

# A Pragmatist Analysis of the Ethics of Self-Tracking

PhD Thesis

Michał Wiczorek, MA

Dublin City University, School of Theology, Philosophy, and Music

Supervised by Prof Bert Gordijn, Dr Fiachra O’Brolchain, and Dr Yashar Saghai

(University of Twente)

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# Abstract

## **A Pragmatist Analysis of the Ethics of Self-Tracking**

**Michał Wieczorek**

This dissertation is devoted to the ethical issues arising in connection to self-tracking practices and technologies. Today, various digital devices (such as Fitbit or Apple Watch) and smartphone apps (e.g., MyFitnessPal) allow users to collect, quantify and analyse information about their behaviour and bodily parameters, typically for the purposes of behaviour change and management. Self-tracking is commonly associated with the promise of translating quantified data into greater knowledge about oneself, as well as greater control over one's habits and body.

Over the course of the dissertation, I identify the normative issues surrounding self-tracking by means of a systematic literature review and adapt John Dewey's ethical theory to apply it to the analysis of the issues that have not yet been adequately analysed in the literature, namely, the impact on the individual and habit formation, the impact on interpersonal relations, and just distribution of benefits and burdens produced through self-tracking.

With the help of Dewey's ethical ideals of inclusive, continuing growing, and democracy (understood as a cooperative and participatory way of life, rather than a political system), I argue that self-tracking 1) has a negative impact on users' identity and autonomy by manipulating them into behaviours that are not necessarily in line with their sense of self; 2) limits the quality and depth of users' engagement with others; and 3) allows companies to exert control over users and profit from their data without adequate compensation, and benefits users from privileged groups to a much greater degree than those coming from marginalised backgrounds.

The analysis is accompanied by a set of recommendations for users, developers and policymakers that would ensure that self-tracking positively contributes to individual and societal flourishing/wellbeing and operates in line with the ideal of social justice.



# Chapter 1. Introduction

## 1. Research objectives

Socrates famously argued that an unexamined life is not worth living. In a sense, this thesis is an attempt to determine whether an obsessively examined one is. Its aim is to analyse the ethical dimension of self-tracking practices and technologies from the perspective of John Dewey's pragmatist ethics. To achieve this goal, I first map and address existing and possible ethical issues that have been and can be identified with regards to self-quantification. On this basis, I perform a detailed analysis of self-tracking from the perspective of pragmatism and provide ethical recommendations aimed at regulators, technology companies, and individual users.

Consequently, in this thesis I aim at achieving the following connected research objectives:

1. Identify the ethical issues surrounding self-tracking and the ethical theories that have been used to address them.
2. Employ a pragmatist ethical approach to analyse a selection of ethical issues connected to self-tracking in more detail.
3. Formulate ethical recommendations for regulators, makers, and users of self-tracking technologies.

## 2. Methodology

I achieve the first research objective with the help of a comprehensive review of the literature devoted to the ethical aspects of self-tracking. This enables me to pinpoint which ethical issues surrounding self-tracking have already been discussed in the literature and what ethical approaches have been utilised and underutilised for this purpose. I supplement the results of the literature review with my own intuitions and insights, and use this foundation to sketch a research agenda for the rest of the dissertation.

The second and third research objectives are achieved with the help of John Dewey's (1957; 1998b; 2008) pragmatist ethics which serves as the foundation for the evaluation of self-quantification and for the recommendations for its further development. My discussion of Dewey's ethical ideals of continuing, inclusive growing, and democracy,

as well as his key philosophical concepts (e.g., intelligent habits, transaction) allows me to present a novel approach to technology ethics that is able to complement mainstream ethics assessment methods by tackling unique and underdiscussed issues (e.g., constitutive impacts of technology, social cooperation in technological contexts).

In my analysis of quantified self-tracking, I focus on habit formation, interpersonal relations and just distribution of burdens and benefits as these three problems have been identified through the literature review as the most pressing and they can be fruitfully examined from my adopted theoretical perspective. Moreover, this approach allows me to discuss the impact of self-tracking on the individual, community and political level. Use cases and examples for this analysis are drawn from existing sociological, anthropological and ethnographical studies, as well as first-hand accounts contributed by self-trackers, as available for example on the Quantified Self movement's website.

