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TRUTHINESS

How non-probative photos shape belief

Eryn J. Newman and Lynn Zhang

“Breaking: Tens of thousands of fraudulent Clinton votes found in Ohio warehouse”. In late 2016, an estimated six million people on social media and other news websites were exposed to this claim, which appeared with a photo of a man standing in front of stacks of ballot boxes.¹ This claim was fake news invented by a college student. And the photo? A stock photo that the same college student found using a “ballot boxes” search on google. The Clinton example is not unique. Fake news and misinformation are often accompanied by decorative photos that relate to the general topic but do not provide any probative evidence regarding whether the headline is actually correct (see examples here: Politico Staff, 2017). From a communications perspective, the use of related stock photos makes sense: photos capture attention, and can at times, aid comprehension and increase the chances that people remember the associated content (Carney & Levin, 2002; Knobloch, Hastall, Zillmann, & Callison, 2003; Waddill & McDaniel, 1992). But decorating headlines or claims with these non-probative photos can have more insidious effects on people’s beliefs.

A growing body of work shows that even a brief exposure to a related but non-probative photo can bias people to believe that an associated claim is true, despite the fact that the photo offers no diagnostic evidence for the claim’s veracity, a *truthiness effect*² (Fenn, Newman, Pezdek, & Garry, 2013; Newman, Garry, Bernstein, Kantner, & Lindsay, 2012; Newman et al., 2015). This truthiness effect holds over several days and influences a range of judgments, including judgments about general knowledge facts, predictions about future events, and judgments about our own episodic memories. We review the literature on truthiness, documenting the ways in which photos and other kinds of non-probative information can rapidly change people’s beliefs, memories, and judgments about their own general knowledge. We also examine the mechanisms contributing to truthiness and explore the implications for fake news and misinformation.

Non-probative photos and truthiness

It is well-established that misleading photos can trick us. When they are doctored to represent an event that never happened, or are paired with repeated suggestion from a trusted source, they can lead people to believe and remember completely false information (Lindsay, Hagen, Read, Wade, & Garry, 2004). But photos like the ballot boxes, that simply decorate, viewed only briefly, have been treated as relatively innocuous (e.g., Carney & Levin, 2002). What is the evidence that such decorative, non-probative photos have any impact on people's beliefs?

Experimental research on truthiness

In one of the first experiments to examine the influence of non-probative photos, people were asked to participate in a trivia test where they saw a series of general knowledge claims appear on a computer screen (Newman et al., 2012). The key manipulation in this experiment was that half of the claims appeared with a related non-probative photo, much like the format one might encounter in the news or on social media, and half of the claims appeared without a photo. For example, participants in this trivia study saw claims like "Giraffes are the only mammals that cannot jump" presented either with a photo, like the headshot of a giraffe in Figure 6.1, or without a photo. Despite the fact that the photos provided no evidence of whether the claims were accurate or not – the headshot of the giraffe tells you nothing about whether giraffes can jump – the presence of a photo biased people toward saying the associated claims were true. Photos produced *truthiness*, a bias to believe claims with the addition of non-probative information. In another set of experiments, published in the same article, Newman and colleagues conceptually replicated the finding. In these experiments, participants were asked to play a different trivia game: "Dead or Alive" (a game that a co-author remembered from old radio programming). The key task was to judge whether the claim "This person is alive" was true or false for each celebrity name that appeared on the screen. Half the time, those celebrity names appeared with a non-probative photo – a photo that depicted the celebrity engaged in their profession but did not provide any evidence about the truth of the claim "This person is alive". For instance, subjects may have seen the name "Nick Cave" with a photo of Nick Cave on stage with a microphone in his hand and singing to a crowd (see Figure 6.1). Nothing about the photo provided any clues about whether Nick Cave was in fact alive or not. In many ways, the photos were simply stock photos of the celebrities. The findings from this experiment were clear: people were more likely to accept the claim "This person is alive" as true when the celebrity name appeared with a photo, compared to when there was no photo present. Perhaps more surprisingly, the same pattern of results was found when another group of subjects were shown the *same* celebrity names, with the *same* celebrity photos, but evaluated the opposite claim: "This person is dead". In other words, the very same photos nudged people toward believing

FIGURE 6.1 On the top, an example of a non-probative photo of Nick Cave in the “Dead or Alive” experiments (Newman et al., 2012); on the bottom, an example of a non-probative photo for the trivia claims experiment reported in Newman et al. (2012, 2015)

Source: Photo of Nick Cave: Creative Commons License attribution: Marco Annunziata. Giraffe: Photograph by Fir0002/Flagstaffotos, under the GFDL v1.2 www.gnu.org/licenses/old-licenses/fdl-1.2.en.html

not only claims that the celebrities were “alive” but also claims that the same people were “dead”.

