

Editorial for the Special Issue on Algorithms in Our Lives

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Computer algorithms—used by media platforms, organizations, and governments—are deeply entangled in our lives. They process the myriad traces we leave in the digital and real worlds; classify us in terms of our finances, consumption patterns, media use, legal problems, health issues, and educational prospects; facilitate various tasks from summarizing news to driving cars; and suggest information and services that at best help us and at worst solely maximize profit of their designers. Although the use of computer algorithms goes back decades, the growth of the Internet and the digitization of media have made algorithms central to how we currently acquire and evaluate information. For example, in 2022, 30% of U.S. adults used an online dating site and, of those who were partnered, 10% (20% among 18–29-year-olds) found their match with the help of these sites' algorithms (Vogels & McClain, 2023). Likewise, in 2022, 28% of global survey respondents used social media as their primary online source of news (Newman, 2023), exposing themselves to a variety of algorithms shaping what they see and believe about the world (by contrast, only 23% of respondents claimed direct access to news websites to be their primary online source of news). The latest developments in large language models such as GPT and image-generation systems such as DALL-E allow for the sophisticated use of algorithms to achieve various individual needs, from speeding up routine tasks to getting help with programming, designing courses, searching for jobs, or creating art (OpenAI, 2023). Indeed, in a recent survey, 16% of U.S. adults used ChatGPT for work, and 19% thought that generative AI technologies such as GPT will have a major impact on their jobs (Park & Gelles-Watnick, 2023).

Because algorithms are built and used by people, their success or failure depends on how well they align with important human objectives, how they are used in practice, and how well they can anticipate or be resilient to social dynamics. In recent years, we have seen many social and political problems that stem

primarily from the misalignment of algorithmic and human objectives (Lorenz-Spreen et al., 2023). For example, algorithms that serve us information we might be interested in are typically designed to maximize click rate rather than quality content, and algorithms used in criminal justice and policing can reinforce existing human biases that are damaging to society (Bak-Coleman et al., 2021). Other conflicts stem from unexpected social dynamics that emerge from the complex interactions between people and algorithms. For example, cues that might have been useful for detecting valid information before the advent of digital media, such as social support (Cialdini & Trost, 1998), repetition (Weaver et al., 2007), and the level of detail (Luke, 2019), can now easily be faked and manufactured by widely available AI systems from bots to text- and image-producing systems. Algorithms are now more and more likely to interact and be trained on data from other algorithms (Shumailov et al., 2023), creating further possibilities for unexpected interactions with their human users. Because of the integral human component in both the construction and use of algorithms, it is essential to understand how they interact with our cognitive and social processes. We believe that this represents an important opportunity for psychologists to get involved and to shape research across disciplines. Indeed, this is a major priority of grant funding agencies such as the National Science Foundation (NSF), who have benefited from broad bipartisan support for AI research. Earlier in 2023, the NSF provided \$140 million in funding for seven new AI institutes, many of which will be conducting research at the intersection of AI and the social, behavioral, and cognitive sciences (<https://www.nsf.gov/cise/ai.jsp>).

This special issue is a collection of perspective pieces invited from leading researchers on the interplay

Perspectives on Psychological Science
1–4

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DOI: 10.1177/17456916231214452

www.psychologicalscience.org/PPS



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between humans and algorithms, aiming to help integrate diverse methodologies and theories across psychology and computer science. We organize these articles into two categories: perspectives on how algorithms influence the mental lives of individuals and perspectives on how findings in psychology can be used to design better algorithms. Simplistically, these categories can be seen as describing the effect of algorithms on human psychology and the effect of human psychology on algorithms, respectively. Of course, in reality, there is a dynamic interplay between these two ways of doing research, with the psychology of human responses to algorithms influencing how algorithms should be designed, and vice versa.

Among the articles describing how algorithms influence the lives and minds of individuals, Mellers et al. show how algorithms can be used in conjunction with human judgments to improve forecasting of geopolitical events. Steyvers and Kumar discuss challenges that human–AI collaboration systems must overcome to contribute to better decision-making in a variety of domains. Metzler and Garcia review the mixed effects of digital media on people’s well-being, exposure to misinformation, and polarization and suggest ways to foster beneficial effects of information-curation algorithms. A similar problem is tackled by Lazer et al., who provide a normative framework for assessing individual- and systemic-level effects of information-curation algorithms. Lewandowsky et al. investigate the entanglement between information-curation algorithms and human users and point out the critical need for more transparency, data sharing, and protections for researchers studying this issue. Jung et al. discuss how social media algorithms could benefit offline civic participation, for example, by both reinforcing existing attitudes and exposing users to diverse information. Finally, Rathje et al. show that false, divisive, and outraging content has a higher chance to go viral on social media despite people’s preference for accurate, nuanced, and educational content. Understanding the attributes that cause content to go viral can inform the design and regulation of algorithms.

Among the articles describing how psychology can be used to better understand and design algorithms, Osborne et al. discuss a number of biases that affect machine learning models and call for a tighter collaboration between psychologists and computer scientists to both improve algorithm design and develop new ways for testing psychological theories. Pellert et al. argue that psychometric tests can be used to better understand biases that large language models might have in the way they resemble human personality, values, and moral norms. Kleinberg et al. examine how insights from psychology can allow machine learning models to infer the mental states and underlying goals

of individuals. Gigerenzer describes how psychological research on heuristics can inform algorithm design and discusses the false trade-off between accuracy and the interpretability of algorithms. Hertwig et al. discuss how the phenomenon of deliberate ignorance (whereby one chooses to not know) might be useful in preventing biases in algorithmic and human decisions.

Finally, two articles discuss similarities and differences between modern algorithms and human cognition. Although cognitive scientists have long been using the computer as an analogy for understanding the human mind (Simon, 1979), the human mind is now sometimes used as an analogy for understanding large language models (Frank, 2023). To examine the value of such analogies, we need systematic research grounded in psychological theory. To that end, Gonzalez describes a new framework to assess how well algorithms can emulate human decision-making in dynamic environments and discusses the importance of studying similarities and differences between algorithmic and human decision processes and not just their outcomes. Liu et al. contribute to the ongoing debate about the similarity of large language and image-generation models to human cognition by examining their respective abilities to innovate versus imitate. It is worth noting that some psychologists have also recently proposed replacing human participants with AI algorithms such as GPT (Dillion et al., 2023; Grossmann et al., 2023). Although there are significant conceptual and ethical issues with this proposal, and many researchers have pushed back strongly against the use of AI as a substitute for human participants (Crockett & Messeri, 2023; Mitchell, 2023), there is no doubt that these technologies have remarkable potential for the study of human cognition and behavior. The articles by Gonzalez, Yiu et al., and others illustrate some responsible and rigorous applications of AI to this fundamental research problem.

We stand at the precipice of a digital age that promises to have an impact as profound as the introduction of computers to psychological research in the mid-20th century. Just as the advent of computers in the 1950s and 60s not only offered new research tools but also shaped our understanding of human cognition, we anticipate a similar transformative effect in our current digital era. As we move forward, it remains to be seen how psychological research will adapt and respond to the abundance of digital data and new algorithms that guide human interactions. One thing is clear: A dialogue between research on human psychology and research on algorithms is vital. Our special issue strives to nurture this cross-disciplinary dialogue, offering an initial platform for shared insights and collaboration that, we believe, can serve as a foundation for a longer, more intricate conversation.

Transparency

Editor: Interim Editorial Panel

Declaration of Conflicting Interests

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

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