My choice of methods is justified through a reference to criteria established through the means of a literature review and a discussion of the most salient features of self-tracking. I first provisionally adopt Vallor's (2016) virtue ethics of technology as a good methodological starting point for the purposes of this dissertation since it is, arguably, the most influential character-centric ethical theory within mainstream philosophy of technology. However, due to criticisms I outline in chapter 4, I ultimately reject her theory in favour of Dewey's pragmatist ethics. This allows me to preserve many of the advantages of virtue ethics, while introducing a range of considerations that are particularly well suited to the analysis of self-tracking. Vallor's theory draws heavily on MacIntyre's virtue ethics and I believe that its definition of a practice is too broad to properly accommodate self-tracking practices, which are highly individualised and do not follow historically-established standards of excellence. Even though there is no agreement whether Dewey should be considered a virtue-ethicist (Carden, 2006; Pappas, 2008), his broader understanding of a practice and his emphasis on habits can be of great use to virtue ethics in general and is in my view more applicable to self-quantification. Moreover, Dewey devotes great attention to the idea of ethical life as centred on constant growth of the individual, and associates ethical consideration with the development of habits, the biological aspects of life and unique life circumstances – all these strongly correspond to key characteristics of self-tracking, particularly in its Quantified Self variety, which I briefly outline in the next section and expand upon in chapter 2. Finally, Dewey's original view of technology allows me to discuss the technological mediation of habits and reflect upon the impact of self-tracking on users' moral imagination,

autonomy and circumstances.

The results of the ethical analysis of self-tracking serve as a foundation for the formulation of recommendations regarding future regulation, design and development, and use of self-tracking. I demonstrate how pragmatism can guide a robust set of recommendations and propose concrete solutions that would address the issues discussed in this dissertation on the political, technological, individual and community level. Overall, I propose how self-tracking should be reformed to be the most conducive to individual and societal flourishing.

### **3. Background and relevance**

The question of “What is the good life?” is among the central ethical questions. It forces us to understand ethics not merely as an exercise in solving dilemmas related to the right course of conduct, but as a deliberative discipline concerned with human flourishing and the best ways to achieve it in given circumstances. We engage in ethical reasoning every time we attempt to determine what kind of life we should lead and what are the ways to achieve it. Once we realise what kind of life would be desirable and happy in our specific circumstances (Should I start a family? Should I be politically engaged?), there comes the time to examine whether our past and possible future behaviour is conducive to the living of that life and whether this behaviour should be changed.

Historically, various techniques have been employed to pursue the goal of self-examination that is central to ethical life. Thinkers like Aristotle advocated constant evaluation of our habits and predispositions in order to achieve a right balance between two extremes, such as avoiding and engaging in dangerous situations (Aristotle, 2004). Others, such as Marcus Aurelius and Michel de Montaigne, wrote diaries and correspondence in which they outlined their daily activities and patterns of behaviour in order to determine their impact on their lives as a whole and on the lives of others (Aurelius, 2011; de Montaigne, 1993; Heehs, 2013). The Christian tradition places great importance on the practice of confession – the faithful are expected to evaluate their behaviour, disclose it to the priest and amend what is deemed undesirable, thus engaging in a life-transforming practice of self-discipline (Foucault, 1988; Friesen, 2017). Today, discourses of psychotherapy and self-care also inform how individuals examine their behaviour and determine whether it is conducive to the living of a good life, however

this good life may be defined.<sup>1</sup>

While the evaluation of individual activity and behaviour patterns usually assumes qualitative forms, like the ones outlined above, other ways of such self-monitoring are also possible. Benjamin Franklin might be the most notable historical example here as he famously took self-discipline to the extreme and devised complex methods of attributing scores to specific types of action in order to determine whether it is conducive to virtuous life (Franklin, 2005). Thanks to its astounding popularity, Franklin's autobiography might be seen to have introduced the notion of self-quantification, that is, the idea that information relating to one's activity, behaviour and vital signs could be depicted through numbers. However, it was not until late 19th century and the introduction of the weight scale and height and weight tables that the idea of using numbers to represent and evaluate details concerning individuals began to fully develop (Crawford et al., 2015).

Today, the use of metrics as a tool for normative judgments about particular ways of life is commonplace (Beer, 2016). The Body Mass Index is not only a way of determining the "normal" weight range for a person of a specific height and age, but can also serve as a source of social stigma or encourage lifestyle changes. Patients are commonly asked to evaluate their well-being (e.g. their level of pain or mood) on a numerical scale, workers are ranked according to their levels of efficiency, while various other metrics inform and impact the way we lead our lives, both because of individual choices and institutional policies.

