

**Ethical Issues Surrounding Artificial Intelligence Technologies in Mental Health:
Psychotherapy Chatbots**

Şerife Tekin

Forthcoming in

Technology Ethics: A Philosophical Introduction and Readings, Routledge Press

edited by

Gregory Robson and Jonathan Tsou

The last few decades have witnessed a substantial increase in the number and needs of individuals with mental disorders and other mental health concerns. Unfortunately, the increase has not been met with a parallel rise in treatments and interventions available to these communities. Consider the 2016 statistics in the United States: 18.3% of all US adults were diagnosed with a mental disorder, and of these, only 43.1% received some kind of treatment, e.g., inpatient or outpatient counseling or prescription medication (Substance Abuse and Mental Health Services Administration 2017).

The need-availability gap widened during the COVID-19 pandemic (KFF analysis of US Census Bureau, Household Pulse Survey, 2020-2021). For example, about four in ten adults in the US reported symptoms of anxiety or depressive disorder, up from one in ten reporting these symptoms from January to June 2019. Reasons for the gap between the rising demand for mental health treatment and available resources include the stresses of the pandemic, shortage of mental health professionals, especially in remote and rural areas, individuals' inability to recognize their mental health problems, high cost of mental health care, stigma attached to having mental

disorders, and increased needs of vulnerable populations, such as refugees, immigrants, or veterans.

In the face of these problems, recent advances in applications of artificial intelligence in medicine and psychiatry give some reason for optimism, as their proponents believe these technologies will fill the need-availability gap by enhancing resources for mental health care.

One technology that has generated significant enthusiasm is the artificially intelligent chatbots, or what I will call *Chat_Bots*. *Chat_Bots* are purported to provide Cognitive Behavior Therapy (CBT) to their users with the aim of helping them improve their mental health and/or address their mental disorders. In the face of the increased interest in these technologies among researchers and the public at large, a plethora of connected questions has emerged: Are *Chat_Bots* effective tools for mental disorder diagnosis and treatment? Which ethical standards should guide their development and use? Must research on the artificial intelligence-assisted behavioral intervention technology be prioritized over improving other diagnostic and treatment strategies, such as in-person psychotherapy? Should this technology be funded publicly or privately?

This chapter will examine some of the ethical issues concerning the use of *Chat_Bots*. First, I will review what *Chat_Bots* are and the contexts in which they are used, with some examples. Second, I will critically evaluate the promises of the proponents of *Chat_Bots* technology and address the ethical concerns lying therein.

1. Digital Phenotyping and *Chat_Bots*

Artificially intelligent psychotherapy chatbots, or *Chat_Bots*, are downloadable smartphone applications that purported to offer Cognitive Behavior Therapy (CBT) to users with the aim of helping them improve their mental health or address their mental disorders. Advantages of using *Chat_Bots* for mental health problems include their comparatively low cost, wide accessibility through personal cell phones, and ability to offer therapy in different languages, making them an ideal tool, especially in areas where there is a shortage of therapists who speak the native language of individuals requiring mental health care, such as refugees (Tekin, 2021; Becker et al., 2014; Luxton et al., 2011). Before evaluating whether and how *Chat_Bots* might be effective in these contexts, let's review the technology underlying their development and see how they purport to provide Cognitive Behavior Therapy (CBT).

Deploying this type of artificial intelligence technology to address mental disorders relies on the assumption that people's patterns of smartphone use are indicative of their mental health.

Tracking individuals' smartphone use and their interaction with various apps is considered to have advantages over existing tools of diagnosis and treatment where, by the time individuals seek treatment from healthcare professionals, the symptoms and signs of their condition may have significantly progressed. Instead of detecting and then treating mental disorders in the clinic, artificial intelligence technologies promise to detect and intervene in mental states before anomalies become full-blown mental disorders. In other words, the goal is to preempt mental illness and intervene before the illness fully develops (Proudfoot et al., 2013).