This truthiness effect – that non-probative photos bias people to believe claims – also holds in other domains of judgment. In a commodity market prediction task, Newman, Azad, Lindsay, and Garry (2018) asked people to guess whether claims about various commodities were true or false. Participants saw a commodity name like “Benzene” appear on a computer screen and decided whether the claim that “this commodity will increase in price” was true or false. As in the initial trivia claim studies, the commodities were paired either with or without a photo of the commodity (e.g., a photo of benzene). Although the photos simply depicted the commodities, people were biased to believe the claims when they saw a photo. This pattern was pronounced for positive claims about the future performance of a commodity (e.g., that the commodity will make a profit), which squares with general rose-colored cognitive biases about future events (e.g., Szpunar, Addis, & Schacter, 2012). In a product evaluation task, people were more likely to believe positive claims about wines (e.g., “This wine was rated high quality”) when those wine labels (e.g., Two Quills Pinot Noir) were accompanied by a non-probative photograph depicting the unfamiliar noun in the wine name (e.g., a photo of quills in a pot of ink). This pattern held even when people were given the opportunity to taste the wines bearing a label that did or did not contain a related photo. In other words, even with additional sensory information – the taste of the wine – photos still biased people’s judgments (Cardwell, Newman, Garry, Mantonakis, & Beckett, 2017).

In a memory for actions task, Cardwell, Henkel, Garry, Newman, and Foster (2016) found that people were biased to believe they performed certain actions (saying true more often to claims like “I gave food to this animal” in a simulated zoo game) when they saw a non-probative photo at test. Notably, photos biased people to believe they had performed a given action, regardless of whether they actually had or had not. This result is particularly surprising – while there is some evidence that photos can distort memory for recent actions, the photos in those studies are often combined with variables such as suggestion, elaboration, and repetition, all of which make it more difficult to discern whether a memory is real or not (Lindsay et al., 2004; for a review see Garry & Gerrie, 2005). The results from Cardwell et al. (2016) demonstrate that even a short exposure to non-probative photos in the absence of other suggestive techniques can lead to immediate mistakes in memory. Taken together, the addition of a non-probative photo does not simply shape belief for general knowledge claims. Rather, these photos have systematic effects on belief across a variety of domains and can influence people’s estimates about the performance of commodities, the quality of products, and judgments about their own recent actions. How do photos exert these effects on assessments of truth?

Underlying mechanisms of the truthiness effect

Although these photos offer no evidence about the truth of a claim, there are several reasons why the addition of a related photo might sway people’s judgments.

We consider those possibilities here and review the related empirical evidence. First, we consider the possibility that photos bias belief because photos are inherently trustworthy. Second, we consider the possibility that photos may bias people's belief via a cognitive fluency mechanism, facilitating the semantic processing of a claim. Third, we consider the possibility that photos bias belief because the addition of photos, although non-probative, creates an illusion of evidence. We present the empirical evidence for each of these theoretical accounts.

Do non-probative photos produce truthiness because photos are inherently trustworthy?

Photos are unique in many ways – they capture a moment in time, usually represent real events, and at times are the best evidence that something actually happened (Kelly & Nace, 1994; Strange, Garry, Bernstein, & Lindsay, 2011; see also Nightingale, Wade, & Watson, 2017). Moreover, people tend to trust photos and often cannot detect when a photo is altered or doctored to mislead (e.g., Nightingale et al., 2017). Thus, in the truthiness paradigm, although photos do not provide probative information for a target claim, they might nonetheless boost belief in the claim because photos are inherently credible themselves.

In order to examine the hypothesis that photos bias people to believe via their inherent credibility, Newman and colleagues (2012) examined whether the truthiness effect was tied specifically to photos, or whether people would be biased by other forms of related – non-probative – information. In an experiment testing this hypothesis, people saw celebrity names and were asked to evaluate the truth of the claim that “This person is alive [dead]”. Half the time, those celebrity names were paired with some non-probative semantic information. For one group of subjects, the non-probative information was a photo depicting the celebrity engaged in their profession, as described earlier. For the other group of subjects, the non-probative information was a verbal description of the celebrity engaged in their profession. For instance, instead of seeing a photo of Nick Cave, those in the verbal condition saw a list of semantic information that could easily be extracted from the photo (e.g., male, black hair, microphone, tambourine; see Figure 6.2).

The key finding in this study was that regardless of whether people saw a photo of Nick Cave or a verbal description of Nick Cave, they were more likely to believe the claim that Nick Cave was alive [or dead], compared to when the claims appeared without the addition of non-probative information (Newman et al., 2012). That is, the addition of semantic information, not photos per se, led to a truthiness effect. These findings fit more broadly with research on truth judgments and cognitive fluency (see Schwarz, 2015). In fact, a growing body of work suggests that the addition of conceptually related information (e.g., non-probative photo or words) enhances the semantic processing of claims, biasing people to believe that associated claims are true. We consider this possibility next.

White Man
Long Black Straight Hair
Musician
Microphone

FIGURE 6.2 Examples of photo and verbal conditions, Newman et al. (2012)

Do non-probative photos produce truthiness via an increase in cognitive fluency?