As the example of weight scales shows, the availability of technical tools has a profound impact on the the extent to which life is quantified. In recent years, many technologies facilitating the tracking of a wide range of personal metrics have become commercially available and this dissertation focuses on a group of them that is particularly closely connected to how individual behaviour and activity is evaluated: digital self-tracking technologies which enable individuals to collect, record and interpret data on a virtually endless number of factors relating to themselves. Although Franklin's virtue tables in which he recorded the details of his daily conduct can be classified as an

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<sup>1</sup> Recently, Mark Coeckelbergh (2022) presented an exhaustive study of different self-improvement practices across history and connected these practices to contemporary technologies. However, his work focuses more on the idea of self-evaluation in general and while he discusses self-tracking at various points in the book, his main technological reference point are AI technologies which are distinct from self-tracking. Consequently, my emphasis on quantified ways of self-evaluation and self-tracking technologies can be seen as complementing the discussion presented by said book.

early example of a non-digital self-tracking technology and many people still self-track using only pens and paper, the recent development of algorithms, wearable sensors and smart devices led to the creation of tools specifically aimed at facilitating self-tracking practices. These tools enable the tracking of factors which previously could not have been reasonably followed. Relatively affordable fitness bands, smart devices and various wearable sensors enable the collection of numerical data relating to steps made on a given day, sleep patterns, eating habits, mood, blood glucose level and countless others. The variety of metrics that can be tracked today is perhaps only limited by the imagination of self-trackers. People like the self-tracking guru Chris Dancy have engaged in the monitoring of factors as unusual as the impact of air levels on sleep quality (Murphy, 2014), but there are self-tracking devices that have been designed to track activities even as seemingly unquantifiable as prayer (Hollister, 2019).

The obsession with self-tracking is not simply a sign of curiosity. Although self-tracking can be reduced to merely the collection of information concerning oneself, I believe it is more than just an epistemological endeavour. As I discuss in chapter 4 in more detail, all technologies influence people's habits and behaviour to a various degree – social media websites changed how we interact with others, while the introduction of cars changed our perception of distance and modes of travelling or commuting. However, self-tracking is particularly interesting from an ethical standpoint because it puts the behaviour change at the centre. Transformation of users' activity patterns is the explicit purpose of self-quantification and not an unanticipated side-effect or a hidden desire of the developers. Social media users might often have no idea how they are influenced by personalisation algorithms and early car enthusiasts could not have anticipated that automotive pursuits would eventually contribute to a fossil fuel-powered climate crisis or lead to far-reaching transformations within the urban environment and infrastructure. On the other hand, self-trackers are told time and time again that habit change is the primary goal of self-quantification, even if it is not a given that all the involved parties understand this process in an in-depth way (as I demonstrate in chapter 5).

Discussing the persuasive power of self-tracking, the humourist David Sedaris (2014) described how the feedback from his Fitbit prompted him to pursue increasingly higher daily step counts and changed the structure of his daily life (even if he took this description to the extreme for comedic effect). This habit and behaviour-oriented direction of self-tracking has also been discussed by scholars: Kristensen and Ruckenstein (2018) observed that every self-tracking practice has a clear teleological

dimension, while Whitson (2013) noted that the structure of self-tracking practices often follows that of a game: participants are given clear goals related to the tracked metrics (such as 10,000 steps per day) and are encouraged to achieve high scores. Participants in qualitative studies also admit that their self-quantification attempts are not merely done out of curiosity and thirst for data. For instance, one woman in a qualitative study conducted by Bode and Kristensen (2015) described her self-tracking project as an attempt to merge her perception of herself with what the data showed she “really” was. A recent review of qualitative studies on self-tracking suggests that behaviour change is not only a proclaimed goal of self-tracking, but is in many cases achievable, even if it is difficult to isolate factors not related to self-quantification and to find a good ground for comparing different projects (Kersten-van Dijk et al., 2017).