The technology that purportedly tracks declining mental states is known as digital phenotyping, a process that involves converting individuals' daily behavior to data. Phenotype refers to individuals' observable traits, e.g., height, gender characteristics, biochemical and physiological composition, and behavior. Phenotypes are the product of our genetics, our environment, the interplay between the two, and the social influence on both. Digital phenotyping is moment-to-moment quantification of the individual-level human phenotype *in situ* using data from personal digital devices (Coghlan & D'Alfonso, 2021; Onnela et al. 2016; Jain et al. 2015). For example, digital phenotyping gathers data on our location, movement, the route we take to work, our voice patterns and speech, length or frequency of texts/calls, number of times visiting a certain app, etc. Although data from such moment-to-moment activities may appear trivial and mundane (Martinez-Martin et al., 2018), some argue they could yield valuable knowledge of hidden current and future ill-health as they provide information about our mental states of behavior (Insel 2018).

Digital phenotyping is made possible through digital sensing, i.e., the activity of digital devices in collecting and storing data about individuals (Coghlan & D'Alfonso, 2021). Digital sensing allows passive, continuous, and quantitative information and can yield much more data and more finely grained data than methods such as periodic questionnaires, interviews, tests, and observations. Electronic activities and digital sensors (Saeb et al., 2015) include accelerometers, GPS, Bluetooth, phone calls, microphone, voice, and text capture (e.g., on social media), skin conductance, gestural sensing, email use, web browsing, and interaction with screens (e.g., swiping, typing, locking, unlocking).

Digital phenotyping collects two kinds of data. Active data require active input from users in response to prompts for those data. For example, questions can be periodically posed by devices to individuals (e.g., “How are you feeling?”). Passive data include unprompted data received from sensors, such as heart rate. Because smartphones collect both active and passive data, they are thought to reflect the user’s mental health status. For example, individuals who are sliding into depression may talk with fewer people, speak slowly, say less, and use a smaller vocabulary, return fewer calls, texts, emails, Twitter direct messages, and Facebook messages, spend more time home and go fewer places, and experience disturbed sleep patterns (Dobbs 2017). All these can be sensed by a phone’s microphones, accelerometers, GPS units, and keyboards. The specificity of these findings still needs to be defined, yet avid proponents of the view that digital phenotyping is the future of the intervention into and treatment of mental disorders are optimistic. For example, Thomas Insel, the former director of the National Institute of Mental Health writes:

Putting sensor data, speech and voice data, and human-computer interaction together might provide a digital phenotype that could do for psychiatry what HgbA1c or serum cholesterol has done for other areas of medicine, giving precision to diagnosis and accuracy to outcomes. (Dobbs, 2017)

Now let’s see how *Chat_Bots* bring together digital phenotyping technology with the core tenets of Cognitive Behavior Therapy (CBT). In terms of technology, *Chat_Bots* rely on active data collected by digital phenotyping, whereby users download *Chat_Bots* and interact/communicate with the app using its prompts. From a clinical standpoint, *Chat_Bots* are designed as if they

were psychotherapists who provide CBT to individuals with mental health challenges and disorders.

CBT is a popular, evidence-based, problem-focused, and time-limited therapeutic approach developed by psychologist Aaron Beck (Beck 1975; Ratnayake 2021). It rests on the assumption that individuals feel bad not only because of events but also because of how they think about those events. It postulates a causal relationship between feelings, thoughts, and behavior that can be summarized as following: *Thoughts create feelings, feelings create behavior, and behavior reinforces thoughts*. For example, thinking we are not worthy of love may cause us to feel bad about ourselves in social situations. Consequently, we may isolate ourselves from our friends. We will receive less attention from our friends, and this, in turn, will exacerbate our negative feelings. CBT aims to break this vicious cycle by helping people change their thoughts, or feelings, or behavior. To achieve this goal, a CBT therapist helps individuals understand that their perceptions of events may be exaggerated or false and encourages them to first re-evaluate and then reframe their interpretations. For example, “I’m never going to make any friends” is an example of distorted thinking in the form of “all-or-nothing.” Removing the (all-or-nothing) distortion leads to a more balanced thought. Rephrasing the thought as “I haven’t made any friends yet” or “I’m sure I’ll make one or two friends eventually” takes the negative and devastating feeling out and helps individuals cope with the reality of their situation in a more constructive way.

