Chapter 10. Technology and Consumer Psychological Wellbeing

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Abstract

This chapter reviews consumers' interactions with technology and its influence on their wellbeing and especially psychological wellbeing. Focus areas discussed in the chapter include smartphones, games, social media, health information technology, artificial intelligence, augmented reality and virtual reality. Some of the specific technologies considered include chatbots, service robots, the use of virtual and augmented reality in the consumer realm, continuous engagement with digital and mobile technologies, mobile health technologies, and activity-promoting gaming. For the most part, the research shows that technology is not generally detrimental to wellbeing. Rather, the way technology is used tends to predict whether there are benefits or risks to wellbeing. The chapter also discusses some extra dangers for the less tech savvy and policy recommendations for minimizing and mitigating the risks technology poses without unnecessarily limiting the potentially life-changing benefits. It is recommended that children are educated about the difference between beneficial and problematic smartphone use, that schools should decide when or whether smartphones can be used in classrooms, that cryptocurrencies should be regulated to protect the environment and consumers, and that industry standards are adopted to protect consumers of artificially intelligent friends.

Introduction

Technology, and especially digital technology, continues to embed itself in the lives of consumers around the world. Technology increasingly affects how consumers buy and what they buy. Automated restocking, drone delivery, and payment using an implanted chip would not have occurred to many consumers a mere couple of decades ago. And yet, these ways to consume now exist and may become commonplace. The continual developments in technology now mean consumers can choose from self-driving cars, 3D printers, glasses that correct colour-blindness, subscriptions to artificially intelligent text and image generators that seem more talented than professional humans, and block-chain-secured digital proof-of-ownership of images of apes wearing hats. These new ways and goods to consume can all affect consumer psychological wellbeing, some of them in profound ways. The continued development of technology and psychological science also allows some technologies to be

specifically designed to improve psychological wellbeing. But, inventive combinations of psychological science and technology can also result in profitable goods that have serious negative effects on consumer psychological wellbeing.

Smartphones and psychological wellbeing

Perhaps the most ubiquitous and significant technology for psychological wellbeing is the smartphone and the infrastructure that supports it (Chan, 2015). The number of smartphone users surpassed 6 billion in 2021 and looks set to nearly match the global total of teens and adults in the near future (Statista, no date). The importance of smartphones is not just based on most people in developed and developing nations having smartphones, it's also how much they use them—up to 5 hours per day on average (in the highest use markets; data.ai, 2023). The psychological wellbeing effects of smartphone use depend on who is using them (e.g., age and culture; Ran et al., 2022), how they are using them (e.g., excessively; Billieux, 2012; Tangmunkongvorakul, 2019), and what they are using them for (e.g., to escape vs to communicate; Horwood & Anglim, 2019).

Smartphones, relationships, and empathy

A striking feature of smartphones is that they enable quick and easy access to people and information. Raine and Wellman (2012) refer to this feature as "networked individualism"—consumers can seek out people and information to the degree they wish and also send information and availability into the various layers and groups around the world. But this freedom may be a double-edged sword.

One of the benefits of this flexible connection technology is that consumers can communicate with loved ones and other humans even if they are physically distant. Relationships are among the most important predictors of psychological wellbeing (Falki & Khatoon, 2016; Jarden et al., 2022); for example, mitigating loneliness (Asher & Paquette, 2003) and depression (Kim & McKenry, 2002) and promoting happiness (Baumeister & Leary, 1995; Demır & Weitekamp, 2007). Smartphones also make it easy to maintain some kind of relationship with lots of people, but research indicates that having a few high-quality relationships is better than many low-quality ones (Demır & Weitekamp, 2007). Communication is important to maintain positive relationships (Hartup & Stevens, 1997). Smartphones provide a wide range of communication options, including voice and video, which appear to be useful for maintaining important relationships and the psychological wellbeing benefits

of those relationships, at least when in-person communication is not possible (Brown & Greenfield, 2021).

But just because smartphones can make it easier to communicate with other people does not necessarily mean that all consumers will use them to maintain important relationships. Smartphones make a huge range of activities possible and highly convenient. When consumers use their smartphones to relax, pass the time, or escape their offline life, research predicts they will have lower psychological wellbeing than consumers using their smartphones for communication and information-gathering (Horwood & Anglim, 2019). See below for details on games and social media.