The pursuit of self-improvement through self-quantification is a central aspect of the Quantified Self movement founded by Wired journalists Gary Wolf and Kevin Kelly. Following the movement’s motto of “self-knowledge through numbers”, members are encouraged to engage in individual data collection experiments and to share their insights with other participants to demonstrate how they arrived at their results, what these results mean to them and what was the influence of the data on their life (Nafus & Sherman, 2014; Wolf, 2010b). The discourse of Quantified Self is closely related to management discourses (O’Neill 2017) and members of the movement place great emphasis on how the collection of data is supposed to increase the control they have over their behaviour (Swan, 2013; Spiller et al., 2018). Indeed, as noted by Ruckenstein and Pantzar (2017), optimisation of habits and daily activity is a central element of the Quantified Self movement and the discourse that surrounds it.

Self-tracking, particularly in its Quantified Self variety, can be criticised for its egocentric character and its overreliance on data, traits that prompted the cultural critic Evgeny Morozov (2013) to famously list it as one of prime examples of technological solutionism. However, Sharon and Zandbergen (2017) correctly observe that discussing self-tracking practices only in terms of data fetishism fails to fully describe the appeal of self-quantification and ignores the potential for self-reflection, resistance and communication possible within the practice. Keeping that in mind, I would propose to examine self-tracking in ethical terms by drawing attention to its focus on recording and evaluating daily activity, patterns of behaviour and habits. I believe that the ways in which self-quantification reflects and informs the perception of one’s conduct can have significant influence over the visions of the good life imagined by self-trackers and the



ways in which they pursue those visions. Although people can self-quantify purely out of interest in their data, their engagement often has a teleological dimension – self-trackers resort to self-quantification to pursue various self-defined goals. These might range from things like greater physical fitness and higher work efficiency to better mood, self-awareness and general well-being. The desire to improve at least some aspects of one’s life or become a better person can be seen as central motivations for self-quantification. Consequently, it is worth examining, how the discussed practices can contribute to individual and societal flourishing and whether they are conducive to living the good life.

Because of its focus on character and growth, as well as the solution of specific problems facing individuals and community, I believe Dewey’s pragmatist ethics to be particularly applicable to ethical questions concerning the direction in which one’s life should follow and the methods of guiding it along the chosen path. Pragmatism is concerned with the ethical salience of specific habits through the evaluation of their contribution to the achievement of goals and desires – and ultimately happiness and the good life. For this reason, I argue that it is particularly well suited to the analysis of self-tracking (especially considering the practice’s emphasis on positive behaviour change) and demonstrate this suitability by applying its key concepts – continuing, inclusive growing, democracy, intelligent habits, transaction – in my analysis.

#### **4. Outline**

Following this introductory chapter, I continue this study in chapter 2 by presenting a more detailed overview of self-tracking technologies and practices. While I have already cursorily described self-tracking in the previous section, chapter 2 contains a more comprehensive discussion of the practice and technologies of self-quantification, while also presenting some key characteristics of self-tracking that need to be accounted for in an ethical analysis.

Chapter 3 consists of a systematic literature review of the ethics of self-tracking and its discussion section identifies the most pressing ethical aspects of self-tracking practices and technologies that are assessed in more detail in chapters 5, 6 and 7.

In chapter 4 I describe the methodological and theoretical commitments guiding my analysis. Although I first consider the suitability of Vallor’s virtue ethics for the purposes of this dissertation, I ultimately argue that Dewey’s pragmatism and its ethical ideals of continuing, inclusive growing and democracy are the best tools for the achievement of

my research objectives. Consequently, I present a method built on the basis of Dewey's philosophy and discuss selected ethical issues surrounding self-tracking in more detail by focusing on the issue of habit formation, interpersonal relations, and just distribution of benefits and burdens – issues identified in the literature review as the most pressing. Chapter 5 uses Dewey's notion of intelligent habit to deal with the problem of habit formation and the impact of self-tracking on users' autonomy and behaviour. Chapter 6 analyses self-tracking from the perspective of Dewey's concept of transaction to discuss the practice's impact on interpersonal relations. In chapter 7, I deal with self-tracking from the standpoint of justice, analysing how the benefits derived from data are distributed among stakeholders and discussing which groups are the most affected by the burdens associated with self-tracking.

Chapter 8 consists of a set of recommendations aimed at regulatory bodies and political institutions (mainly within the EU), the makers of self-tracking technologies, and the self-trackers themselves. I discuss concrete governance and technological solutions, as well as interventions into self-tracking practices that would ensure that self-quantification contributes to the ethical ideals endorsed in this dissertation (i.e., continuing, inclusive growing, and democracy).