For CBT to be effective, people need to repeatedly record their thoughts and challenge them, again and again, before the new thought pattern becomes natural. This is especially difficult at

the moment when they would benefit most from doing it—i.e., when they are experiencing strong emotions.

Let's now examine how *Chat_Bots* are thought to implement CBT. Consider one smartphone psychotherapy chatbot, Woebot. Woebot was created by psychologists and AI experts who aimed to address the mental health needs of those with no access to basic health care. They built Woebot to provide CBT to its users. It is currently available via Facebook Messenger. It has over 17k likes, and its standalone mobile application has around 60k downloads to date. The public interest seems to have turned into a significant user base as well. According to the company's website, Woebot has more than 2 million conversations per week, across more than 120 countries (Woebot website. <https://woebot.io>. Accessed September February 2, 2021). Woebot uses digital phenotyping through brief daily chat conversations, a mood tracking facility, curated videos, and word games to help people manage their mental health. The goal is for people to talk to Woebot when they are feeling emotionally unwell.

Consider this scenario. Suppose Jane has been experiencing a lot of anxiety lately. She is behind in her course work at school, and her boss at the grocery store where she works just scheduled extra shifts for her over the busy holiday season. She cannot say no because she needs this job to pay for her college tuition, and she does not want to disappoint him. But she is also worried about being able to finish her assignments on time. All this has led her to ignore the household chores, and now her roommates are upset with her. Jane is overwhelmed. She has heard about Woebot from her friends at school and decides to download it to see if it can help her with her stress and anxiety. After she registers and enters her data into the app, a little robot person

appears on her screen and gives her an orientation on how to use Woebot. The robot person, or *Chat_Bots*, explains to Jane that Woebot is grounded on CBT, and it teaches its users the skills to help themselves. *Chat_Bots* then proceed to explain to Jane that Woebot “tracks her mood,” “gives her insight,” can “teach her stuff,” “help her feel better,” and “be there 24/7.” Jane starts responding to *Chat_Bots*’s prompts about what and how she is feeling. It is assumed that the more Jane interacts with Woebot the better the *Chat_Bots* will get to know her mental states and provide strategies that will reduce her mental health burdens.

The ostensible advantage of using Woebot is its ability to guide people in challenging their thoughts (Fitzpatrick et al., 2017). Woebot does not develop solutions to individual problems, such as Jane’s ability to dedicate enough time for her school work, but it asks questions so users can find answers on their own. Woebot’s prompts are modeled on CBT; they invite people to recast their negative thoughts in a more objective light, encouraging them to talk about their emotional responses to life events and then to stop and identify the psychological traps causing their stress, anxiety, and depression. Its creators argue that Woebot is not only more affordable than seeing an actual therapist every week (or more frequently); it is also more effective because the person using it does not feel stigmatized. Alison Darcy, one of the psychologists who developed Woebot, said in an interview, “[T]here’s a lot of noise in human relationships... Noise is the fear of being judged. That’s what stigma really is” (Dobbs 2017). For Darcy, when users are talking to an anonymous algorithm, they will not fear judgement. However, these promises are not warranted, as they sidestep the complexity of the experience of mental disorder, and *Chat_Ters* raise some important ethical concerns.

