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Review

Children's susceptibility to online misinformation

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Abstract

Children have a reputation for credulity that is undeserved; even preschoolers have proven adept at identifying implausible claims and unreliable informants. Still, the strategies children use to identify and reject dubious information are often superficial, which leaves them vulnerable to accepting such information if conveyed through seemingly authoritative channels or formatted in seemingly authentic ways. Indeed, children of all ages have difficulty differentiating legitimate websites and news stories from illegitimate ones, as they are misled by the inclusion of outwardly professional features such as graphs, statistics, and journalistic layout. Children may not be inherently credulous, but their skepticism toward dubious information is often shallow enough to be overridden by the deceptive trappings of online misinformation.

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In February of 2019, a story titled “California newborn becomes first baby to be named an emoji” circulated widely on social media. The story claimed that the US was now allowing parents to use special characters on their child’s birth certificate and that one mother in California had named her baby the emoji equivalent of “heart-eyes heart-eyes, heart-eyes.” The story was fake and could be recognized as such by either its content or its source. The story contained many implausible details, such as that naming laws had changed after a “recent Windows XP update” and that the newborn’s “whole family is planning to change their last names to #yolo.” And the story’s source—prettycoolsite.com—could be

dismissed as unreliable from its URL alone. Still, this story was shared on social media thousands of times, and some of those who shared it were likely children.

The vast majority of US elementary-school-aged children (89%) have access to the internet [1], which they use mainly to watch videos and play games. These activities are typically mediated by content-streaming platforms, like YouTube and TikTok, or social media platforms, like Instagram or Snapchat. Are children prepared to navigate this new information landscape?

Recent research suggests not. Many elementary schoolers think that information found on the internet is generally accurate [2] and that the credibility of a website can be gleaned from its appearance [3]. When searching for information online, they are indifferent to whether a website contains signs of illegitimacy such as factual inaccuracies (“seals are bright green mammals”) or exaggerations (“it snows every day during winter”) [4]. Elementary schoolers also perform no better than chance at differentiating fake news from real news; stories like “California newborn becomes first baby to be named an emoji” are judged true as often as they are judged false [5]. Indeed, in a national survey of elementary schoolers in the UK, only 3% were able to identify which of six news stories were real and which were fake [6].

Older children do not fare much better. Many middle schoolers are unable to identify hoax websites on topics such as male pregnancy [3] or the Pacific Northwest tree octopus [7], and most middle schoolers have trouble explaining why sponsored content from a bank might not provide objective financial advice or why statistics cited in the comments section below a news article should not be included in a research paper [8]. Most middle schoolers also have trouble discriminating between news stories and other content posted on a magazine homepage such as opinion pieces and sponsored advertisements [8]. Even high school students tend to evaluate the credibility of a source based on the information the source has posted about itself rather than searching for more objective information posted by other, independent sources [9].

These problems, at first glance, appear to be a symptom of childhood credulity: children are susceptible to online misinformation because they are susceptible to

misinformation in general. But studies of children's ability to identify and reject dubious information indicate that children are not credulous, not even as preschoolers. Their susceptibility to misinformation would appear to be driven by the medium rather than the message.

Detecting implausible claims

Children are commonly thought to believe that anything is possible, but controlled studies suggest otherwise. Children as young as three have no difficulty identifying events that violate physical laws and judging them impossible. They recognize that objects cannot spontaneously change size, shape, or location and that physical contact is required to bring about such transformations [10]. They also recognize that the laws of nature are immutable and deny that a person could violate them by growing smaller, staying awake forever, walking through a wall, walking on the ceiling, turning into ooze, or floating in the air—even if that person really wanted to or tried really hard [11,12].

If children do err when reasoning about possibility, they err on the side of judging *too little* possible [13]. Young children not only deny the possibility of events that violate physical laws but also deny the possibility of events that violate mere regularities—events that are improbable but not impossible, like drinking onion juice or finding an alligator under the bed [14]. Young children claim a person could not own a pet unicorn in real life, but they also claim a person could not own a pet zebra; they claim a person could not make lightning-flavored ice cream in real life, but they also claim a person could not make pickle-flavored ice cream [15,16]. Children's tendency to judge improbable events impossible has been observed across contexts [17], across cultures [18], and in spite of instruction [19,20].

These findings indicate that children are not credulous, but they also indicate that children are not fully astute in their differentiation of what is possible from what is not. They base their judgments of whether something could occur on their expectations of whether it would occur; events that violate those expectations are deemed impossible without much (or any) reflection [21]. Children's early skepticism is thus broad but shallow. They reject events as impossible without identifying why and, as a result, can easily change their mind. Indeed, at the same time that children reject hypothetical improbabilities, like a person owning a pet zebra, they accept genuine impossibilities, like a person flying through the sky in a reindeer-drawn sleigh, if those impossibilities are backed by a trusted authority.