From one moment to the next, people tend to notice shifts in their ongoing cognitive processing. Whether we are trying to recall general knowledge or imagine a scenario, there is variation in how much effort we must exert in information processing. We are generally aware whether perceiving, understanding, or imagining a claim feels easy and effortless, or difficult and effortful (for reviews see Alter & Oppenheimer, 2009; Jacoby, Kelley, & Dywan, 1989; Schwarz, 2015). When information processing feels easy and smooth, we tend to nod along (see Marsh & Stanley, Chapter 8; Schwarz & Jalbert, Chapter 5). That is, when we can easily retrieve related information from memory, rapidly make sense of, and quickly generate mental imagery about a claim or idea, we tend to believe that it is true. As Schwarz and Jalbert describe in this volume, ease of processing is an important cue to assessments of truth, in part, because easy processing is interpreted as evidence for many important criteria that are related to assessments of truth: information that is easy to process is rated as more coherent, credible, compatible with our own general knowledge, likely to have high social consensus, as well as being well supported by significant evidence (Schwarz, 2015; Schwarz & Newman, 2017).

Non-probative photos should (theoretically) facilitate the conceptual processing of a claim

There are several reasons why a non-probative photo (or related words) might influence the ease of processing a claim and bias people to conclude that a claim is true (see Alter & Oppenheimer, 2009 for a review of factors that lead to cognitive fluency). First, a related non-probative photo should provide a semantically rich context for evaluating a claim, facilitating rapid retrieval of information relating to a target of the claim (see Whittlesea, 1993; Wilson & Westerman, 2018). That is, in evaluating the claim “Giraffes are the only mammals that cannot jump”, a photo of a giraffe should help people to more rapidly retrieve related (but likely non-probative) details about a giraffe (see Carr, McCauley, Sperber, & Parmelee, 1982). When people can rapidly retrieve information (whether that information is diagnostic or not) from memory, they tend to conclude that easy retrieval signals frequency, familiarity, and truth (see related concepts of semantic priming and cognitive availability; Begg, Anas, & Farinacci, 1992; Kelley & Lindsay, 1993; Tversky & Kahneman, 1973; Whittlesea, 1993). Second, a related photo should help people to more vividly imagine the claim at hand. Research shows that when people can easily imagine a hypothetical event, they tend to conclude that it is more likely (Sherman, Cialdini, Schwartzman, & Reynolds, 1985; see Alter & Oppenheimer, 2009 for a review). Third, pairing a related photo with a claim should make that claim more concrete, increasing the ease of understanding elements in the claim. When information is written in concrete

language and is easy to understand, people are more likely to believe it (Hansen & Wanke, 2010; Oppenheimer, 2006). That is, while related non-probative information should not provide evidence for a claim, it should facilitate cognitive processing in three key ways: (1) helping people to rapidly retrieve related semantic details, (2) helping people to easily imagine claims, and (3) helping people to understand the associated claim. It is well-documented in the broader cognitive literature that any one of these variables can increase cognitive fluency and the chances that people agree with a claim, suggesting that non-probative photos may be an especially influential variable in assessments of truth.

Experimental evidence for a cognitive fluency account of truthiness

What is the evidence that photos influence people's assessments of truth via a change in the ease of processing of the claim? There are several predictions that arise from the cognitive fluency literature. The first is that a non-probative photo should bias people to think a claim is true, to the extent that the photo facilitates conceptual processing of the claim. Thus, non-probative photos should produce truthiness when they are semantically related to a claim, but not when they are semantically unrelated (see Alter & Oppenheimer, 2009). The addition of semantically related photos should facilitate conceptual processing of the claim, while the addition of semantically unrelated photos should interfere with the processing of the claim, compared to when there is no photo present at all (Figure 6.3). In order to test this idea, Newman and colleagues (2015) used the general knowledge paradigm described earlier and added one additional tweak to the method: they manipulated the semantic relationship between the photos and the claims.

As in the studies described earlier, people saw trivia claims either paired with a photo or not and had to decide whether those claims were true or false. The key manipulation in these new studies was that half of the subjects saw photos that were semantically related to the claims (e.g., the claim "Magnesium is the liquid metal inside a thermometer" was paired with a photo of a thermometer), and half the subjects saw photos that were semantically unrelated to the claims (e.g., the claim "Magnesium is the liquid metal inside a thermometer" was paired with a photo of a lizard). The results of these studies are consistent with a cognitive fluency interpretation of truthiness – relative to when there was no photo, semantically related photos that should have facilitated conceptual processing of the claim biased people to think an associated claim was true, whereas semantically unrelated photos that should have interfered with conceptual processing of the claim biased people to think an associated claim was false, i.e., a *falsiness effect*.

Another prediction from the fluency literature is that the truthiness effect should be larger when the claims that appear with photos are presented among other claims that appear with no photo. A growing body of work shows that well-established fluency effects are more robust in within-subject, rather than between-subject designs (e.g., Mere Exposure Effect, Truth Effect, Recognition

FIGURE 6.3 Representative examples of semantically related and unrelated photos from Newman et al. (2015)

Source: Photo of Thermometer: Creative Commons License attribution, Da Sal. www.flickr.com/photos/112931986@N07/11646098174. Lizard: Free Usage, <https://routespartnership.org/industry-resources/images-video-library/free-use-wildlife-images/reptiles>

Memory Effects: Hansen, Dechêne, & Wänke, 2008; Westerman, 2008; for a review, see Wänke & Hansen, 2015). Put simply, an important component of fluency-based effects is the relative ease of processing information. This is not unique to fluency. Indeed, changes in experience are generally more informative than steady states (Berelson & Steiner, 1964). This is exactly what is found in truthiness paradigms: the truthiness effect is more robust in experimental designs that manipulate the presence of a photo within, but not between-subjects (Newman et al., 2015).