Turkle (2022a; 2022b) has argued that consumers are increasingly using their smartphones to escape from difficult but important social interactions—the ones that help us to *really* get to know ourselves and each other. If young people hide in their smartphones every time a social interaction appears to be heading deeper than the common "surface" topics like views on celebrities and what the weather is outside, then they miss the opportunity to work through those moments when Turkle sees us as being most vulnerable and human (2022a; 2022b). The empirical research is mixed. Some studies fail to confirm a negative association between smartphone dependency and empathy (Rovithis et al., 2021), but there is evidence in support of smartphone dependency predicting lower altruism (Hao et al., 2020; Rovithis et al., 2021), and of phubbing (phone snubbing—someone using their phone instead of engaging with the people with them) being annoying (Courtright & Caplan, 2020) and, therefore, potentially detrimental. The mixed empirical results about smartphone use and empathy likely reflect the importantly different ways smartphones can be used. Smartphone-based voice and video communication with physically distant friends and family is an important way to share deeply and empathetically with loved ones. Weijers and Munn (2021), also argue that smartphones provide convenient access to text-based discussions that could help some people develop and exercise empathy. Turkle (2011a) has argued that text-based communication is emotionally impoverished and, thereby, less conducive to empathy. However, Weijers and Munn (2021) note that people with visibly obvious physical disabilities or those on the autism spectrum may prefer text-based communication because they can engage more comfortably without visual cues, possibly allowing for more empathetic interactions.

Smartphones and identity

It has long been known that consumption can forge identity, such that consuming certain products and brands can affect how we feel, and visibly consuming certain products or brands can affect how

others perceive the consumer's identity (Hamilton, 2003). Many aspects and kinds of identity have been linked to psychological wellbeing, including gender identity (Thoits, 1992), sexual identity (Rostosky et al., 2018), ethnic identity (Abu-Rayya, 2006), and multiple identities (Thoits, 1983).

Smartphone consumption seems to be an important part of identity creation for many people (He, Li, & Harris, 2012), perhaps because smartphones can fulfill all three of Ahuvia, Izberk-Bilgin, & Lee's criteria for brand love (2022, p. 460): "(a) functioning as a topic of conversation, (b) connecting the consumer with others who identify with the symbolic meanings behind the brands, and (c) providing practical instrumental benefits that support the relationship, such as a cell phone that allows for communication between friends."

Some of the best evidence linking smartphone consumption to identity comes from a study by Clayton, Leshner, & Almond (2015) that sought to test the extent to which iPhone users treat their phones as an extension of themselves and the consequences of being separated from this part of themselves. Based on Belk's Extended Self Theory (1988; 2013) and Sivadas and Machleit's Objects Incorporated into the Extended Self Scale (1994), Clayton and colleagues created an iPhone-specific extended self-scale with items such as "My iPhone is central to my identity" and "My iPhone is part of who I am" (2015, p. 122). The experimental study revealed a "lessening of self" as well as a host of negative psychological effects when participants were separated from their phones (p. 132).

As smartphones, and the applications they carry, become more immersive and more central to the identity of consumers, it is reasonable to expect an increasing risk of negative effects on consumers' psychological wellbeing from some aspects of smartphone consumption. Some of these risks are explored below.

Smartphones and mental health

Increased use of and identification with smartphones sets consumers up for several minor annoyances that may have a more serious impact on the psychological wellbeing of dependent users (see below).

Since access to the internet and power is to smartphones as access to air and nutrition is to humans, interruptions in wireless internet service and related issues can annoy and potentially create anxiety in smartphone users. This issue became acute for students during the COVID-19 pandemic (Lee, Jeong, & Kim, 2021), as inadequate internet access became more than an inconvenience (Lederer et al., 2021), especially for lower-income students (O'Brien et al., 2022; Rudenstine et al., 2021).

Smartphone consumers can also become affected by features of their phones or the parent company's tactics. Bloatware, unwanted applications that hinder performance (McDaniel, 2012), and especially bloatware that cannot be removed or is unnecessarily intrusive can cause annoyance and feelings of suspicion and being used as a mere means (Elahi, Wang, & Chen, 2020). Planned obsolescence, aspects of product creation that are designed to make a product need replacing much sooner than necessary, is rife in technology, especially in smartphones (Proske et al., 2016), and it can annoy consumers for many reasons, including environmental and financial (Barros & Dimla, 2021). This annoyance has led to several class action lawsuits against smartphone companies that are alleged to have forced software updates that make older models so slow they are unusable (Bisschop, Hendlin, & Jaspers, 2022).

Reviews of studies of smartphone use and its impacts on mental health report only very tentative findings due to the quality of the studies. The general effects of smartphone use on the general population (Thomée, 2018) and young people (Girela-Serrano et al., 2022) are not obviously problematic. Excessive use may be linked to anxiety and depression (Girela-Serrano et al., 2022; Thomée, 2018) and may affect sleep quality if it occurs before bedtime (Thomée, 2018), which can negatively affect psychological wellbeing (functioning and affect) the following day (Hamilton et al., 2007).