2. Ethical Problems with Chat_Botss

The first ethical problem is what I call the “bot is not a therapist” problem, namely, that it is incorrect to call what *Chat_Bots* do “therapy,” nor can we call *Chat_Bots* “therapists” – even though they are promoted and advertised this way by their developers. The word “therapy” has Greek origins. The verb form *therapeuo* means “to serve, to attend, to be servant,” “to worship (gods),” and “to take care of something or someone (people, animals, the mind, etc.). It also means “to heal, to cure,” a meaning developed in the 5th century by Hippocrates, the father of modern medicine. It is important to highlight that *therapeuo* is a transitive verb and is thus directional; it implies multiple agents or persons participating in the process of healing or taking care. The noun form *therapeia* means “healing,” “curing,” “service done to the sick,” and “a waiting on.” A feminine noun, *therapeia* is directional and assumes a giver and a receiver. In modern psychology, medicine, and psychiatry, therapy has been used to address something taking place between (at least) two agents: the healthcare professional and the patient. Thus, calling *Chat_Bots* therapists implies calling them persons or agents, but they are far from that. If *Chat_Bots* are not agents or persons, they cannot be expected to be in charge of addressing mental health concerns of the individuals using them. This poses an ethical problem: by implying users will receive therapy from an agent, a *Chat_Bots* gives a false promise and thereby overstates its potential benefit.

The “bot is not a therapist” problem has negative clinical and ethical ramifications because a fundamental component of recovery or improvement facilitated by therapy is the therapeutic alliance between patient and therapist, but it is hard to speak about such an alliance between an

individual and a bot. The alliance represents a process where the patient and the therapist work together to determine the goals of treatment based on the patient's existing problems and expectations from psychotherapy. Thinking together, they identify the steps to achieve that goal, forming a connection in the process. Research suggests the therapeutic alliance is a strong predictor of successful outcomes (Ardito and Rabellino 2011; Capaldi et al. 2016). Building a therapeutic alliance is a relational process in which the therapist gives uptake to the patient's concerns, and the patient feels recognized and cared for. *Chat_Bots* are unlikely to offer patients the crucial therapeutic experience of feeling that someone else, despite knowing their flaws and vulnerabilities, cares about them. Perhaps people will seek help from a bot but such help may not bring them the results they need or desire.

The "bot is not a therapist" problem has other implications as well. An important component of successful psychotherapies, or other healthcare treatments in medicine for that matter, is the trust built between the patient and healthcare professionals (Collier 2012). Research indicates that both medical professionals and patients perceive trust to be the fundamental ingredient of a successful treatment program. Some even say, "Without trust, physician-patient interactions could become more like consumer transactions at a shopping mall" (Collier 2012). For example, Rita Charon, the founder of narrative medicine, argues that the clinician must acquire the skills to listen, interpret, and reflect on the patient's stories with an "engaged concern" to achieve therapeutic outcomes because this is the fundamental way in which the patient learns to trust the clinician (Charon 2006). Giving uptake is necessary to build trust. In the field of mental health, this is crucial. Such alliances cannot be formed between a person and a bot as their interactions are mediated by prompts designed by an AI technology rather than a person who cares for the

patient, and the patient who feels recognized and respected by a therapist. In light of this, it is hard to imagine a patient building a trusting relationship with a chatbot.

The second problem is the “trackability assumption,” i.e., the assumption that a psychotherapy chatbot will accurately track individuals’ feelings, moods, and behaviors and will reflect the status of their mental health. There are multiple reasons why this assumption may be false. First, not everyone is equally self-reflective; individuals may not be aware of their moods, the changes in those moods, or how various triggers may affect their moods and behavior. This might lead them to not accurately relay these to *Chat_Botss*. In fact, one advantage of in-person CBT is the psychotherapist’s ability to challenge patients and encourage them to notice the connection between their moods and their behavior. Because *Chat_Bots* like Woebot are self-directed and the users themselves are in charge of tracking and reporting their feelings and moods, they may be limited in fully observing and tracking mental and behavioral phenomena. Second, *Chat-Thers* only know as much as users reveal to them, and they can only help as much as users decide to help themselves. Third, some individuals with mental disorders suffer from anosognosia, which leads them to deny that they have a mental health problem (Amador and David 2004; Tekin 2016). If they do not think they have a problem, they will be less likely to monitor their moods and behaviors. Finally, there is increased awareness worldwide of various concerns about the use of private data by businesses; this may lead users of *Chat_Bots* to self-censor and not report everything about their mental states and behavior. As I discuss below, public awareness of various data businesses’ (such as Facebook) manipulation and selling of private data may lead the potential users of these chatbots to lose trust in their effectiveness, thus hampering their ability to benefit.