A fluency account also predicts that the extent to which photos facilitate processing of a claim should depend on the familiarity of key elements in the claim (see Parks & Toth, 2006; Whittlesea & Williams, 1998). That is, claims with elements that are easy to understand should be closer to a “fluency ceiling” than claims that contain unfamiliar elements (see Cardwell, Newman, Garry, Mantonakis, & Beckett, 2017; Zhang, Newman, & Schwarz, 2018). Therefore, claims with familiar elements like “Two Roses Pinot Noir was rated high quality” should benefit less from the presence of a photo than claims like “Two Quills Pinot Noir was rated high quality”. Several findings within the truthiness literature fit with these predictions. The initial truthiness experiments showed that truthiness was most pronounced for unfamiliar celebrity names like Nick Cave compared to more familiar celebrity names like Brad Pitt (Newman et al., 2012). More recently, Abed, Fenn, and Pezdek (2017) found that photos biased people to believe claims about unfamiliar others, but not claims about oneself, perhaps due to differences in available, relevant knowledge. Moreover, Cardwell et al. (2017) found that the extent to which photos led to a truthiness bias was dependent on how much the presence of a photo had increased comprehension of unfamiliar elements in a claim.

Taken together, these effects are consistent with a fluency account – photos (or words) likely bias people to believe by facilitating the conceptual processing of associated claims. Although these studies provide converging evidence for a fluency account of truthiness, there is at least one other possibility: perhaps photos bias people’s judgments, in part, because people assume that the experimenters, across these different studies, are offering relevant evidence that participants should use to answer the claim.

Do non-probative photos produce truthiness via an illusion of evidence?

When communicating, people expect speakers to provide only information that is relevant to the ongoing conversation and refrain from providing more information than necessary (Grice, 1975). Therefore, when a related, although non-probative, photo is presented with a claim, people may reasonably assume that the photo is relevant to the judgment at hand and that the placement of the photo is the communicator’s attempt to provide supportive evidence for the claim (for

reviews on Gricean effects see Schwarz, 1994, 1996). From this perspective, truthiness may be driven, in part, by an illusion of evidence created by the photo, rather than changes in the ease of processing produced by the photo.

In order to disentangle the illusion-of-evidence account from a fluency account, Zhang et al. (2020) examined truthiness effects in the context of comparative claims. Zhang et al. altered materials from the commodity market prediction task described earlier (Newman, Azad, Lindsay, & Garry, 2018), so that (1) each claim was presented in a comparative format and (2) half of the participants saw comparative claims about easy-to-visualize commodities (e.g., “Shrimp will have increased more in price than rose in three months”) and the other half saw claims about difficult-to-visualize commodities (e.g., “Betel will have increased more in price than leghorn in three months”). A third of the time, those claims appeared with a photo of the linguistic subject of the claim (e.g., *Shrimp* for the high and *Betal* for the low imageability group), a third of the time those claims appeared with a photo of the linguistic referent in the claim (e.g., *Rose* for the high and *Leghorn* for the low imageability group), and a third of the time, those claims appeared with no photo. Using comparative claims and varying the imageability of the items allowed Zhang and colleagues to disentangle a fluency account from an illusion-of-evidence account for the following reasons. From an illusion-of-evidence perspective, photos of both the subject (*Betal/Shrimp*) and the referent (*Leghorn/Rose*) are conversationally and conceptually relevant to the claim and can be treated as supportive evidence for both high and low imageability claims. If the truthiness effect is indeed produced by an illusion of evidence, either photo should bias people to accept the claim as true in both high and low imageability conditions.

From a fluency perspective, however, photos of the subject should produce truthiness, whereas photos of the referent should produce falsiness. Moreover, the truthiness and falsiness effects should depend on the changes in the ease of processing produced by the photos. Research on comparative judgments shows that a comparison begins with an assessment of features of the subject, which are then checked against features of the referent (e.g., Tversky, 1977; Tversky & Gati, 1978). Put simply, the subject is the focus of the claim and people tend to process the subject before the referent. Accordingly, facilitation and impairment in the processing of the subject should have consequences for the processing and consequently the acceptance of the claim. Thus, a fluency account would predict that relative to the no photo condition, a photo of the subject in a comparative claim should increase acceptance of the claim by facilitating the processing of the subject (e.g., presenting a photo of *Betal* for the claim “Betel will have increased more in price than leghorn in three months”), especially when the subject is otherwise difficult to visualize without a photo. In contrast, a photo of the referent should decrease acceptance of the claim by making processing of the subject (and consequently processing of the claim) more difficult than when no photo is presented (e.g., presenting a photo of *Rose* for the claim “Shrimp will have increased more in price than

leghorn in three months”), especially when the subject is otherwise easy to visualize without a photo.