Excessive use and dependency on smartphones appear to be a serious concern, and not just for adolescents. Bhattacharya and colleagues (2019) have argued that Nomophobia, the fear of being without or unable to use one's smartphone (King, Valença, & Nardi, 2010), is widespread and serious enough to be classified as a mental illness. Yildirim and Correia (2015, p. 134) used a mixed methods approach to validate their Nomophobia Questionnaire, which asks for degree of agreement with statements like: "Running out of battery in my smartphone would scare me" and "If I were to run out of credits or hit my monthly data limit, I would panic". These items were inspired by interviewee comments, including: "If it does go dead, that's the sort of thing when it is like 'I need to charge my phone right now'" and "without that access to the Internet I feel like that would make me uncomfortable'' (Yildirim & Correia, 2015, p. 134). A review of the prevalence of Nomophobia found huge variation in the proportion of people problematically high in Nomophobia, ranging from 1% to 87% of the sample, with women and young people possibly at greater risk (León-Mejía et al., 2021). A review of the effects of Nomophobia concluded that high levels predict a range of psychological and other problems, including anxiety, stress, and poor academic performance (Rodríguez-García, Moreno-Guerrero, & Lopez Belmonte, 2020). Some data suggest that smartphone use and dependency significantly increased during COVID-19 lockdowns, possibly exacerbating this issue

(Bhatnagar, Tarachandra, & Undaru, 2021). Consumers of smartphones should be aware of any increasing dependance and take steps to reduce the risk of harm to themselves.

In addition to harming themselves, high-use consumers of smartphones also risk harming others, at least in some contexts. A review of studies on the effects of parents' phone use on their children notes parents' increasing use of smartphones around their children and identifies some potential risks to their children's psychological wellbeing as a result (McDaniel, 2019). McDaniel cautions readers about the general quality of these studies but highlights that parental phone use does appear to displace communicating with and otherwise paying attention to present children, with likely negative effects on the children's healthy psychological adjustment (Sroufe, 2005). The children themselves seem to have noticed their parents' phone use. Rideout and Robb (2018) report on their nationally representative sample of 1000 US teenagers, highlighting that 33% of them want their parents to spend less time on their smartphones, and 28% of them think their parents would find that difficult because they are addicted. More evidence is needed, but it seems like children of parents who are regularly distracted by their phones may learn fewer words (Reed et al., 2017), perform worse in sports (Stupica, 2016), and suffer from greater developmental delays (Davidovitch et al., 2018).

Games

While the popular conceptualization of a 'gamer' still imagines a teenage male, gaming is now common across all age groups in society and occurs in a variety of forms (Clement, 2022). 'Casual' and 'passive' gaming on mobile devices such as phones and tablets generates an increasing volume of total game time spent (Nieborg, 2016) and increasingly relies on microtransactions to generate income for game developers (Lassila, 2022). Simultaneously, both professional e-sports leagues and popular streaming services such as Twitch have turned gaming as a job into a visible possible career path for people (Johnson & Woodcock, 2019). This conjunction of factors—the widespread accessibility of gaming, its high uptake, monetization, and the blurring of the line between gaming for fun and as work—has raised a number of concerns regarding gaming and psychological wellbeing. It is important not to focus exclusively on the potential psychological harms caused by gaming, however. There are also benefits arising from at least some games and gaming practices, including social wellbeing derived from inclusion in diverse gaming communities and improvements in physical and psychological wellbeing through active gaming, particularly augmented and virtual reality games (Munn, 2012; Munn & Weijers, 2021).

Accessibility & Uptake

Throughout the COVID-19 pandemic, the popularity of video games was, perhaps unsurprisingly, high. Over 3 billion people are 'gamers' (Clement, 2022), and while there remains some truth to the common conception of gamers being mainly young men (72% of American men aged 18-29 sometimes or often game), nearly half of US women between 18 and 49 also often or sometimes play games, whether on computers, TV, consoles or mobile devices (Perrin, 2018). The most popular games are not the ultra-violent first-person shooters which often capture the popular imagination, but rather puzzle and strategy games—more 'casual' experiences that can be played on phones and in short bursts (Perrin, 2018). If pessimistic accounts of the harms caused by videogaming are correct, then we are due an avalanche of harms to global psychological wellbeing from these gamers. However, we have reason to believe that the harms of gaming are often overstated. In particular, the early moral panic about video games and gun violence has been overstated, and there seems little reason to believe these to be meaningfully connected (Suziedelyte, 2021). In moderation, or as part of an otherwise balanced life, this technology need not be harmful at all and can even benefit users—there is a burgeoning area of research utilizing commercially available games as therapeutic tools (Colder Carras et al., 2018). However, there remain some concerning characteristics of videogames.