Prior to age eight, most children believe in Santa Claus, the Easter Bunny, and the Tooth Fairy [22], even though these characters violate physical laws. Children are

aware of the characters' impossible properties, but they accept their existence on the basis of social pressure from family, friends, and other members of their community [23]. Children whose parents encourage belief in Santa believe more strongly than those with less-encouraging parents, but even the latter still believe [24]. Children may be disposed to reject claims that violate their expectations, but that disposition can easily be overridden by social cues to the contrary including the word of trusted authorities, engagement in belief-relevant activities, and perceived consensus among one's peers.

Detecting unreliable sources

Just as children are selective in the claims they believe, they are selective in the sources they trust. When confronted with two informants asserting contradictory claims, children as young as two side with the informant, demonstrating greater reliability [25]. Children assess reliability using a variety of cues, including an informant's past accuracy, knowledgeability, competence, and confidence [26], and they use those assessments to evaluate a variety of claims, including the names of objects, the functions of tools, the rules of games, and the locations of toys, among other facts and procedures [27]. Children's inferences about reliability can be surprisingly subtle, as when preschoolers side with an informant who made an accurate prediction, indicative of prior knowledge, over an informant who made an accurate observation, indicative of attention but not necessarily knowledge [28].

Epistemic cues like accuracy and knowledgeability are not, however, the only cues children take into account; they also consider the informants' social characteristics such as how attractive they are, whether they resemble the child in age or gender, and whether they speak with a foreign accent—cues that have no bearing on the veracity of the informants' testimony [29]. Indeed, we must learn to privilege epistemic cues over social ones, as we initially view both cues as equally informative [30]. That is, young children are no more likely to trust a knowledgeable informant with negative social characteristics than an ignorant or incompetent informant with positive characteristics.

Children's use of social characteristics suggests that their early strategies for evaluating source reliability are not always sound. Another quirk in children's strategies—a quirk of particular relevance to online information—is their fixation on written information over other forms of testimony. As soon as children can read, they defer to text as an authoritative source of knowledge [31] and privilege written information over oral information when deciding which of two assertions to accept [32]. They fixate on written information not only when learning new words or facts but also when

learning new procedures, trusting instructions read from a manual over those transmitted orally from one informant to another [33]. Even children who are poor readers themselves prefer written assertions over oral ones [34].

Writing also overrides children's inclination to reject implausible claims, as they will accept such claims when conveyed by text [35]. If, for instance, they are shown a hybrid animal that looks mostly like a bird and partly like a fish, they will accept that the animal is a fish if the word "fish" appears on an accompanying label. Children who are simply told the animal is a fish reject that assertion, insisting that it is a bird instead. Children's willingness to trust text over their own intuitions is potentially problematic when applied to the internet, where all information is conveyed by text, accurate or not.

Unique challenge of online misinformation

The findings reviewed above indicate that children are epistemically sophisticated in some ways but naïve in others. They exhibit a healthy dose of skepticism in the face of implausible claims and unreliable informants, but they can be persuaded to change their minds by the trappings of authority and authenticity. Such trappings abound on the internet, where children encounter websites, videos, and social media posts designed to legitimize implausible content with professional-looking graphs and formatting and mask unreliable sources with professional-sounding credentials or, alternatively, with the cloak of anonymity.

While children have strategies for identifying dubious information, those strategies are not particularly helpful on the internet, as they are directed toward people, not texts, and pertain to assertions, not records. Children are adept at diagnosing the epistemic credentials of the people around them, tracking their accuracy, competence, and confidence, but such information is unavailable when evaluating text detached from the person who wrote it. If children happen to know something about an author's reliability, they will take that information into account when deciding whether to trust their written assertions [36]. Yet it is rare that internet users know anything about the reliability of online authors beyond the information the authors themselves have divulged.

Likewise, children are adept at identifying implausible claims, erring on the side of too much skepticism rather than too little. But when children encounter information on the internet, it is framed not as mere assertion but as fact—a written record stored in a repository of records that internet users tend to accept at face value. In this medium, misinformation is often presented in the same feeds and with the same formatting as true information,

rendering it more similar to the testimony of an authority than the conjecture of a peer or other lay informant.

The strategies children need for detecting misinformation on the internet are different from those they develop on their own for detecting misinformation in daily life. They need strategies like lateral reading, or verifying information across multiple websites [9], critical neglecting, or disengaging with an online source at the first sign of deception [37], and vigilance towards manipulative motives [38]. The internet is a powerful tool for learning; even children with minimal experience using the internet recognize that it is a better source of information than their peers [39]. But the internet presents information in a way that thwarts children's natural defenses against misinformation, requiring them to learn new strategies tailored specifically to this new medium.

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