

Are Digital Technologies the New Silent Determinants of Mental Health?

Martin Dechant
martin.dechant@ucl.ac.uk
University College London
London, UK

Samuel Wilkinson
samuel.wilkinson.22@ucl.ac.uk
University College London
London, UK

Abstract

Mental health is shaped by a complex interplay of social, economic, and environmental factors, yet the role of digital technology remains underexplored in this discourse. While digital tools have transformed healthcare, communication, and daily life, they have also introduced new risks, including algorithm-driven echo chambers, online toxicity, deceptive design, and data privacy concerns. Despite growing evidence linking digital environments to mental health outcomes, technology is often treated as a neutral medium rather than an active determinant of well-being. In this provocation, we argue that digital technology should be recognized as a key determinant of mental health—shaping behaviours, experiences, and structural inequalities in ways that demand critical scrutiny. We call on the Human-Computer Interaction (HCI) community to move beyond solutionist approaches and engage in systemic, interdisciplinary efforts to assess both the benefits and harms of digital technologies. How can we design technology that fosters long-term mental well-being rather than short-term engagement? How do we balance automation with human connection? And ultimately, what responsibility does the HCI community bear in shaping technology's role in mental health? By framing digital technology as a determinant of mental health, we seek to spark a deeper conversation on its systemic impact and the ethical obligations of those designing our digital future.

CCS Concepts

• **Human-centered computing** → **Human computer interaction (HCI)**; • **Applied computing** → **Health informatics**; **Consumer health**; • **Social and professional topics** → *Codes of ethics*.

Keywords

Digital Mental Health, Public Health, Determinants, Commercial,

ACM Reference Format:

Martin Dechant and Samuel Wilkinson. 2025. Are Digital Technologies the New Silent Determinants of Mental Health?. In *Proceedings of (CHI '25 Workshop on Envisioning the Future of Interactive Health)*. ACM, New York, NY, USA, 3 pages.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

CHI '25 Workshop on Envisioning the Future of Interactive Health, Yokohama, Japan
© 2025 Copyright held by the owner/author(s).

1 Introduction

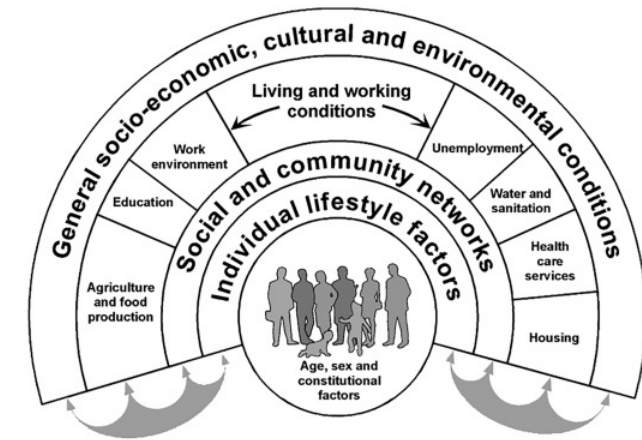
The individual's mental health cannot simply be defined by the individual's behaviour, genetics, or medical care. Dun-Campbell et al. [8] argue that this narrow perceptive lowers the efficacy of interventions and the assessment of mental health needs. Factors such as wider social, political, economic, and commercial forces affect our mental health [14]. Within recent years, more researchers have broadened their perspective on factors affecting our mental health and investigated factors such as wealth [5], education [9], and the impact of public living places [4]. Over the last decades, almost all of these determinants have been enhanced by digital technologies. In most countries around the world, digital tools and assistance systems have been introduced to healthcare and social care facilities [21]. Many of us socialise, work, and play in digital spaces that interweave physical and digital spaces.

While digital technologies have increased social connectivity, access to information and (health) services, and unlocked new great ways to enhance individuals' creativity and productivity, they also introduced new risks: Prior work has, for example, alerted us to the relationship between excessive usage of social media and the increased risk for the development of mental health needs such as anxiety, body-dysmorphia, and lower self-esteem. Algorithm-driven content curation may reinforce filter bubbles, expose individuals to harmful content, and may contribute to the spread of misinformation [19]. Digital surveillance, data privacy concerns, and the commercialization of personal information further complicate the relationship between technology and mental well-being [2].