Monetization

The funding model for many of the most popular modern games revolves around microtransactions rather than upfront payment for a game (Lassila, 2022). So, games are 'free' to play but lock content, time, advantages, or cosmetics behind payments. In this way, games can encourage both overspending and dependence, which can be particularly problematic for people with limited access to income, such as children and teenagers. This problem is exacerbated when the payment model is, as is also common practice, not payment for a guaranteed return but rather payment for lottery tickets—random chances of particular outcomes—often referred to as "loot boxes". Loot boxes and their analogues serve for video games much the same function as booster packs do in collectable card games such as Magic: The Gathering—trading on consumers' desire for that one rare item or card that will make a lot of difference to their gameplay.

To the extent that the enjoyment of video games is gated behind such payment mechanisms, the potential for harm to wellbeing becomes evident. The most notorious of such approaches is exemplified by 'gacha' games, such as Genshin Impact, which exploit players' desire for the best equipment or character to enable their progression within the game by gating their availability behind

games of chance. The dopamine burst from opening the loot box combines with the gambler's fallacy bias (after losses or misses, we assume we are "owed" a win) to entice many consumers to spend more than they (in retrospect) or others (like parents) think they should (Castillo, 2019). Awareness of these issues has led to the threat of class-action lawsuits that could be very costly for the parent companies of games with loot boxes (McDonough, 2019). In reaction to these legal threats, some companies have opted for alternative revenue models. For example, despite some suggestions that Fortnite is not really "free to play" (e.g., Williams, 2021), Fortnite eschews purchasable loot boxes or items that give in-game advantages. Instead, Fortnite makes money by selling a huge and constantly changing array of cosmetics, such as items that change the look of characters but not their in-game proficiency.

Not just fun

The practice of gaming is now a business, rather than merely a hobby. Many people play games for a living, whether as participants in various e-sports leagues or as influencers of various forms on platforms like Twitch and YouTube (Johnson & Woodcock, 2019). With the growth of these forms of engagement with video games, the idea that it is 'just a game' is becoming less true. Gaming is now work, at least for many. While this has some obvious advantages for those who can successfully make a career out of what had in the past been only recreational, this group is small in number, not just in comparison to the total number of gamers in the world, but also in comparison to the number who would like to pursue gaming as a career. The prevalence of such content also generates a range of potentially harmful parasocial relationships between viewers and influencers (Hartmann, 2016). For example, popular content creators can become trapped, beholden to their viewers who may not want them to change their personality, style, or favourite game, and may also demand more regular content and more personal interaction (Munn, Buscicchi, & Weijers, 2021). In this dynamic, streaming can become intense and restricting emotional labour (Woodcock & Johnson, 2019), which can have negative effects for psychological wellbeing (Aung & Tewogbola, 2019; Zapf, 2002).

Psychological wellbeing benefits of gaming

Researchers have now engaged in direct testing of the effects of game-playing on affective wellbeing and have found a positive relationship between the two (Johannes, Vuorre, & Przybylski, 2021). Halbrook and colleagues (2019) found that there are a broad range of contexts in which game playing is beneficial, such as playing in positive social contexts and playing physically active games. Indeed,

there are an increasing number of games which serve to directly improve the physical and psychological wellbeing of participants in them. A successful example is Pokémon Go, which remains wildly popular despite having been initially released in 2016. While the 78 million monthly active users it had in January 2023 is only around a third of its early peak (232 million players in 2016; Wise, 2023), that still represents millions of people who are physically active in pursuit of this mobile game.

Similar advantages for physical health and wellbeing accrue from the burgeoning field of virtual reality gaming. Many of these games serve both as entertainment and as fitness training tools, either incidentally (as in Beat Saber, where gamers undertake physically intensive lightsaber-wielding challenges set to a wide range of popular music) or explicitly (as in FitXR, a competitive fitness training game featuring boxing, high-intensity interval training, and dance workouts). Thanks to the vast global reach of these games and the positive links between exercise, health, and psychological wellbeing (Hassmen, Koivula, & Uutela, 2000), these games have huge positive impact on psychological wellbeing around the world.

Another positive aspect of contemporary gaming culture is that the medium of persistent online multiplayer games, in particular, provides participants with socially and psychologically valuable skills by helping them gain competence in social interactions, develop leadership abilities, and make friends (Munn, 2012; Raith et al., 2021). Various researchers have described these advantages as the building of social capital within online communities via social interaction (Perry et al., 2018; Zhang & Kaufmann, 2017), and they have found these advantages to occur across the age spectrum of participants in these game spaces. Positive social interactions online, including in games, can promote psychological wellbeing and help develop skills for social and other kinds of success in offline environments, which, in turn, can also contribute to promoting psychological wellbeing (Orben, Tomova, & Blakemore, 2020).

