

Keeping It Real in the Era of Bots and Trolls

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Today it is much harder to distinguish science from science fiction.⁽¹⁾ The advent of social media has created a universe of information made up of equal parts of opinion, facts and false information.⁽²⁾ The evolutionary shifts in the media environment that have occurred in recent decades have enabled bad actors increasingly to circulate fake news, misinformation, and disinformation⁽³⁾, with the help of trolls, bots, and respondent-driven algorithms.⁽⁴⁾ Internet trolls and bots greatly amplify the message of alternative internet news outlets: Between 9% and 15% of Twitter accounts are estimated to be bots, and Facebook estimates that as many as 60 million bots are currently trolling its platform; in 2016, 20% of all tweets concerning the presidential election came from bots.⁽³⁾⁽⁵⁾⁽⁶⁾ As a result of these changes over the last 30 years, communication in media and political environments has changed profoundly in ways that degrade effective communication.⁽⁴⁾ Rather than process information dispassionately, partisan stakeholders resort to motivated reasoning with the goal of protecting their beliefs and values from external threat. As Iyengar and Massey⁽⁴⁾ put it, “As a result, whenever scientific findings clash with a person or group’s political agenda, be it conservative (as with climate science and immigration) or liberal (as with genetically modified foods and vaccination risks), scientists can expect to encounter a targeted campaign of fake news, misinformation, and disinformation in response, no matter how clearly the information is presented or how carefully and convincingly it is framed.”

Just as the social media sector and policy makers are incessantly faced with the challenge of countering fake news, disinformation, and even hate speech, the field of medicine is similarly confronted with the spread of inaccurate, incomplete, or patently false health information.⁽²⁾ Making things worse, mounting evidence suggests that falsehoods spread more easily than truths online.⁽⁷⁾ This is compounded by a concurrent low trust that is placed in institutions, with a 2016 Gallup report indicating that only 36% of individuals in the U. S. have adequate confidence in the medical system.⁽⁸⁾ Distrust of science and misperceptions of scientific knowledge are derived less from problems of communication and more from misleading and biased information taken from the internet.⁽⁴⁾ Three factors that lead to erosion of trust in science are:

1. A rapid decrease in the cost of publishing information;
2. The expanding opportunities to select a “palatable” online information source;
3. The sheer abundance of misinformation enables its persistence.

In essence, opponents of the content of a report or a message need only call it “fake news” to invoke a conspiracy against that content.⁽¹⁾

Ominously, misinformation on social media can have adverse effects on public health. One example is the increasingly prevalent antivaccine posts that serve to legitimize debate about vaccine safety, potentially reducing vaccination rates and increasing vaccine-preventable disease.⁽²⁾ The concept that MMR vaccination causes autism was based on one flawed study (Wakefield), long since retracted, countered by seventeen much larger and higher quality studies that have proven otherwise. Nevertheless, the internet abounds with celebrities, activists, and politicians with no specific knowledge or training who use their fame to promote a message that causes serious harm.⁽⁹⁾

The number 1 killer of both men and women around the world is cardiovascular disease. Robust scientific advances have fostered significant improvements that benefit individuals and society, but a significant impediment to the optimal management of CVD is false medical information.⁽⁹⁾ Although the scientific community generally still enjoys relatively high levels of public trust, one in five individuals expresses skepticism about scientists.⁽²⁾ Distrust in science and misperceptions of scientific knowledge increasingly stem less from problems of communication and more from the widespread dissemination of misleading and biased information, and concerns about public misinformation in the United States—ranging from politics to science—are growing.⁽⁴⁾⁽¹⁰⁾

Being misinformed is not only a function of a person’s ability and motivation to spot falsehoods, but also of other group-level and societal factors that increase the chances of citizens to be exposed to factual information. In “Science audiences, misinformation, and fake news,” Scheufele and Krause⁽¹⁰⁾ state, “in the most recent US Science & Engineering Indicators (SEI) survey, one in three Americans (36%) misunderstood the concept of probability; half of the population (49%) was unable to provide a correct description of a scientific experiment; and three in four (77%) were unable to describe the idea of a scientific study, indicating an inability among many members of the public...to differentiate a sound scientific study from a poorly conducted one and to understand the scientific process more broadly.” A recent assessment of American students’ media literacy demonstrates that the vast majority of them struggle to (i) recognize the possible biases of politically charged tweets and (ii) distinguish between a news story and news-like advertisement.⁽¹¹⁾

Gaps in perceptions of fake news as a problem and gaps in the ability to meaningfully access corrective information across groups with different socioeconomic status are troubling and are not restricted only to the lay public. Pharmaceutical firms have found ways to influence—and often corrupt—medical research and publications, and key firms and organizations that affect physicians’ clinical choices.⁽¹⁰⁾⁽¹²⁾ These include professional associations, continuing education programs, online professional networking groups, hospital administrators, insurers, organizations that create practice guidelines and diagnostic treatment categories, and patient advocacy organizations.⁽¹²⁾ Since manufacturers sell drugs in a market economy, promotion is inevitable, and some promotion is appropriate.⁽¹²⁾ Nevertheless, marketing is a source of institutional corruption, turning institutions away from their

purpose, when it substitutes false or misleading information for reliable medical knowledge and when it co-opts physicians and researchers into marketing activities.⁽¹²⁾ There is clearly a need to educate professional school faculty and students about the social psychology underlying manipulative marketing. Additionally, the rise of pharmaceutical-firm-funded university research changes the social context of research, and along with it, the opportunities and constraints on researchers.⁽¹²⁾

There are many ways to counter the onslaught of misinformation. One good way is to ensure that our professional charges—students, interns, residents, mentees, and others—have a better grasp on what constitutes good evidence and how to spot inaccurate and incomplete information, in print or online. Another means, summarized by Hill⁽⁹⁾, is that we should “enhance science literacy in our world; one place to start is by doing a better job of teaching the scientific method in our schools so that the lay public is aware that science is accomplished in fits and starts, but, in the end, gets it right.”

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