Indeed, Zhang et al.’s findings were consistent with these fluency predictions. Photos of the subject increased, whereas photos of the referent decreased, acceptance of the comparative claim depending on the changes in the ease of processing produced by the photos. In other words, instead of being treated as supportive evidence, photos of the referent acted more like the semantically unrelated photos used in previous research (see Newman et al., 2015), producing a *falsiness* effect. These findings are at odds with an illusion-of-evidence account, which predicts that any related photo would produce truthiness.

Considered together, converging evidence across a range of manipulations supports a cognitive fluency account of truthiness. The addition of related, but non-probative photographs can facilitate the processing of a claim, biasing people to conclude that a claim is true.

Truthiness and illusions of familiarity and knowledge

Although the key focus of this chapter is truthiness, there is a growing body of evidence showing that non-probative photos also shift people’s assessments of familiarity, having implications for how people remember and how they estimate their own general knowledge when they encounter a claim. These findings are critically relevant to how people evaluate fake news and misinformation. We therefore describe those findings here.

Assessments of familiarity are often influenced by how rapidly an idea or associated information is retrieved from memory (see Jacoby et al., 1989). This makes sense – compared to something that is new, when something has been seen before, it is easier to retrieve and easier to identify (e.g., Feustel, Shiffrin, & Salasoo, 1983; Tulving & Schacter, 1990). However, a feeling of familiarity can be manufactured by variables in the current context that happen to facilitate the processing of information, and yet have nothing to do with prior exposure (Whittlesea, 1993). For instance, it is well-established that features of a recognition memory test that make test items feel fluent, can bias people to claim that they have seen the items before, regardless of whether they actually have or not (Westerman, 2008; Jacoby et al., 1989). For example, in a recognition test, people are more likely to claim they have studied a target word (“boat”) when that word appears in a semantically predictive sentence at test (e.g., “The stormy seas tossed the *boat*”) rather than in a more neutral sentence (e.g., “He saved up his money and bought a *boat*”; Whittlesea, 1993). Recently, Wilson and Westerman (2018) demonstrated that adding non-probative photos to a recognition memory test influences people’s memory judgments in a similar way. Photos not only facilitated the speed by which people identified test items, but also produced illusions of familiarity – leading people to claim they had previously seen words that they had never studied (see Brown & Marsh, 2008; repeated photos can also rapidly lead to illusions of familiarity).

Given that photos can produce illusions of familiarity, it is perhaps not surprising that they can also lead people to overestimate how familiar they are with complex concepts in a knowledge estimation task. Across a series of experiments, Cardwell, Lindsay, Förster, and Garry (2017) asked people to rate how much they knew about various complex processes (e.g., how rainbows form). Half the time, people also saw a non-probative photo with the process statement (e.g., seeing a photo of a watch face with the cue “How watches work”). Although the watch face provides no relevant information about the mechanics of a watch, when people saw a photo with a process cue, they claimed to know more about the process in question. When Cardwell et al. examined actual knowledge for these processes, those who saw photos had explanations that were similar in quality to those who did not see a photo. In the context of fake news and misinformation, such findings are particularly worrisome and suggest that stock photos in the media may not only bias people’s assessments of truth but also lead to an inflated feeling of knowledge or memory about a claim they encounter.

Reducing truthiness

Given the powerful effects of non-probative information, one critical question is: how can one reduce truthiness? We address this question from three different perspectives, considering (1) the conditions under which people are susceptible to truthiness, (2) individual differences in susceptibility to truthiness, and (3) whether instructions or alerts about the photos influence susceptibility.

Under what conditions are people susceptible to truthiness?

Prior knowledge

Across the cognitive fluency literature, people are typically less influenced by experiences of easy processing when they have high prior knowledge about the claims they are judging (e.g., Dechêne, Stahl, Hansen, & Wänke, 2010; Parks & Toth, 2006; Unkelbach, 2007). This pattern also holds for truthiness. As described earlier, truthiness effects are typically smaller and less robust when people are evaluating claims that can be easily answered with one’s own general knowledge (Newman et al., 2012). That is, trivia claims like “Mount Everest is the tallest mountain”, tend to produce smaller truthiness effects (Newman et al., 2012; see also Cardwell et al., 2016, 2017; Zhang et al., 2018 for effects of noun familiarity discussed earlier). Notably, while the truthiness effect is reduced under these conditions, it is not fully eliminated (Cardwell et al., 2016, 2017; Newman et al., 2012). This effect of attenuation, is consistent with research on the repetition-based truth effect. The key finding from the truth effect literature is that repeated claims are more likely to be judged as true than new claims (Bacon, 1979; Begg et al., 1992; Hasher, Goldstein, & Topino, 1977; for a review see Dechêne et al., 2010). Like truthiness, this effect is

most robust when people are judging ambiguous claims, via an increase in processing fluency from repeated exposures (see Dechêne et al., 2010). But Fazio and colleagues (2015) showed that the tendency to believe repeated claims holds even when, under other testing conditions, participants demonstrate that they know the correct answer to the claims (Fazio et al., 2015; see also Henkel & Mattson, 2011). Relatedly, Unkelbach and Greifeneder (2018) found robust effects of fluency when clues about the accuracy of the claims were presented to participants while they made judgments of truth. Considered together, the findings from the truthiness literature and the truth effect literature suggest that an experience of easy processing is a robust input in assessments of truth, despite the presence of general knowledge and other more probative inputs (see Unkelbach & Greifeneder, 2018 for an analysis of the combined effects of fluency and declarative inputs).