Social media

The abundance of products and saturated markets makes targeted marketing an important strategy for companies to communicate with consumers (Kumar & Gupta, 2016). Social media companies, such as Facebook, have become experts at profiling users and providing companies with opportunities for highly precise and personalised marketing communications on a large scale (Svatošová, 2012). The huge number of interactions consumers have on social media platforms, and the possibility to glean social, emotional, political, and financial information from those interactions, makes social media a completely different arena for marketers (Chaffey & Ellis-Chadwick, 2019). In the domain of free-to-

use social media, consumers should realise that they are the product (Du, 2022); social media companies sell the profiles and actions of consumers to other companies and provide them with direct access to the consumers they now know a lot about. Companies are well aware of the advantages of targeted marketing via social media. Not all social media use is via smartphones, but data.ai (2023) predicts that US$362 billion will be spent annually on adverts designed to run on smartphones.

As social media platforms began to monetise their services, they used artificially intelligent algorithms designed to curate the content suggested to users based on what best captured their attention and interactions (Liang, 2022). The algorithms found what many researchers already knew: high-arousal negative emotions such as anger and fear are very engaging to human minds (Al-Rawi, 2019). The algorithms also found that emotionally engaging content does not have to be true to garner a lot of attention (Kozyreva, Lewandowsky, & Hertwig, 2020), and perhaps stoking anger and fear in users is even easier when the content appears to be real but is not. Especially with new AI-backed deepfake technology that can create realistic videos of real people saying and doing things that they have never said or done (Kapur & Ansari, 2022), consumers need to be very careful about how they choose to spend their attention and what they choose to believe, lest false beliefs turn into problems for their psychological wellbeing.

Context matters for the psychological wellbeing effects of social media

Another effect of the algorithms behind social media platforms is that social media use can be highly engaging, and even addictive, as the content provided is tailored to be as appealing as possible to each individual consumer (Bhargava & Velasquez, 2021). The engaging nature of social media has led to 59% of the global population using it, spending an average of two and a half hours on it per day (Chaffey, 2023). This high level of usage has prompted considerable research. The most comprehensive meta-analysis of the effects of social media use on wellbeing shows that the relationship is not significant, meaning that on average and in general social media use does not appear to have a noticeable effect on wellbeing (Hancock et al., 2022). An 8-year longitudinal study came to the same conclusion (Coyne et al., 2020).

However, as with smartphone use, research shows that the effects of social media use depend on several contextual factors. In particular, positive interactions on social media can help mitigate loneliness (Orben, Tomova, & Blakemore, 2020), build and maintain relationships (Roberts & David, 2020), predict social wellbeing (Hancock et al., 2022), and promote positive psychological wellbeing (Kim & Kim, 2022). Social media can also be used to develop confidence by facilitating self-expression

(Pera, Quinton, & Baima, 2020). However, social media use is also positively associated with anxiety and depression, although the associations are relatively small (Hancock et al., 2022). Looking specifically at causal effects, high psychological wellbeing seems to cause lower levels of social media use, while no significant causal relationship was found between psychological distress and social media use (Hancock et al., 2022). Indeed, it seems that how we use social media is much more salient to psychological wellbeing outcomes than whether we use it or even how much we use it. Lee and colleagues (2021) identify two distinct mindsets about social media use: viewing it as a tool and viewing it as an addictive pastime. Mieczkowski and colleagues (2020) found that social media mindset mediates the relationship between social media use and some wellbeing outcomes. Notably, Lee and colleagues (2021) found that viewing social media as a tool was associated with lower levels of anxiety, depression, and stress, while the opposite was true for viewing it as an addictive pastime.

Social media influencers

Social media technologies, including Instagram and YouTube videos, have enabled a new avenue for companies to communicate with consumers through trusted intermediaries—social media influencers. Consumers spend their time and attention on influencers for a range of reasons, including sourcing information and enjoyment that can translate into happiness offline (Kim & Kim, 2020; Kim & Ko, 2019). In a study of consumers of influencer content, Kim and Kim (2022) found that interest similarity, language similarity, and self-disclosure (of the influencer) appeared to increase perceptions of friendship among consumers. In addition to affecting product interest and brand loyalty, perceived friendship appeared to have a relatively strong positive effect on psychological wellbeing (Kim & Kim, 2022). From the consumers' perspective, the perception of friendship with influencers carries some risk. The relationship is unequal in several ways and may be based on inauthenticity (Baek, Bae, & Jang, 2013). If consumers happen to meet their hero or get a glimpse behind the curtain, then they may discover that the influencer does not know them at all or has presented themselves inauthentically. For example, an influencer may believe their online session with followers has finished, so they relax and vent their frustrations about their followers or the product they just endorsed, but the live streaming is still in progress. Events like this can cause feelings of betrayal that are no less important for psychological wellbeing because they occur online (Bourgeois, Bower, & Carroll, 2014; Reich, 2010). Influencers who present idealized lives may also cause psychological distress in their viewers. A study of new mothers found that exposure to idealized (but not realistic) portrayals caused significantly higher levels of envy and anxiety (Kirkpatrick & Lee, 2022).