The third problem is what philosophers Joshua August Skorburg and Phoebe Friesen have called the “evidence gap.” More specifically, no conclusive data show *Chat_Bots* to be efficacious for diagnosis and treatment (Becker et al., 2014; Skorburg & Friesen, 2021). The number of tested evidence-based mental health apps is small, and studies usually rely on small, non-controlled, and non-randomized samples. Moreover, only a few of them report sustainable results for a period of more than three months, try to replicate these results, or test the effects of mobile interventions on everyday life, work, or social functions in general (Fiordelli et al. 2013; Donker et al. 2013). In fact, the majority of commercially available mental health apps are not supported by robust empirical evidence (Skorburg & Friesen, 2021). For example, while 73 of the most downloaded mental health apps in the iTunes and Google Play stores claim to be effective at improving symptoms, only one includes a citation to a published study (Larsen et al., 2019). The efficacy data are even slimmer for CBT delivered by *Chat_Botss*. The best available evidence suggests *Chat_Bots* may be effective as adjuncts to traditional forms of psychotherapy, but they fail to offer significant benefit on their own. Some may even lead to worse outcomes (Weisel et al., 2019). The technology is advancing so fast that research seems unable to keep up. In addition, there are important questions about evidence. For example, some apps are marketed directly to consumers, who seem less vigilant in relaying evidence of the apps’ effectiveness or limitations. Others, especially apps developed by clinicians, seek endorsement by therapists for their patients and are therefore more forthcoming about their limitations.

The fourth and final problem is the ethical problem of “data privacy.” *Chat_Bots* collect a great amount of demographic and medical information by urging users to enter a lot of personally

identifiable data, for example, name, phone number, email address, age, gender, and even photos. They frequently catalogue lifestyle information, such as food consumption and exercise habits, or information related to diagnoses and treatments (e.g., chronic health/mental health problems, screening results, medication dosages). Moreover, when using the app, people usually create a record of their daily routines and practices (e.g., diet, exercise, mood). Even if the developer has a privacy policy, there are usually no regulations¹ to protect the privacy and security of personal health information; once sensitive information is made public via social media, users have little to no control over it. In addition, there is a strong possibility that *Chat_Bots* will lack reliable security; they might transmit unencrypted personal data over insecure network connections or allow ad networks to track users, raising serious concerns about their ability to protect the privacy and confidentiality of user information (Harris 2013; Njie 2013). Personal health information is of great value to cyber-criminals and can be used to obtain medical services and devices or bill insurance companies for phantom services in the victim's name. As there are few legal protections, victims are forced to pay or risk losing their insurance and/or ruining their credit ratings (Dolan 2013). Fraudulent healthcare events can leave inaccurate data in medical records about tests, diagnoses, and procedures that could greatly affect future healthcare and insurance coverage (Dolan 2013). Erroneous mental health information could even influence a person's social life or work opportunities (Hoffman and Zachar 2017; Tekin 2014).

¹ Note that researchers working on developing and using this technology in the US must abide by the statutes of the Health Insurance Portability and Accountability Act (HIPAA) legislation, which requires data privacy and security provisions for safeguarding medical information. However, if the researchers are not in the US, they may be exempt from such requirements. At this point, there are no universal guidelines.

3. Conclusion

This chapter laid out some ethical concerns about the use of artificial intelligence technology in addressing mental health problems by examining one such technology that promises to provide CBT to its users. Going against the popular wave of enthusiasm for *Chat_Botss*, the chapter raised four ethical problems concerning their use, labeling them “bot is not a therapist” “trackability assumption,” “evidence gap,” and “data privacy.” Given these problems, to the extent the technology is experimented on, developed and used, it should be funded by private funds instead of public money, as the latter option would take much-needed funds away from the development of efficacious diagnostic and treatment methods. In addition, more regulation is needed on the use of these technologies. No clear measures and certifications (from federal or other third-party institutions) are in place to guarantee their effectiveness.

