



SCIENCE BRIEF

How does the gut know truth?

The psychology of “truthiness.”

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The comedian Stephen Colbert (2005 video (<http://www.cc.com/video-clips/63ite2/the-colbert-report-the-word---truthiness>)) introduced the term truthiness to describe “truth that comes from the gut, not the book.” Following Brexit and the rise of Donald Trump, the Oxford Dictionaries (2016) selected post-truth as the word of the year 2016 to denote “circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief.” Indeed, current public discourse — on topics ranging from politics to vaccines, from genetically modified food to

human-caused climate change — suggests that knowledge from the gut may often override knowledge from the book, that is, established facts based on scientific evidence. But how does the gut know what’s true? What makes a claim feel right?

Intuitions of truth

When people consider whether something is true, they usually ask themselves one or more of the questions in Table 1. Each of these questions can be answered analytically or intuitively (Schwarz, 2015; Schwarz, Newman & Leach, 2016). Analytic answers, akin to knowledge from the book, draw on relevant knowledge and may involve extensive information search, which is taxing and requires cognitive resources. Intuitive answers, akin to knowledge from the gut, are less demanding and rely on feelings of fluency and familiarity. The easier a claim is to process and the more familiar it feels, the more likely it is judged “true.” When thoughts flow smoothly, people nod along.

Table 1. Criteria for judging truth

Criteria	Analytic evaluation	Intuitive evaluation
Social consensus: Do others believe it?	Search databases, look for supporting statistics, or poll a group or audience.	Does it feel familiar?
Compatibility: Is it compatible with what I believe? Is it compatible with what I feel?	Recall one’s own general knowledge and assess the match or mismatch with new information.	Does it make me stumble? Is it difficult to process, or does it feel right?
Coherence: Does it tell a good story?	Do the elements of the story logically fit together?	Does the story flow smoothly?
Credibility: Does it come from a credible source?	Is the source an expert? Does the source have a competing interest?	Does this source seem familiar and trustworthy?
Support: Is there much supporting evidence?	Look for corroborating evidence in peer-reviewed scientific articles or news reports, or use one’s own memory.	Is the evidence easy to generate or recall?

When knowledge is uncertain, people turn to social consensus to gauge what is likely to be correct (Festinger, 1954) — if many people believe it, there’s probably something to it. Hence, people are more confident in their beliefs if others share them (Visser & Mirabile, 2004) and more inclined to believe scientific theories when there is consensus among scientists (Lewandowsky, Gignac, Vaughan, 2013). But determining the extent of consensus can be difficult and familiarity offers a plausible shortcut — if many people think so, one should have heard it a few times, making it familiar. This gives small but vocal groups a great advantage — the more often they repeat their message, the more familiar it feels and the more people infer that many others agree, even if every repetition comes from the same source. Likewise, a text can feel more familiar merely because it was repeated several times on a page, even when due to a printing error (Weaver, Garcia, Schwarz & Miller, 2007).

People are more likely to accept a claim that is compatible with their own beliefs than one that is not (Abelson et al., 1968; Wyer, 1974). Compatibility can be assessed analytically by checking the claim against other knowledge or intuitively by attending to one’s subjective experiences during exposure. Information that is inconsistent with one’s beliefs elicits negative feelings (e.g., Festinger, 1957) and is processed less fluently than information that is consistent with one’s beliefs (for a review, see Winkielman, Huber, Kavanagh & Schwarz, 2012). These subjective experiences serve as problem signals that trigger more careful assessments of the veracity of a statement. For example, when asked “How many animals of each kind did Moses take on the Ark?” most people answer “two” despite knowing that the biblical actor was Noah, not Moses (Erickson & Mattson, 1981). The biblically themed question feels familiar and people focus on what they are asked about (how many?) rather than a background detail (who). But when the question is printed in a difficult to read font, thus making it harder to process, thoughts flow less smoothly and people are more likely to notice the misleading supposition embedded in the question (Song & Schwarz, 2008).