As for the influencers themselves, very little research has been conducted on their psychological wellbeing (Levesque et al., 2023). Munn, Buscicchi, and Weijers (2021) have pointed out that being a popular influencer likely involves a lot of emotional labour and may make them feel trapped into streaming or posting regularly and doing things just because their followers want them to. Given that so many young people are interested in this line of work (Duffy, 2016), it is somewhat concerning that it may not be conducive to psychological wellbeing.

Health information technology

Whether through wearable technology, like Fitbits, or through online applications accessed through phones or personal computers, we can now monitor and intervene on ourselves and even our psychological wellbeing like never before (Neff & Naus, 2016). This range of technologically mediated options allows people to engage in "personal science", the use of empirical methods for self-improvement (Ajana, 2022; Wolf & De Groot, 2020). However, those who do not wish to share personal data with corporations must be wary (Islam, 2022).

The benefits for psychological wellbeing have been pursued by positive psychologists and others, revealing a great deal of potential (Harrison et al., 2011; Mitchell, Vella-Brodrick, & Klein, 2010). Perhaps most importantly, many online psychological interventions are cheap to create and highly scalable (Boiler et al., 2014), which means they might be especially helpful in places with insufficient mental health resources, such as many low- and middle-income countries (Ospina-Pinillos, Krausz, & Hickie, 2021).

A meta-analysis of positive psychological interventions found that online interventions are less effective than in-person interventions, but they are still effective (Koydemir, Sökmez, & Schütz, 2021). Research also shows that they should be designed and delivered in a context-sensitive way to achieve uptake and psychological wellbeing benefits (Moran, di Blasi, & Setti, 2019; Ospina-Pinillos, Krausz, & Hickie, 2021). Documented benefits of successful online psychological wellbeing interventions include increased positive emotions (Howells, Ivtzan, & Eiroa-Orosa, 2016), reduced depression in moderately depressed people (Sergeant, & Mongrain, 2014), and reduced anxiety in young people undergoing cancer treatment (Greer et al., 2019).

Artificial Intelligence (AI)

Customer service

A once-common consumer expectation—that you will be able to ask a person for assistance in navigating company infrastructure when, for example, you try to change some aspect of your insurance policy—is becoming less common as AI assistants replace human workers, particularly in providing online support. As yet, telephone-based support roles for humans have not been rendered obsolete by technology. But online customer service is increasingly delivered by AI and chatbots rather than humans (Adam, Wessel, & Benlian, 2021). Companies utilizing AI for these purposes see clear advantages to replacing human employees with AI, not least because AI do not usually require wages or health benefits. Perhaps even more importantly, AI is seen as better able to adaptively engage with particular users, thereby increasing the amount of money an individual is likely to spend with a company (Libai et al., 2020). The lack of a human touch does make some consumers less satisfied, but as customer service AIs become more helpful and more human-like in their communication (Hsu & Lin, 2023; Nicolescu & Tudorache, 2022), this will likely diminish.

Robots and digital friends

Consumer AI availability and use have skyrocketed since late 2022 and are likely to continue to rise as these technologies proliferate in a variety of contexts. While projects intending to use robots as caregivers for the elderly and others with ongoing care requirements have existed for many years, the prevalence and quality of AI experience means that such projects (such as elliq.com) have been reinvigorated (Vercelli et al., 2018; Broadbent et al., 2023; Andtfolk et al., 2022). AI-backed chatbots, such as Replika, are much more engaging now as a result of the rapid development of AI capacity, and increasing numbers of consumers are willing to treat them as friends or even lovers (Munn & Weijers, 2023a; Ta et al., 2020; Weijers & Munn, 2022).

One standard worry about the rise of the possibility of care robots and AI friendships is that the development of these, in lieu of the development of human-human connections, will risk making us worse friends and lonelier people (Coeckelbergh, 2018; De Graaf, 2016; Elder, 2015; Turkle, 2011b). But it is not clear that this need be so. It could just as well be that such AI friendships provide those who otherwise do not have good friendships with the ability to grow and foster these with other humans, and in doing so, to lead better lives (Munn & Weijers, 2023a). For example, in a randomized controlled trial, Greer and colleagues (2019) found that young people immediately post-cancer treatment improved their psychological wellbeing (above control) by using an AI chatbot counsellor.

Another risk for people becoming attached to care robots or AI chatbots is that these technological friends tend to be under corporate control. Corporations, following the profit incentive, may radically

change the behaviour of these technological friends with software updates or even terminate them by shutting down that part of their business (Munn & Weijers, 2023b). As the technology progresses in this area, research will need to be ongoing. Until the implications become clearer, consumers are urged to be cautious what they make friends with.