As digital technologies increasingly shape our daily lives, their role in mental and physical well-being demands deeper examination. While traditional health determinants—such as socioeconomic status, environment, and lifestyle—are widely recognised and explored [8], technology's influence remains underexplored in health research and policy. We argue that Human-Computer Interaction experts should unite with clinical experts to examine the characteristics of the health determinant "health".

2 The determinants of (mental) health

Dahlgren et al. [6] propose the "rainbow" of determinants, which describe a diverse range of social, economic, and environmental factors which influence people's (mental) health. Systematic variation in these determinants causes social inequality, which is an important driver for health inequalities in present times [1]. Prior work explores the role of various types of determinants, such as geographic, social, but also environmental showing that the development and maintenance of mental health needs is a complex interplay of multiple factors beyond the individual[6, 8].



Source: adapted from Dahlgren and Whitehead, 1991

Figure 1: The Dahlgren et al. model of determinants of mental health [6]

Most recently, researchers have begun to focus on one determinant factor much more closely: the commercial determinants of (mental) health. Commercial determinants can be described as *“the systems, practices, and pathways through which commercial actors drive health and equity”* [10]. It includes the direct as well as indirect effects of the consumption of produced commodities, like tobacco, alcohol, fossil fuels and unhealthy foods but also drivers of consumption such as marketing and advertising [15]. Beyond that prior work about commercial determinants has started to look into the role of commercial actors affecting our societal and cultural environments - both strong factors affecting our mental health [7]. Prior work gives plenty of examples which illustrate how commercial decisions affect our mental health, such as the consumption of alcohol and smoking on depression and suicidal rates [8]. This also includes indirect effects such as the framing of “consume responsible” advertisements of harmful commodities blaming the individual for the product’s harm instead of the product [17]. Despite the evidence for the role of unhealthy consumption decisions on (mental) health outcomes, existing discussions on the social determinants of health generally do not fully acknowledge all commercial determinants [16]. A recent umbrella literature review of Dun-Campbell et al. [8] provides a recent overview of the current status of the discussion of commercial determinants of mental health. While most of the larger commodity industries were represented in the review, digital technologies and the analysis of their impact were scarce. However, social media exposure has been identified as a driving factor for common mental health problems including suicide and self-harm. Yet, only social media as technology was identified in this review leading to the question: What is the impact of other digital technologies on our mental health?

3 Digital technology: A “hidden” determinant?

Digital technologies have been more and more interwoven into our daily lives with various goals. This includes enhancing our productivity, increasing the safety of our spaces, or just thrilling

us with new digital entertainment. Also within health services digital technologies become a core component: We’re booking our appointments online or via an app, engaging in telemedicine online, or even using digital assessments or interventions to overcome our mental illnesses. New gadgets, such as smart jewellery, and new enhances sensors in mobile devices, help us to keep track of our body and support us during the day. The rise of smarter artificial intelligence also offers great opportunities to develop digital tools to improve service qualities by smart triage [22], offer assistance (e.g., AI-based therapy chatbots [18]), and enable early public health detection approaches [3]. However, over the last decades researchers, especially in the field of Human-Computer Interaction, raised concerns about the design tactics of digital technologies in general. Concepts such as deceptive design [11] were discovered which affect users’ decisions in digital spaces causing problematic behaviour such as overspending. Other digital social phenomena, like online toxicity [13] and various forms of online harassment [12], have a severe impact on our users’ mental health [20]. However, just like in the physical realm, developers who are confronted with these problems, shift the responsibility of these problems to the individual. A clear example of this issue is online toxicity in digital games. Many multiplayer games foster environments where harassment, cyberbullying, and aggressive behaviour [13] spread. Despite evidence linking online toxicity to stress, anxiety, and lower well-being, developers often shift responsibility to users by offering tools like mute or block functions rather than addressing the root causes—such as competitive ranking systems, anonymity and lack of accountability, and engagement-driven design. This reflects a broader trend in digital technology, where mental health risks are treated as individual concerns rather than systemic issues. If digital environments can foster harmful behaviours that impact well-being, should we not recognize digital technology itself as a determinant of mental health?

4 Where does HCI stand in this field and how can we work together to unravel the role of technology for (mental) health?

As digital technologies become increasingly embedded in our daily lives, especially in the context of health, it is essential to question our current understanding of the determinants of mental health. Traditional determinants, such as socioeconomic status, environment, and lifestyle, have long been recognized for their critical influence on well-being. Yet, the expanding role of digital technologies in shaping our interactions, behaviours, and experiences necessitates a reevaluation of the factors that influence mental health.

