of the world also contribute to the problematic consequences of exposure to inaccurate information.

The ways in which people encode and retrieve information from memory represent a useful starting point for contemplating processing consequences. Consider that once information is encoded into short- or long-term memory, it has the potential to be retrieved for subsequent use, whether valid or inaccurate (O’Brien & Cook, 2016). It is an unfortunate consequence of memory functioning that when new information is encoded that contradicts prior knowledge, those earlier acquired memory

traces are not overwritten or discarded. Memory traces, once encoded, are viable candidates for retrieval, as a function of the contexts and cues that might reactivate them (Tulving & Thomson, 1973). Questions, for example, can reactivate previously encoded, related information, both episodic and permanent, which can include ideas that were experienced as debunked and wrong. Reactivating those knowledge traces can have problematic consequences, as demonstrated in the previously described findings.

Another processing challenge is that information in memory may not be tagged in ways that highlight validity or veracity. People do not seem to routinely encode whether information they receive is reliable or unreliable during comprehension (e.g., Sparks & Rapp, 2011). We acquire information from countless sources, some of which are more likely to rely on valid evidence for generating and presenting their claims than are others. A useful comprehension strategy would involve separating the useful, valid information from unsubstantiated claims and certain falsehoods. Yet several projects have demonstrated that people often (a) integrate false content into general knowledge, and (b) that false content influences subsequent behaviors (e.g., Appel & Richter, 2007; Fazio, Barber, Rajaram, Ornstein, & Marsh, 2013). Reading and comprehension require precious mental resources, reducing the likelihood that people can also allocate resources to carefully compartmentalize information based on source and content. As a result, accurate and inaccurate memory traces may become muddled together, again allowing for both to be retrieved on subsequent tasks.

Other crucially relevant factors influence the retrieval of information from memory in ways that can create problems for decision-making. Phenomenological feelings that information can be easily accessed from memory often leads individuals to consider information as valid even when it is patently false (Oppenheimer, 2008). Information recently encountered is more readily accessed from memory than is information acquired in the more distant past. As such, recently presented inaccuracies might be recalled on a test, or influence judgments we make about the world, as that information might *seem* true or relevant (Fazio, Brashier, Payne, & Marsh, 2015). The availability of information from short- (e.g., recently read materials) and long-term memory (i.e., prior knowledge) is also enhanced when encoded information is surprising and incongruous, is emotionally arousing, and plausibly fits into existing understandings. This range of impactful factors further complicates the likelihood of using inaccurate information as well as efforts to reduce it.

People’s metacognitive judgments about what they know also do not seem to help the matter. Individuals often claim to know more than they actually do (Kruger & Dunning, 1999), which creates difficulties for making decisions about which content and understandings to rely upon. Consider that after reproducing inaccurate information to complete comprehension and decision-making tasks, participants sometimes report that they knew those answers before having even engaged in the task (Marsh et al., 2003). This of course is questionable given that participants were unlikely to have encountered those falsehoods in other contexts prior to participating in the experiment.

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