Table 2. Ease of reading influences detection of misleading question (Song & Schwarz, 2008, Experiment 1)

Print font	% answering without noticing error
“How many animals of each kind did Moses take on the Ark?”	88%
<i>“How many animals of each kind did Moses take on the Ark?”</i>	53%

Claims are also more likely to be accepted as true when they are compatible with how one feels. Kim, Park and Schwarz (2010) induced peaceful or excited feelings before their participants read an advertisement that promised a serene or an adventurous vacation. Participants who felt excited were more likely to think that the adventurous vacation will deliver what the advertisement promised, whereas those who felt peaceful were more likely to think that the serene vacation will live up to its promises. Similarly, angry people may find angry messages credible, even while acknowledging that substantive details are flaky.

Claims are also more likely to be accepted when they form a coherent and plausible story (Johnson-Laird, 2012; Pennington & Hastie, 1993). Coherent stories are easier to process than incoherent stories with internal contradictions. The ease with which stories can be processed serves as an experiential marker for how well things hang together (Topolinski, 2012) — as long as thoughts flow smoothly, the story seems to make sense.

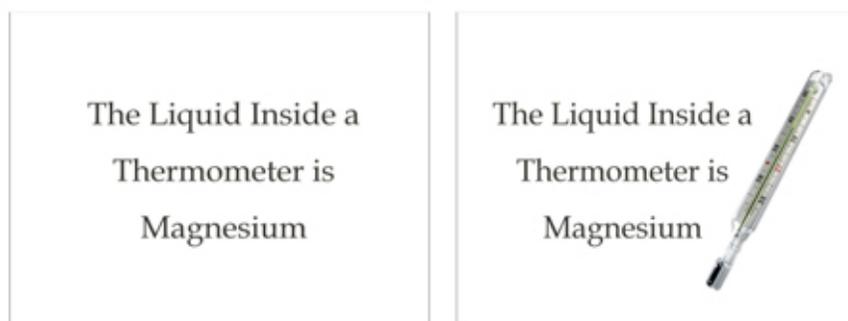
Not surprisingly, information is more likely to be accepted when it comes from a credible source. Source credibility can be evaluated by drawing on the source’s expertise, affiliation, past statements and so on (for a review, see Eagly & Chaiken, 1993). It can also be evaluated intuitively, in which case feelings of fluency and familiarity loom large. Repeatedly seeing a face is sufficient to increase perceived honesty and sincerity as well as agreement (Brown, Brown & Zoccoli, 2001; Weisbuch & Mackie, 2009). People are also more likely to believe statements when they are made in a familiar and easy to understand accent (Lev-Ari & Keysar, 2010) and when the speaker’s name is easy rather

than difficult to pronounce (Newman, Sanson, Miller, Quigley-McBride, Foster, Bernstein & Garry, 2014).

Finally, a claim is more likely to be accepted when it has a large body of supporting evidence. Evidence can be assessed analytically by consulting relevant literature or one's own knowledge. But it can also be gauged by how easy it is to bring some evidence to mind — the more evidence exists, the easier it should be to think of some (Schwarz et al., 1991; Tversky & Kahneman, 1973). Hence, people who are asked to list two supporting arguments are more persuaded by a claim than people asked to list six supporting arguments. Even when people can list many arguments, doing so is more difficult than listing only a few and highlights that good support is difficult to come by (for a review, see Schwarz, Sanna, Skurnik & Yoon, 2007).

A given claim is also more likely to be accepted when it appears with a photo — even when the photo has no probative value (Newman, Garry, Bernstein, Kantner & Lindsey, 2012). For example, people are more likely to believe “Magnesium is the liquid metal inside a thermometer” when they see a photo of a thermometer (Figure 1), even one that provides no information about the liquid inside. Photos exert this influence because they are perceived as offering evidence and make it easier for the reader to understand and imagine the claim. As a result, the claim feels fluent, familiar and true.