Prior work continues to highlight both the positive and negative effects of digital technologies on mental health suggesting that digital tools are not merely supplementary or neutral; they actively shape our well-being. From AI-driven mental health tools to the pervasive use of social media and smart devices, digital technologies have become deeply integrated into health management, self-perception, and social interaction. This development comes with new challenges, such as misinformation, online toxicity, and the reinforcement of harmful behaviours, all of which can cause harm to our mental health.

We propose that **all aspects** of digital technologies should be seen as determinants of mental health, integral to the complex interplay of factors influencing well-being. This change in perspective necessitates a more nuanced, interdisciplinary approach to the development and implementation of digital health tools. It also requires us to ask critical questions, such as whose interests these technologies serve, the role of third parties in shaping our social and cultural environments, and the ethical implications of algorithm-driven content curation. Are we designing tools for genuine support, or are we simply reinforcing engagement metrics that prioritize retention over well-being?

We argue that digital technologies are influencing mental health outcomes just as much as socioeconomic status, environment, and other recognized factors. Therefore, it is our collective responsibility—researchers, designers, clinicians, and policymakers—to ensure that these technologies promote users' well-being instead of serving corporate or economic interests. By embracing this shared responsibility, we can effectively harness the potential of digital technologies to improve mental health rather than detract from it.