Time is of the essence: smartphone psychotherapy chatbots are already becoming integrated into routine healthcare (e.g., logging data, checking and updating patient status), so we must create strong ethical guidelines for the technology and certification programs for mental health apps worldwide (Ozdalga et al. 2012; Tomlinson et al. 2013), and we must do so quickly. Given my concerns, I suggest research funding should be allotted cautiously. As it stands now, *Chat_Bots* should not be used as a substitute for person-level interventions.

Works cited

Ardito, R. B., & Rabellino, D. (2011). Therapeutic alliance and outcome of psychotherapy: historical excursus, measurements, and prospects for research. *Frontiers in psychology*, 2, 270. <https://doi.org/10.3389/fpsyg.2011.00270>

- Amador, X. F., & David, A.S. (2004). *Insight and psychosis*. New York: Oxford University Press.
- Becker S, Miron-Shatz T, Schumacher N, Krocza J, Diamantidis C, Albrecht U. mHealth 2.0: Experiences, Possibilities, and Perspectives. (2014). *JMIR Mhealth Uhealth*;2(2):e24
- Beck, A.T. (1975). *Cognitive therapy and the emotional disorders*. Madison, CT: International Universities Press, Inc.
- Becker S, Miron-Shatz T, Schumacher N, Krocza J, Diamantidis C, Albrecht U. mHealth 2.0: Experiences, Possibilities, and Perspectives. (2014). *JMIR Mhealth Uhealth*;2(2):e24; DOI: 10.2196/mhealth.3328
- Capaldi, S. Asnaani A; Zandberg L.J.; Carpenter, J.K.; Foa E.B. (2016). Therapeutic alliance during prolonged exposure versus client-centered therapy for adolescent posttraumatic stress Disorder. *Journal of Clinical Psychology*, 72(10); 1026-36
- Charon Rita. (2006). *Narrative medicine: Honoring the stories of illness*. Oxford University Press, New York.
- Collier, Roger. (2012). "Professionalism: the importance of trust." *Canadian Medical Association Journal = Journal de l'Association Medicale Canadienne*, Volume 184,13: 1455-6.
- Coghlan, Simon & D'Alfonso, Simon (2021). Digital Phenotyping: an Epistemic and Methodological Analysis. *Philosophy and Technology* 34 (4):1905-1928.
- Dobbs, D. (2017). The smartphone psychiatrist. *The Atlantic*. <https://www.theatlantic.com/magazine/archive/2017/07/the-smartphone-psychiatrist/528726/>. Accessed 18 Feb 2022.
- Dolan, P.L. (2013). Health data breaches usually aren't accidents anymore. <http://www.amednews.com/article/20130729/business/130729953/4/>. Accessed 18 Feb 2022.
- Donker, T., Petrie, K., Proudfoot, J., Clarke, J., Birch, M. R., & Christensen, H. (2013). Smartphones for smarter delivery of mental health programs: a systematic review. *Journal of Medical Internet Research*, 15,e247.
- Fiordelli, M., Diviani, N., & Schulz, P. J. (2013). Mapping mHealth research: a decade of evolution. *Journal of Medical Internet Research*, 15,e95.
- Fitzpatrick K.K., Darcy A, Vierhile M. (2017). Delivering cognitive behavior therapy to young adults with symptoms of depression and anxiety using a fully automated conversational agent (Woebot): A randomized controlled trial. *JMIR Mental Health*, 4(2):e19.
- Harris, K.D. (2013). *Privacy on the go: recommendations for the mobile ecosystem*. California Department of Justice.

http://oag.ca.gov/sites/all/files/agweb/pdfs/privacy/privacy_on_the_go.pdf. Accessed 18 February 2022.