Figure 1. Nonprobative photos increase acceptance



In sum, easy processing gives an affirmative intuitive answer to each of the major truth criteria. This reflects reliance on generally correct lay theories of mental processes: Familiar information is indeed easier to process; information that is coherent and compatible with one's knowledge is indeed more likely to be correct; and supporting arguments are easier to generate when there are many of them. But people are more sensitive to their feelings than to where their feelings come from (Schwarz, 2012). They miss that their experienced ease or difficulty of processing may result from influences that are completely unrelated to a claim's veracity, such as number of repetitions, ease of reading (e.g., due to color contrast and print font), listening (e.g., due to accent) and pronunciation (for a review of variables that influence fluency, see Alter & Oppenheimer, 2009). Indeed, the same statement is more likely to be accepted as true when the color contrast makes it easier to read, as illustrated in Figure 2.

Figure 2. Color contrast and truth (based on Reber & Schwarz, 1999)

Text example	Mean acceptance as true across 16 statements
Orsono is a city in Chile.	8.36 (significantly above chance level)
Orsono is a city in Chile.	8.09 (at chance level)

Echo chambers

Intuitive truth tests foster the acceptance of information on social media. On Facebook, one's friends (a credible source) post a message that is liked and reposted by other friends (social consensus), resulting in multiple exposures to the same message. With each exposure, processing becomes easier and perceptions of social consensus, coherence and compatibility increase. Comments and related posts provide additional supporting evidence and further enhance familiarity. At the same time, the filtering mechanism of the feed makes exposure to opposing information less likely, as illustrated by the Wall Street Journal's "Blue Feed/Red Feed (<http://www.wsj.com/video/red-feed-blue-feed-liberal-vs-conservative-facebook/0678AF47-7C53-4CDF-8457-F6A16A46CDAF.html>)" site. Even outside of social media, the personalization of internet offerings facilitates a similar narrowing of one's information diet (Pariser, 2011).

Going beyond the mere acceptance of information, these processes are also likely to leave people with a high sense of expertise and confidence — not only does the information seem true, it has been seen without much opposing evidence. This enhances the familiar phenomena of naïve realism (Ross & Ward, 1996) — the world is the way I see it and whoever disagrees is either ill-informed (which motivates persuasion efforts) or ill-intentioned (if persuasion fails).

Correcting misinformation

False information is notoriously difficult to correct (for comprehensive reviews, see Lewandowsky, Ecker, Seifert, Schwarz & Cook, 2012; Schwarz, Sanna, Skurnik & Yoon, 2007). While suspicion or warnings prior to exposure reduce the acceptance of false (as well as correct) information, corrections after exposure are often futile. Most correction attempts confront misleading statements with facts. This works as long as the facts are highly accessible, but backfires after a delay because it ignores the downstream consequences for intuitive truth assessments. Extensive thought about the misinformation at the correction phase increases fluent processing when the misinformation is re-encountered at a later time. If the correct facts do not easily come to mind at that moment, the false information will feel all the more fluent and familiar, fostering its endorsement as true. For example, telling people multiple times that a health claim is false reduced acceptance of the claim when people were tested immediately, but increased acceptance three days later, when the details were forgotten but the claim felt familiar (Skurnik, Yoon, Park & Schwarz, 2005). Older adults are particularly vulnerable to such backfire effects because memory for details declines faster with age than the global feeling of familiarity when one re-encounters previously seen information (Skurnik et al., 2005).

To be successful, correction attempts should avoid the repetition of false information and instead focus on making the truth as fluent and familiar as possible. Unfortunately, the truth is often more complex than false stories, putting it at a disadvantage. Overcoming this disadvantage requires that

the truth be articulated clearly and repeated frequently, in formats that are easy to process. Photos, illustrations and anecdotes should highlight what is true, without facilitating images of what is false. This is particularly challenging when the false information itself is the key piece of news, for example, when a highly visible public figure posts a false claim on Twitter. Media coverage of such “news events” will inevitably repeat the false claim and spread it to a wider audience. In such cases, it is not sufficient to note that the claim is “unsubstantiated” — a detail that will fade faster than the vivid claim. Instead, media coverage needs to make the truth the primary focus, highlighting in vivid and concrete ways how the false claim deviates from it.

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