Negative valence

Another consistent pattern within the truthiness literature is that the bias to believe claims with photos is often completely eliminated or reversed when people are asked to judge negatively valenced claims. For example, in one line of research when people were asked to judge the claim that “This wine was rated *low* quality”, the presence of a photo either had no effect or produced a tendency to disbelieve the claim (Cardwell et al., 2017). Similarly, in the experiments on claims about one’s own actions, when people were asked to judge the claim “I gave this animal *unhealthy* food” a photo of the animal led people to disbelieve the claim (Cardwell et al., 2016). Notably, the typical truthiness effect was found for the corresponding positive claims in these studies; that is, people were more likely to believe that the same wine was rated *high* quality and that they gave the same animal *healthy* food when a photo accompanied the claims. Why would the typical truthiness effect attenuate or reverse for a negatively valenced claim? A large literature shows that a feeling of cognitive ease is an inherently positive experience (Reber, Schwarz, & Winkielman, 2004; Winkielman, Schwarz, Fazendeiro, & Reber, 2003). Indeed, ease of processing generally increases positive, but not negative judgments. For instance, an experience of cognitive fluency leads to higher ratings of beauty and liking, but not disliking, or ugliness (Reber, Winkielman, & Schwarz, 1998; Seamon, McKenna, & Binder, 1998). Moreover, an experience of easy processing is reflected in facial expressions – fluently processed stimuli lead to activation of the zygomaticus, a psychophysiological marker of positive affect (Topolinski, Likowski, Weyers, & Strack, 2009; Winkielman & Cacioppo, 2001). These findings may explain why, in the context of a negative evaluative judgments, the presence of a non-probative photo has little effect on people’s assessments of truth and can in fact bias people to say false to negative claims.

Of course, the findings of the dead or alive study seem at odds with this account. One might expect that a judgment about whether a celebrity is dead

or not is also negatively valenced. But in the dead or alive study, people made judgments about a series of famous names, thus it is possible that the dead or alive status may have been evaluated with fame on the mind, rather than the negative valence of death and loss (see also Cardwell et al., 2017 for a discussion of whether the dead or alive statements were more likely to be interpreted as facts about the world, rather than valenced claims). Better understanding the limitations for the valence effect is a topic worthy of future research. For instance, would priming people to consider infamy versus losing a star influence the extent to which a truthiness effect was detected?

Another related and compelling question to consider – especially in the context of fake news – is whether identity consistent or inconsistent claims can act in the same way as positive or negatively valenced claims. Consider for instance, the opening paragraph. If I am a Hillary or Democratic supporter, the addition of a photo may do less to sway my beliefs than if I am a Republican supporter. That is, the truthiness effect may vary by the extent to which claims align with my own beliefs and political ideology. This is another question that could be addressed in future work.

Who is susceptible to truthiness?

Cognitive styles

The literature on persuasion and attitude change shows that some people are more likely to draw on heuristic cues in evaluating a message than others. This individual difference is usually assessed with the Need for Cognition scale (NFC; Cacioppo & Petty, 1982), which measures how much people enjoy and engage in deep thinking. Those who score high on NFC are more likely to consider the quality of an argument or message as well as the consistency of the evidence presented. As a result, they are more persuaded by strong than by weak arguments. In contrast, those who score low on NFC attend less to the substance of the arguments and are more likely to rely on heuristic cues (such as the status of the communicator) and tangential, non-diagnostic information (for reviews, see Petty & Cacioppo, 1986; Priester & Petty, 1995; see also Reinhard & Sporer, 2008). This may suggest that those who are high in NFC should be less likely to fall victim to truthiness, because they tend to rely less on tangential cues and should be more likely to notice that the photos are non-probative. But we find no reliable evidence for this idea (see Newman, Jalbert, Schwarz, & Ly, 2020). One might expect that perhaps other measures that capture people's tendency to engage in more analytical processing may reduce truthiness. For instance, the Cognitive Reflection Test (CRT) measures one's ability to override an initial intuitive response in favor of a more analytical answer (see Pennycook, Fugelsang, & Koehler, 2015). Those who do well on the CRT may thus be less swayed by the intuitive ease with which the claim is processed, and more likely to notice that the photos are non-probative.