References

- [1] [n. d.]. <https://www.gov.uk/government/publications/health-profile-for-england-2018/chapter-6-wider-determinants-of-health>
- [2] Allison E. Aiello, Audrey Renson, and Paul N. Zivich. 2020. Social Media- and Internet-Based Disease Surveillance for Public Health. *Annual Review of Public Health* 41, Volume 41, 2020 (2020), 101–118. doi:10.1146/annurev-publhealth-040119-094402
- [3] Ahmed M Alhuwaydi. 2024. Exploring the role of artificial intelligence in mental healthcare: current trends and future directions—a narrative review for a comprehensive insight. *Risk Management and Healthcare Policy* (2024), 1339–1348.
- [4] Adrian Buttazzoni, Sean Doherty, and Leia Minaker. 2022. How Do Urban Environments Affect Young People's Mental Health? A Novel Conceptual Framework to Bridge Public Health, Planning, and Neurourbanism. *Public Health Reports* 137, 1 (2022), 48–61. doi:10.1177/0033354920982088 arXiv:https://doi.org/10.1177/0033354920982088 PMID: 33563094.
- [5] K N Carter, T Blakely, S Collings, F Imlach Gunasekara, and K Richardson. 2009. What is the association between wealth and mental health? *Journal of Epidemiology & Community Health* 63, 3 (2009), 221–226. doi:10.1136/jech.2008.079483 arXiv:https://jech.bmj.com/content/63/3/221.full.pdf
- [6] Göran Dahlgren and Margaret Whitehead. 2021. The Dahlgren-Whitehead model of health determinants: 30 years on and still chasing rainbows. *Public Health* 199 (2021), 20–24. doi:10.1016/j.puhe.2021.08.009
- [7] Cassandra de Lacy-Vawdon and Charles Livingstone. 2020. Defining the commercial determinants of health: a systematic review. *BMC Public Health* 20 (2020), 1–16.
- [8] Kate Dun-Campbell, Greg Hartwell, Nason Maani, Alice Tompson, May CI van Schalkwyk, and Mark Petticrew. 2024. Commercial determinants of mental ill health: An umbrella review. *PLOS Global Public Health* 4, 8 (08 2024), 1–21. doi:10.1371/journal.pgph.0003605
- [9] Tom Fryers, David Melzer, Rachel Jenkins, and Traolach Brugha. 2005. The distribution of the common mental disorders: social inequalities in Europe. *Clinical Practice and Epidemiology in Mental Health* 1 (2005), 1–12.
- [10] Anna B Gilmore, Alice Fabbri, Fran Baum, Adam Bertscher, Krista Bondy, Ha-Joon Chang, Sandro Demaio, Agnes Erzse, Nicholas Freudenberg, Sharon Friel, Karen J Hofman, Paula Johns, Safura Abdool Karim, Jennifer Lacy-Nichols, Camila Maranha Paes de Carvalho, Robert Marten, Martin McKee, Mark Petticrew, Lindsay Robertson, Viroj Tangcharoensathien, and Anne Marie Thow. 2023. Defining and conceptualising the commercial determinants of health. *The Lancet* 401, 10383 (2023), 1194–1213. doi:10.1016/S0140-6736(23)00013-2
- [11] Colin M Gray, Cristiana Teixeira Santos, Nicole Tong, Thomas Mildner, Arianna Rossi, Johanna T Gunawan, and Caroline Sindors. 2023. Dark patterns and the emerging threats of deceptive design practices. In *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems*. 1–4.
- [12] Evey Jiaxin Huang, Abhraneel Sarma, Sohyeon Hwang, Eshwar Chandrasekharan, and Stevie Chancellor. 2024. Opportunities, tensions, and challenges in computational approaches to addressing online harassment. In *Proceedings of the 2024 ACM Designing Interactive Systems Conference (Copenhagen, Denmark) (DIS '24)*. Association for Computing Machinery, New York, NY, USA, 1483–1498. doi:10.1145/3643834.3661623
- [13] Bastian Kordyaka, Samuli Laato, Katharina Jahn, Juho Hamari, and Bjoern Niehaves. 2023. The cycle of toxicity: Exploring relationships between personality and player roles in toxic behavior in multiplayer online battle arena games. *Proceedings of the ACM on Human-computer Interaction* 7, CHI PLAY (2023), 611–641.
- [14] Antonis A. Kousoulis and Isabella Goldie. 2021. A Visualization of a Socio-Ecological Model for Urban Public Mental Health Approaches. *Frontiers in Public Health* 9 (2021). doi:10.3389/fpubh.2021.654011
- [15] Kelley Lee, Nicholas Freudenberg, Marco Zenone, Julia Smith, Melissa Milon, Robert Marten, Joana Madureira Lima, Sharon Friel, Daniel Eisenkraft Klein, Eric Crosbie, and Kent Buse. 2022. Measuring the Commercial Determinants of Health and Disease: A Proposed Framework. *International Journal of Health Services* 52, 1 (2022), 115–128. doi:10.1177/00207314211044992 arXiv:https://doi.org/10.1177/00207314211044992 PMID: 34723675.
- [16] Nason Maani, Jeff Collin, Sharon Friel, Anna B Gilmore, Jim McCambridge, Lindsay Robertson, and Mark P Petticrew. 2020. Bringing the commercial determinants of health out of the shadows: a review of how the commercial determinants are represented in conceptual frameworks. *European Journal of Public Health* 30, 4 (2020), 660–664.
- [17] Nason Maani, Mark Petticrew, and Sandro Galea. 2023. *The commercial determinants of health*. Oxford University Press.
- [18] Heidi Nieminen, Anna-Kaisa Vartiainen, Raymond Bond, Emilia Laukkanen, Maurice Mulvenna, and Lauri Kuosmanen. 2025. Recommendations for Mental Health Chatbot Conversations: An Integrative Review. *Journal of Advanced Nursing* (2025).
- [19] Donghee Shin. 2024. *Misinformation and Algorithmic Bias*. Springer Nature Switzerland, Cham, 15–47. doi:10.1007/978-3-031-52569-8_2
- [20] Keita Suzuki, Reiko Asaga, Andre Sourander, Christina W Hoven, and Donald Mandell. 2012. Cyberbullying and adolescent mental health. (2012).
- [21] John Torous, Sandra Bucci, Imogen H. Bell, Lars V. Kessing, Maria Faurholt-Jepsen, Pauline Whelan, Andre F. Carvalho, Matcheri Keshavan, Jake Linardon, and Joseph Firth. 2021. The growing field of digital psychiatry: current evidence and the future of apps, social media, chatbots, and virtual reality. *World Psychiatry* 20, 3 (2021), 318–335. doi:10.1002/wps.20883 arXiv:https://onlinelibrary.wiley.com/doi/pdf/10.1002/wps.20883
- [22] Tayler Watson, Rachel Tindall, Amelia Patrick, and Steven Moylan. 2023. Mental health triage tools: A narrative review. *International journal of mental health nursing* 32, 2 (2023), 352–364.