In chapter 9, I conclude by summarising the findings of the previous chapters, reflecting on the suitability of my pragmatist method, providing a general assessment of self-tracking, and suggesting avenues for future research.

## Chapter 2. Self-tracking: an overview

### 1. Introduction

The purpose of this chapter is to present an overview of self-tracking that will serve as a descriptive basis for the normative work undertaken in the later parts of this thesis.

Before I focus on ethical issues surrounding self-tracking, it is first necessary to provide an accurate definition of the phenomenon, situate it alongside other similar technologies and technologically-mediated practices, and present the most common applications of self-tracking technologies as well as the characteristics of their typical use.

I start in section 2 by providing a narrative illustration of a single day during which an imagined user of self-tracking technologies interacts with different apps and devices. It is meant to provide a baseline understanding of what self-tracking could entail and make the phenomenon clearer to readers for whom it might be unfamiliar.

I then define self-tracking in section 3 and compare it to other practices and technologies focused on the collection of data by individuals.

On this basis, I turn in section 4 to a general description of technologies that commonly lie behind self-tracking projects and their most typical applications (e.g. for fitness-tracking, health monitoring and workplace surveillance). I also present an overview of what commonly happens to self-tracking data as it is used by various involved parties.

I already noted in chapter 1 that the Quantified Self movement is an important part of the self-tracking landscape and I cover it in more detail in section 5. I describe the origins and core characteristics of the movement, while also demonstrating the idiosyncrasies that make members of the movement stand out from average users of self-tracking tools.

In section 6, I draw on existing research relating to Quantified Self members and other users of self-tracking devices in order to discuss the characteristics of self-tracking that are the most relevant for the purposes of ethical evaluation of self-quantification. As I note in this section, self-quantification is an ambiguous phenomenon and can often display conflicting tendencies. This section offers a comprehensive description of features and tensions that need to be accounted for in an ethical analysis of self-tracking.

In section 7, I conclude this chapter by reiterating its main arguments and briefly outlining how they connect to the later parts of this dissertation.

## **2. A Day in the Life of a Self-Tracker**

What is self-tracking? An illustration might be the best way to give a provisional answer to this question.

Imagine yourself as a person obsessively focused on monitoring every aspect of your life. As soon as you wake up, you take a look at a smart watch to see how long you slept and what was the length of each of the phases of sleep. The device offers you a sleep score and a neat comparison to the quality of your sleep in the past month, alongside suggestions on how to improve it.

You put on a tracksuit and go for a morning run. Your smartwatch measures the time and distance of your jog and countless more detailed metrics such as pace, change in elevation and calories burned. At the end of the run you are asked to evaluate your satisfaction with the exercise (5 stars!) and are given a few tips: drink this amount of water, do not slow down after the fourth kilometer, stretch for 15 minutes. If you use a more socially-oriented app, like Strava, you might see your name on a leaderboard and your accomplishment compared to thousands of friends and strangers.

After a shower, you head to the kitchen to prepare breakfast. As with every meal of the day, you take a photograph of your plate and an app calculates the approximate amount of calories you are about to consume. If you did not turn off personalised recommendations, you would receive some pointers on healthier eating or the number of calories you can still consume before you exceed the norm. Everything is presented seamlessly alongside targeted ads recommending products that might help you reach your fitness goals. Before getting ready to work, you quickly log the coffee and the glass of water you had alongside your breakfast to keep track of your hydration targets.

Just like the morning run, your daily commute is also registered on your smartwatch (30 minutes on a bicycle) and it is counted towards your daily activity targets represented by a colourful graph. Before sitting down at your desk, you once again log down a glass of water you just had (you are at 12% of your daily target) and open your computer alongside a productivity measuring tool which tracks your engagement at work and the amount of time you spent focused at your tasks. Your workday is measured in 25-minute increments, followed by regular 5 minute breaks and occasional longer (15 minutes) moments of respite. Between each of the short working sessions, you go to the water

cooler not only because you need to stay hydrated, but because regular walks are the only way to reach your daily target of 10,000 steps. Maybe your smartwatch was given to you by your HR department and you track your steps within an office wellness scheme – the management of your company decided that active workers make for productive workers and as an added benefit they now know how often you step away from your desk and even how you spend your free time (as you keep the watch on your wrist for most parts of the day).