Age

It is well-documented that as people age, their ability to recollect episodic details decreases, while feelings of familiarity are relatively unaffected (for a review see Jacoby & Rhodes, 2006). In the context of memory, this means that older adults are often more susceptible to illusions of memory because they tend to draw on familiarity rather than recollection (Jacoby & Rhodes, 2006; see also illusions of truth Skurnik, Yoon, Park, & Schwarz, 2005). In the context of general knowledge, however, recent evidence suggests that aging may not impair performance, but instead provide protection against biases in assessments of truth. Research on the repetition-based truth effect shows that while older adults and younger adults are similarly susceptible to the truth effect when judging ambiguous claims, older adults show a smaller truth effect than younger adults when judging easier or better-known claims (Brashier, Umanath, Cabeza, & Marsh, 2017, see also Parks & Toth, 2006). One explanation for these findings is that older adults simply know more and could more easily answer the better-known claims. But Brashier and colleagues controlled for knowledge between the two age groups by conducting a knowledge check. Why then, would older adults be less susceptible to the truth effect than younger adults for better-known claims? One possibility that Brashier et al. offer is that older adults have more developed knowledge networks, which increases the likelihood that they can apply relevant knowledge in the moment (see Umanath & Marsh, 2014).

It is possible that similar patterns are observed for truthiness and other fluency-based effects on general knowledge. To date, there has only been one initial study investigating the effects of age on susceptibility to the truthiness effect. In a recent study at a local science center, Derksen, Giroux, Newman, and Bernstein (2019) recruited participants from age 3 to age 60 and asked them to participate in an age-adjusted version of the truthiness paradigm (using claims that both three-year-olds and older adults might find difficult to answer, such as “Woodpeckers are the only bird that can fly backwards”). These data showed no reliable differences in the size of the truthiness effect across different age groups (see also Thapar & Westerman, 2009). This initial research shows that pictures might persuade despite one’s age, although more research is called for here. But this research also raises an interesting possibility – just as older adults are less susceptible to the effect of repeated exposure for better-known claims (Brashier et al., 2017), age may also guard against the effect of non-probative photos for claims that are easy to answer or are better known. This is also an interesting empirical question for future research.

Can instructions or warnings reduce truthiness?

In a world where social media giants like Facebook and Google are scrambling to develop algorithms to detect misleading photos and questionable news stories, are there person-level interventions that can help people protect themselves from

falling victim to the biasing effects of photos? The truth effect literature suggests that the answer is yes. Indeed, giving people a warning about the truth status of claims reduces (although does not eliminate) people's susceptibility to repetition-based truth effect (Jalbert, Newman, & Schwarz, 2020; see also Nadarevic & Aßfalg, 2017). One possible mechanism for this reduction in the truth effect is that people examined claims with a more skeptical lens, overriding feelings of familiarity. Would such a mechanism also reduce the impact of non-probative photos? In recent work, Ly and Newman (2019) found that while a general warning about truth – “take your time and think critically before responding to each claim” – can increase accuracy in judging claims (i.e., ability to discriminate between true and false claims), it did not reduce the truthiness effect (bias to judge claims presented with photos as true). This pattern is compatible with research on misinformation, showing that general warnings typically do not fully eliminate the effects of misinformation (e.g., Butler, Zaromb, Lyle, & Roediger, 2009; Ecker, Lewandowsky, & Tang, 2010).

Explicitly alerting people to the fact that the photos only illustrate elements in the claim, and do not provide evidence for the associated claims, also does not eliminate truthiness, suggesting that photos have an insidious effect on people's assessments of truth (Newman, Garry, Feigenson, & Marsh, 2014). Indeed, in one study, after completing the commodity market prediction task, Newman et al. (2018) asked people how they thought the photos of commodities had influenced their judgments. A total of 62% of participants said that the photos helped them understand or imagine the claim, while another 28% said the photo did nothing or slowed them down. Only 10% said they thought the photo added credibility to the claim. Put simply, people had little insight into how photos shape their judgments (see Pronin, 2007 for a general review of failure to identify bias in judgment). The only instructional manipulation that has successfully eliminated truthiness was to tell people to ignore the photos (Newman et al., 2014). This “ignore” approach may work in an experimental setting but have limited application in natural settings where photos and images tend to capture attention and affect time spent on engaging with online material (e.g., Knobloch et al., 2003).

Truthiness and fake news

The photo-headline formula is a standard template for news – real or fake. At first glance these decorative photos seem to be innocuous, but the research reviewed here suggests they signal truth and can bias people to believe within just a few seconds. The size of the truthiness effect varies across studies and materials, but in a typical trivia claim experiment we recently estimated effect size to be Cohen's $d = .23$, 95% CI [.15, .30]. While participants in these studies were directed to assess truth, those who are scrolling through the news are not necessarily testing truth or on alert for false information. In fact, those who read news online spend on average only 2.5 minutes per visit to newspapers sites (Pew Research Center, 2019), and this time on news stories is further reduced when browsing news on

mobile devices (Dunaway, Searles, Sui, & Paul, 2018). Relatively relaxed processing of news items, combined with disinformation campaigns where stories and headlines are designed to mislead, may mean that photos produce larger biases than we typically detect in laboratory settings. Indeed, recent research shows that when people are not alerted to the possibility of false claims, the illusory truth effect nearly doubles (Jalbert et al., 2020).