Virtual Reality (VR) & Augmented Reality (AR)

Virtual reality technology is designed to take us, experientially speaking, to a digital place. Using VR enables consumers to experience immersive replications of real life or imaginative surreal or hyperreal environments (Evans, 2013). For example, potential tourists can now 'experience' their holiday destination in advance, either as a means of determining whether they want to go there or even potentially in lieu of going there (Tan et al., 2022). Obviously, the veracity of such experiences can differ dramatically, and the willingness of tourists to engage in such activity is declining now that COVID travel restrictions are largely a thing of the past. However, there are at least some subdomains of tourism where particular consumers stand to benefit from the expansion of tourism practice into virtual environments. For example, those who do not want to or cannot afford to travel internationally now have access to famous monuments and environments via virtual reality (Wilson, 2020). As well as preventing the degradation of these rarities, virtual tourism could help satisfy consumers' curiosity and desire to explore widely.

Augmented reality technology combines some virtual aspects with users' current experience of reality, such as superimposing a virtual avatar into a camera app in a phone. AR, as it currently exists (and potentially future iterations of VR), will also bring with them new legal and social challenges that may bear on users' psychological wellbeing. There is the risk of criminal liability for actions undertaken while utilizing AR technology, such as distracted driving because you were playing Pokémon Go behind the wheel (Lemley & Volokh, 2018). AR and VR also amplify concerns already mentioned in the smartphone section about the psychological wellbeing risks of users becoming increasingly tethered to their devices. AR interfaces, such as Pokémon Go, provide further motivation for consumers to use these devices for increasing amounts of time, and in ways that are both more immersive and, consequently, more risky than the types of use which generated the initial waves of concern regarding the prevalence of smartphones. Again, however, the wellbeing risks are linked to how the technology is used; many users of Pokémon Go use it safely and get the physical and psychological wellbeing benefits of the extra exercise.

Extra dangers for the less-tech-savvy

Not fully understanding technology can actively undermine wellbeing in an environment where new technologies are constantly emerging. This was illustrated during the enforced social isolations mandated during the COVID-19 pandemic, wherein those with the skills and competencies to engage socially online fared better than those who lacked these skills, often the elderly, the less financially secure, or both (Munn, 2021). When increasingly forced to go online by digital government initiatives (Phang et al., 2006) or pandemic-related lockdowns, people less familiar with online technology can experience anxiety. For example, anxiety about online security, and especially the possibility of being hacked, has been shown to cause mental distress over and above generalized anxiety (Elhai & Hall, 2016).

Another important threat to the psychological wellbeing of less-tech-savvy people is the financial stress that results from being scammed out of money online (Button et al., 2014). Arguably straddling the borderline between scam and investment, the new markets for cryptocurrencies and NFTs (non-fungible tokens) have the potential to cause significant financial distress. Enabled by recent technological developments, both of these domains pose risks for those who do not understand the underlying structures of the systems, not least because evangelists for both crypto and NFTs systematically downplay the risks associated with them. While the 2020s have, to date, been less buoyant than the 2010s for crypto and NFT enthusiasts, these risks remain live for those without relevant expertise. Even prior to the most recent bust cycle in crypto, which saw the value of Bitcoin fall from a peak of approximately $67000 in November 2021 to a low of $16000 in January 2023 before rebounding slightly in 2023 (Coinmarketcap, 2023), experts had raised warnings about both volatility within the crypto trading environment and the falsity of various claims from crypto enthusiasts regarding the soundness of crypto investment (Canh et al., 2019).

When coupled with the technical difficulties inherent in extracting cryptocurrency into useful financial assets and the frequency with which crypto exchanges collapse (Maduonuorah, 2023), often without providing any recourse for those who lose their investments, the dangers of crypto to the unwary are overwhelming. A prominent example was the collapse of FTX in November 2022. When FTX collapsed, it was the third largest crypto exchange in the world by volume. The market response to this from large investors was to reject crypto as unsafe and focus instead on more traditional assets (Yousaf, Riaz, & Goodell, 2023).

The psychological wellbeing risks to private individuals investing in these markets are clear. The returns from cryptocurrencies, far from being assured, are highly volatile and subject to risks beyond

the control of individuals, not least the very present risk of large sums of hypothetical net worth simply disappearing overnight due to the collapse of the exchanges on which they are traded. When coupled with the shaky basis of the valuation of cryptocurrencies in general—for example, that they are bad at fulfilling their intended use case of replacing 'fiat currency' (Perkins, 2018) and that a primary actual use case for crypto is to facilitate illegal activity (Foley et al., 2019)—there are good reasons to be wary of cryptocurrency.