After dinner (once again photographed and attributed a calorie score), you sit down to read a book and take note of the progress you made (57 pages in an hour and a half, getting you ever closer to the target of reading 40 books per year). Following that, you might have sex with your partner while your wearable device logs the duration of the intercourse and the calories burned (sometimes even attributing a score). Depending on your gender, an app might also calculate the possibility of conception (as they assume by default that women in a relationship are trying to conceive) or let you know how many days will pass before your next period and what kind of flow you should expect.

At the end of the day, you might step on a smart scale which will quickly generate a graph depicting your weight loss and calculate your body fat (again, with a few recommendations on how to do better). An app might also prompt you to evaluate your mood on a scale of 1 to 10 and suggest ways to improve it (e.g. try to get more sleep and exercise, track and limit your exposure to blue light coming from screens).

Of course, much of what I have outlined above assumes that you are a young, fit and able-bodied person – an image of a “typical” or “normal” user that is prevalent in self-tracking technology, even though most self-trackers do not fit this mold. However, if you happen to live with a chronic condition, you might find yourself tracking even more. If you are diabetic, you might use a self-tracking device that allows you to actively monitor your blood glucose levels (and coupled with an insulin pump, administer the much needed medicine as necessary), while if you have hypertension, a device might be continuously approximating your blood pressure. Moreover, you might log every time you take your medicine and transmit that information to your doctor, while your insurance company might outright require you to supply self-tracking data to receive coverage or lower premiums.

### **3. Conceptual clarifications**

Even though the illustration outlined in the previous section might be exaggerated, it

accurately depicts the potential breadth of self-tracking. It is difficult to determine what exactly self-tracking entails, as well as where it starts and where it ends. Similarly, there is no agreement in the existing literature about the scope of the practice and the terms that should be used to describe it. Authors discussing collection of personal data with digital devices use terms including “self-tracking“, “quantified self“ (as follows from the name of the Quantified Self movement), “self-quantification“, ”activity tracking“, “personal analytics“, “personal informatics” and ”lifelogging” (Lupton, 2016a; Selke, 2016c). For the sake of consistency, I propose to use ”self-tracking” as the main term through which I will refer to the collection of quantified personal data with digital devices, occasionally referring to ”self-quantification” to avoid repetition.

The terminological diversity present in the existing literature hints at definitional problems associated with the current state of research on self-tracking. Current discussions lump together applications of technology as diverse as the tracking of menstrual cycles using analogue technologies, quantification of exercise with the help of wristbands and the labourious attempts to record every aspect of life with the help of wearable cameras and memory storage, as in the case of Gordon Bell (Bell & Gemmel, 2009).

I propose to define self-tracking as collection, representation and analysis of personal data in numerical form with the help of digital devices. This definition does not include all key characteristics of self-tracking (which are further discussed in section 6). Instead, it is meant to draw a strong distinction between self-tracking and lifelogging, which I consider to be a distinct phenomenon, even if it also refers to collection of personal data. However, I take lifelogging to differ from self-tracking both in the type of data collected and the purpose of collection.

First, lifelogging deals mostly with qualitative data and is more closely connected with memory, description of impressions and retention of images. Conversely, self-tracking focuses predominantly on quantification of activity and bodily parameters (although the quantified data can be also presented in visual form, i.e. as graphs). To provide an example, in my understanding, a person watching their weight would engage in lifelogging if they regularly took photographs of their body, while they would engage in self-tracking if they kept a record of the numerical values representing their weight in, for example, kilograms. It has to be noted, however, that the two practices are not mutually exclusive and some self-tracking projects might also benefit from the use of pictures or other qualitative means of retention (e.g. people tracking their weight loss in

kilograms and body fat, but also taking pictures representing their progress). Nevertheless, the focus on numbers is a distinct characteristic of self-tracking, as evidenced, for example by the motto of the Quantified Self movement: “self-knowledge by numbers”. This is further explored in section 6.1.

Secondly, there exists a difference in the purpose of the two practices. I consider lifelogging to be concerned with storing personal information mostly for the purposes of retention – the goal of a lifelogger is usually to create an easily accessible and searchable archive of memories, impressions or notes. On the other hand, self-tracking is often meant to be a basis for actionable insights that can be conducive to behaviour change (e.g. developing the habit of daily exercise). Of course, this distinction does not provide a razor-sharp divide – for example, there is nothing preventing a lifelogger from using their qualitative data to achieve some pre-established goal, just like a self-tracker could monitor some metrics out of curiosity. However, a clear teleological dimension can be observed in self-tracking (Kristensen & Ruckenstein, 2018) and I will elaborate on this in section 6.3.