Hoffman, G.; Zachar, P. (2017). RDoC's metaphysical assumptions: problems and promises. In J. In Poland & Ş. Tekin (Eds.), *Extraordinary science and psychiatry: responses to the crisis in mental health research* (pp. 59–86). Cambridge: MIT Press.

Insel, T. (2018). Digital phenotyping: A global tool for psychiatry. *World Psychiatry*, Volume 17, Number 3, 275-277.

Jain, S.H., Powers, B.W., Hawkins, J.B., Brownstein, J.S. (2015). The digital phenotype. *Nature Biotechnology*, 33 (5): 462- 463.

Larsen, M.E., et al. (2019). "Using Science to Sell Apps: Evaluation of Mental Health App Store Quality Claims," *NPJ Digital Medicine* 2, no. 1: 1-6.

Njie, C.M.L. (2013). Technical analysis of the data practices and privacy risks of 43 popular mobile health and fitness applications. Privacy Rights Clearinghouse. <https://www.privacyrights.org/mobile-medical-apps-privacy-technologist-research-report.pdf>. Accessed 18 Feb 2022.

Onnela, J., Rauch, S.L. (2016). Harnessing smartphone-based digital phenotyping to enhance behavioral and mental health. *Neuropsychopharmacology*, 41 (7): 1691- 1696.

Proudfoot, J., Clarke, J., Birch, M.R., Whitton, A.E., Parker, G., Manicavasagar, V., et al. (2013). Impact of a mobile phone and web program on symptom and functional outcomes for people with mild-to-moderate depression, anxiety and stress: A randomised controlled trial. *BMC Psychiatry*, 13, 312.

Luxton, D. D., McCann, R. A., Bush, N. E., Mishkind, M. C., & Reger, G. M. (2011). mHealth for mental health: Integrating smartphone technology in behavioral healthcare. *Professional Psychology: Research and Practice*, 42(6), 505–512. <https://doi.org/10.1037/a0024485>

Ratnayake, S. (2021). 'I will never love anyone like that again': cognitive behavioural therapy and the pathologisation and medicalisation of ordinary experiences. *Medical Humanities* Published Online First: 29 November. doi: 10.1136/medhum-2021-012210

Saeb, S., Zhang, M., Karr, C. J., Schueller, S. M., Corden, M. E., Kording, K. P., & Mohr, D. C. (2015). Mobile phone sensor correlates of depressive symptom severity in daily-life behavior: An exploratory study. *Journal of Medical Internet Research*, 17(7), e175. <https://doi.org/10.2196/jmir.4273>

Skorburg, J.A.; Friesen, P. (2021) Mind the Gaps: Ethical and Epistemic Issues in the Digital Mental Health Response to Covid-19. *Hastings Center Report* 51, no. 6: 23-26. DOI: 10.1002/hast.1292

Substance Abuse and Mental Health Services Administration. (2017) *Key substance use and mental health indicators in the United States: Results from the 2016 National survey on drug use and health*. HHS Publication No. SMA 17-5044, NSDUH Series H-52.

<https://www.samhsa.gov/data/>

Tekin, Ş. (2021). Is Big Data the New Stethoscope? Perils of Digital Phenotyping to Address Mental Illness. *Philos. Technol.* 34, 447–461. <https://doi.org/10.1007/s13347-020-00395-7>

Tekin, Ş. (2016). Are Mental Disorders Natural Kinds? A Plea for a New Approach to Intervention in Psychiatry. *Philosophy, Psychiatry, and Psychology*, Volume 23, No: 2, 147-163.

Tekin, Ş. (2014). Self-insight in the time of mood disorders: after the diagnosis, beyond the treatment. *Philosophy, Psychiatry, and Psychology*, 21(2), 139–155.

Weisel, K.K. et al. (2019): “Standalone Smartphone Apps for Mental Health—a Systematic Review and Meta-analysis,” *NPJ Digital Medicine* 2, no. 1:1-10.

Woebot website. <https://woebot.io>. Accessed 18 February 2022.