NFTs share many of the risks of cryptocurrencies but also have some unique additional risks associated with them. In particular, many NFT offerings are just scams of a variety of sorts. Perhaps the most publicly notorious of such scams are the so-called 'rug pulls', in which a marketing campaign for an upcoming NFT drop secures large amounts of funding from excited investors, and then the project leads simply disappear with all the money that has been fronted (Beyer, 2022). Other NFT promotions merely overpromise and underdeliver.

In either case, there are significant psychological wellbeing risks to those without a thorough understanding of the prevalence of deception in this space. The domain of crypto and NFTs is still under-regulated and, more so than ever, people should heed the dictum: buyer beware.

Policy recommendations

Throughout this chapter, we have provided a range of evidence that generally suggests technology can have a significant impact on psychological wellbeing. In most cases, broad categories of technology use cannot be said to be, on balance, bad or good for consumers. Rather, the context a technology is used in and the way in which it is used are usually much more predictive of whether there will be positive or negative effects on psychological wellbeing. Combining this result with the consumer sovereignty benefits to consumers and the innovation and efficiency benefits to society of relatively free markets, generally restrictive policies should be avoided. The possible risks to consumer wellbeing that many technologies can bring also give reason to avoid untargeted policies promoting the technologies mentioned above. The focus should be on research-based policies that target specific context-technology combinations where the positive or negative effects are clear. Adequate research is not always available and should be promoted in areas of particular importance. We suggest some examples below.

Education for phone use and phone use in education

Given the informational and communicative benefits of smartphone use, blanket restrictions should be avoided. Indeed, the extensive research on smartphone use discussed above shows that only certain kinds of use are problematic. As such, policies focused on education about the kinds of smartphone use that are potentially harmful could be useful, especially because some people have trouble identifying problematic use (Jeon et al., 2022). These education programmes could be run through schools, with some trials showing they result in decreased problematic smartphone usage in children (e.g., Gui et al., 2023). Schools might also provide a good opportunity for young people to realise that they can survive without their phones for short periods of time. In a US-based study of middle and high schools, Tandon and colleagues (2020) found that most principals support some kind of phone use policy, usually restricting use during class time but not recess or lunch time. Given the wide variety of educational contexts and the potential for phones to be used in the process of learning (Hartnell-Young & Heym, 2008; e.g., for math Ariyanto, Kusumaningsih, & Aini, 2018), governments should avoid enforcing blanket bans on smartphone use in all classes. Rather, schools should be given the autonomy to do what is best in their particular context.

Regulate cryptocurrencies

As discussed above, crypto currencies and NFTs provide many risks to consumers but are generally underregulated. Both of these recent technologies are kinds of financial instruments. As such, policymakers should work towards including them in existing regulations for financial instruments (Alkadri, 2018). This move may stifle innovation somewhat and cause many crypto operations to change jurisdictions. Nevertheless, this move will help protect many consumers from financial harm and help consumers realise that these industries are still very risky to get involved in. Regulating decentralized systems like cryptocurrencies can be difficult but can be achieved by targeting intermediaries in the system where the cryptocurrencies reconnect to traditional centralised systems, like the banking system (Nabilou, 2019). Environmentally damaging proof-of-work crypto currencies should also be regulated, which could be targeted at the code or higher level (Weijers & Turton, 2021). Research on how to make the most of these new technologies should be encouraged, as China has done (Riley, 2021). The right balance of additional research and regulation might help this industry continue to grow in a more sustainable manner and one that poses less risk of financial stress to consumers.

Industry standards (at least) for technology that affects friendship

Wellbeing researchers have demonstrated the importance of positive relationships with family and friends for psychological wellbeing (Munn & Weijers, 2021; Hojjat, Moyer, & Halpin, 2017). Increasingly, technology enables communication and shared experiences with friends and other loved ones. These technologies range from chat rooms and game servers to AI specifically designed to be friends to their users. In most cases, businesses providing these services to consumers have a financial interest in facilitating these connections and preventing service disruptions or downtime. However, in some cases it will no longer be in the businesses' interests to maintain these connections. For example, several once-popular game servers that facilitated online-specific friendships between dedicated gamers have been shut down (Pitcher, 2014). As long as a warning is given, the affected friends could devise a new way to continue their friendship. But other examples are not so easily solved. Munn and Weijers (2023b) point out that when AI chatbot friends are discontinued, it may make the consumer feel like their friend has been killed. This is even more impactful on the psychological wellbeing of those who considered their AI friend to be their best friend or even lover. Any business that provides friendships should take very seriously the potential impact its decisions could have on consumers' psychological wellbeing. At the very least, these businesses should be encouraged to generate industry standards that include pre-purchase warnings about the risks, timely notification of service changes, and preferably some kinds of option for service continuation in the event the business wishes to move on. This service continuation is not always without costs but could be achieved by leaving old servers running without ongoing service, enable porting the data to another provider, or making the source code open access so user communities can take over the continuation of service.

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