Consequently, a definition of self-tracking as “collection, representation and analysis of personal data in numerical form with the help of digital devices” is meant to delineate a distinct and broad field of technologies and practices that can still be studied in a coherent and comprehensive manner. While lifelogging might be similar in some aspects to self-tracking, including lifelogging practices and technologies in my research would make it too broad and potentially unmanageable from the practical and conceptual standpoint. After all, there exist many more practices of collecting, representing and analysing personal information with the help of digital devices that do not depend on quantification, such as digital journaling, curation of a digital photo archive and even personal blogging. All of these could be a part of a lifelogging project, but they are only remotely related to (my understanding of) self-tracking in virtue of their digital nature and focus on personal information. The distinction between quantitative and qualitative ways of recording information is crucial for the purposes of distinguishing between different practices of collecting personal data and it allows me to focus on self-tracking as a unique phenomenon. The difference in the purpose of data collection (i.e., retention vs behaviour change and management) only further justifies the distinction between self-tracking and lifelogging.

#### **4. Description of technology**

There are many self-tracking technologies currently available on the market and the most dedicated enthusiasts often experiment with sensors or create their own devices to capture a wide range of metrics.<sup>2</sup> However, typical consumers are probably familiar with devices such as smart bracelets, smart watches and smart scales, or track themselves using sensors embedded in most contemporary smartphones (e.g. pedometers and GPS). Self-tracking technologies can be divided into self-tracking devices – equipment specifically designed to gather data – and self-tracking apps which can be installed on a broader set of devices in order to enable data collection. Devices such as Fitbit smart bracelets contain specialised sensors enabling the collection of data and display this data in a related app, but it is possible to engage in a form of digital self-tracking without purchasing a dedicated device, for example by downloading Fitbit’s app on a smartphone to enjoy a limited set of features (as sensors embedded in smartphones are not capable of tracking as many metrics as a dedicated smart bracelet, or are unable to do so with comparable accuracy).

The first commercially available self-tracking devices appeared as a byproduct of experiments conducted by enthusiasts of personal data collection who have been attempting to record a variety of information about themselves at least since the beginning of the 21st century (Bell & Gemmel, 2009; Wolf, 2010a). The popularity of amateur self-tracking prompted the creation of first self-tracking devices aimed at the general public which entered the market in early 2010s. Fitbit appeared in 2010 (Ewalt, 2010), quickly followed by Jawbone UP in 2011 and UP24 in 2013 (Smith, 2019). The Pebble e-ink watch, which boasted some fitness-tracking features, broke the 2013 Kickstarter record for the most funded campaign, collecting \$10 million (Kickstarter, 2020). It has to be noted however, that even though the popularity of self-tracking has really exploded in the last 10 to 15 years, companies like Polar, Garmin and Fossil, which today make up an important share of the smart watch market, have been developing and marketing GPS-powered data-collection wearable devices (often aimed towards professional and amateur athletes) since the 1980s (Kite-Powell, 2016). Nevertheless, it can be argued that their technology matured only at the beginning of the 21st century, alongside other self-tracking devices (Knapp, 2016, Thompson, 2018).

By mid-2010s, the self-tracking market attracted the attention of the biggest

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<sup>2</sup> The forum of the Quantified Self movement (<https://forum.quantifiedself.com>) is full of discussions about such homemade devices. The following video by Dan Brown is only one example of many: <https://vimeo.com/groups/45234/videos/11911517> (accessed 4 January 2023).



technology companies, as demonstrated by the introduction of self-tracking devices by Apple, Samsung, Sony (Thompson, 2018) and, more recently, Amazon (Bohn, 2020; Fowler & Kelly, 2020). Moreover, after the failure of the self-tracking oriented platforms Google Health and Google Fit, as well as the relative lack of success of their WearOS smartwatch operating system, Google announced the acquisition of Fitbit in 2019 (Gartenberg, 2019, Chee, 2020). The Chinese technology companies Huawei and Xiaomi also offer self-tracking devices in their lineup of products, and many other smaller firms also sell self-tracking devices.