The ease of sharing information online may also make the influence of photos more widespread. Although it is difficult to estimate “truthiness in the wild” from lab experiments, recent evidence suggests the effects of non-probative photos hold when participants are tested in a simulated social media environment (Fenn, Ramsay, Kantner, Pezdek, & Abed, 2019). Compared to claims that appeared without photos, participants not only found both true and false information accompanied by photos more likely to be true, but also liked the information more and were more likely to share it on a simulated social media platform. Yet people have little insight into the influence of photos on their judgment (Newman et al., 2018; see Pronin, 2007 for a general review of failure to identify bias in judgment). In fact, individuals tend to believe that others are more vulnerable to fake news and media effects than themselves (Jang & Kim, 2018; Sun, Pan, & Shen, 2008). These findings are worrying, given that an estimated 68% of Americans report getting news from social media platforms (Matsa & Shearer, 2018), while many more are incidentally exposed to news when using such platforms.

Although the focus of this book is on fake news, a headline may not need to be intentionally deceptive in order for photos to promote false beliefs. For example, photos may promote false beliefs when paired with headlines that are designed to entertain. Indeed, sites like *The Onion* or *The Borowitz Report*, which publish satirical articles about fictional events, are often mistaken for real news (Garrett, Bond, & Poulsen, 2019). Although these articles are written in exaggerated language to highlight their satirical nature, they are almost always accompanied by decorative, and sometimes doctored photos, that relate to the fictional events. If people miss the satire, the decorative photos likely encourage false beliefs for stories that are entertainment, not facts. Moreover, some news headlines are exaggerated, although not entirely false, to catch readers’ attention. Paired with a related photo, such headlines may seem real at first, but many readers do not click beyond the headline itself, missing nuances in the longer text (Gabiellov, Ramachandran, Chaintreau, & Legout, 2016). Given that photos can have lasting effects on belief (Fenn et al., 2013) as well as producing false memories (Cardwell et al., 2016; Strange, Garry, Brenstein, & Lindsay, 2011), mere exposure to such photo-headline combinations might create and make false beliefs stick.

Technological advancements and the future of fake news

With the advancement of technology making digital access and spread of information more convenient, detecting instances of fake news on different media

platforms will be critical in addressing the potential for false beliefs. An estimated 64% of adult Americans report that fake news stories are causing them a great deal of confusion about current affairs, and nearly a quarter of Americans report having shared political misinformation online knowingly and unknowingly (Barthel, 2016). Since warnings tend to be more effective when given before than after exposure (Jalbert, Newman & Schwarz, 2020), developing algorithms to detect clickbaits and misinformation online prior to exposure is particularly important.

Reducing the media attention that often follows false headlines may also help to ward off false beliefs. Text analysis on social media reveals that misinformation tends to resurface multiple times after its initial publication, while facts do not (Shin, Jian, Driscoll, & Bar, 2018). This is particularly concerning given that repeated exposure to false information increases the familiarity of the fake news, making false details stick in memory over time (Bacon, 1979; Begg et al., 1992; Hasher et al., 1977; for a review see Dechêne et al., 2010). This holds true even when the intention of the repetition is to correct false details, such as the “myth versus fact” approach commonly used in campaigns that are intended to combat misinformation (e.g., Skurnik et al., 2005; Schwarz, Sanna, Skurnik, & Yoon, 2007; see also Schwarz & Jalbert, Chapter 5). To avoid ironically increasing the chance that false information is misremembered as being true once exposed, perhaps the misinformation is best left ignored. In the meantime, repeating correct information and its corresponding facts while decorating them with photos may help people remember the facts without promoting the myths. It is important to note that while photos can promote acceptance and sharing of misinformation, they can also promote facts (Fenn et al., 2019). Thus, in addition to current investigations of how photos may bias judgment, future work on truthiness should explore how non-probative photos can be used to correct bias and combat misinformation.

Summary

Deciding whether information is accurate or not pervades our everyday lives, whether that is considering a claim from social media, a claim in the news, or a claim in more high stakes contexts such as in the courtroom. Photos appear in each of these contexts, either as decorations or communication tools aimed to capture attention or illustrate a message. But these photos do more than decorate or illustrate – with only a short exposure, a seemingly innocuous, related photo can wield significant and consistent effects on judgment, biasing people toward believing and liking claims within just a few seconds. The truthiness effect adds to a larger literature on cognitive fluency and is yet another example of how the availability of conceptually relevant information can enhance processing, but bias judgment. While people may be confident in their ability to discern fact from fiction, truth from lies, and real from fake, the truthiness effect squares with broader research on eyewitness memory, lie detection and truth, showing that

assessments of truth are fallible and vulnerable to biases we are often unaware of. But the future is not completely bleak. Just as photos bias people to believe false claims, they also make facts stick. The science of truthiness should therefore not stop at the understanding of how judgment can be biased by photos, but be used as a weapon to combat misinformation and promote facts in the post-truth era.

Notes

- 1 See full story: www.nytimes.com/2017/01/18/us/fake-news-hillary-clinton-cameron-harris.html
- 2 Newman and colleagues called this biasing effect of non-probative photos a *truthiness effect*, borrowing a word that US satirist Stephen Colbert coined for “truth that comes from the gut and not books”. See www.colbertnation.com/the-colbert-report-videos/24039/october-17-2005/the-word-truthiness

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