In addition to the above-mentioned companies focusing on smart bracelets and smartwatches (arguably the paradigmatic self-tracking devices), users are able to collect their own data through the means of, for example, smart scales (offered by companies like Withings and Wyze) and dedicated medical devices such as continuous glucose monitors (offered by, e.g., Dexcomm). However, the potential scope of self-tracking technologies is difficult to determine as there are countless smartphone apps dedicated to the quantification and tracking of factors such as fertility (e.g. Glow, Flo, Clue), productivity (DeskTime, Hours, RescueTime), food intake (e.g. LoseIt!, MyFitnessPal, MyPlate), habits (Momentum, Habitica), mood (Daylio, Moodily, Moodnotes), sleep (SleepScore, Sleep Cycle, Pillow, Rise), books read and music listened to (Goodreads, last.fm), and many others.

The data collected by self-tracking technologies is processed by algorithms and presented to users in the form of numbers and graphs. These technologies commonly offer personalisation features. The data serves as a basis for the creation of a digital profile, sometimes called a data double (see Ruckenstein, 2014), which is later used to recommend content to users, formulate predictions about their future metrics, and even nudge them into a specific behaviour (Lanzing, 2019). From the perspective of the users, such personalisation might be in line with the goals surrounding the tracking, for example, by helping them find the exercise most suitable in their circumstances, change their diet, or develop expectations and targets for their weight loss.

However, the data collected through self-tracking and the digital profiles constructed on its basis are available not only to the users, but to various institutional actors, including technology companies developing the devices, online advertisers, insurance companies, employers and even governments (Lupton, 2016a; 2016b; Neff & Nafus, 2016). Moreover, the decision to start self-tracking might not always belong solely to the users, as different actors can be motivated to encourage others to engage in self-tracking (and

potentially share their data with third parties). Consequently, researchers working on self-tracking routinely refer to Lupton's (2016b) typology of the modes of self-tracking which describes why users might decide to track and what happens with their data:

a) private – the decision to track belongs purely to the tracking individual and the data is purposely shared with a limited number of third parties, if at all;

b) pushed – user picks up tracking as a result of external encouragement (e.g., as part of a voluntary workplace wellness scheme, or following a recommendation from the doctor) and the data is typically shared with the party that pushed the user into tracking;

c) communal – user tracks in order to share their data with others (e.g., patients with a similar condition);

d) imposed – user is required to track themselves and share their data with a third party (e.g., when tracking is a means of workplace surveillance, or when a private insurer makes tracking an integral part of their insurance coverage, see Barlyn, 2018);

e) exploited – self-tracking data is repurposed by third parties for commercial purposes (e.g., by advertisers using it to offer user targeted ads).

It has to be noted that the above modes of self-tracking are not exclusive and it is common for them to overlap, for example, when users tracking for private purposes still receive targeted advertisements because their data is shared by default with the partners of the manufacturer of their chosen device.

As a result of these diverse applications and motivations for self-quantification, self-tracking data may be used by third parties to create personalised ads and prices (as in the case of private insurance), organise workplace surveillance, inform policy decisions, and for many other purposes. Considering that privacy policies and data governance practices surrounding self-tracking technologies are often unclear and that manufacturers share the data with their partners by default, users might not be aware of and able to control the extent of their data that ends up with third parties. Consequently, an analysis of the ethics of self-tracking devices has to consider not only the technologies and practices of self-tracking, but also the use of data created through them.

## **5. Quantified Self**

The Quantified Self (QS) movement is an important part of the self-tracking landscape. Upon its inception in 2012, it attracted the attention of numerous enthusiasts of self-tracking, researchers and journalists. Today, it is still the largest community of self-trackers and for many researchers and journalists it is one of the main reference

points when it comes to self-quantification of activity. I also often refer to research about QS members and to their own testimonials concerning self-tracking technologies and practices. Consequently, this section presents some of the characteristics of QS.

Founded by *ex-Wired* editors Kevin Kelly and Gary Wolf, the Quantified Self movement aims at establishing an international community of self-trackers through the promotion of the idea of self-quantification and the organisation of regular meet-ups and conferences exploring users' experiences with self-tracking. At the time of writing, the official group of QS on [Meetup.com](https://www.meetup.com) has over 87,000 members spread across 147 regional groups (<https://www.meetup.com/topics/quantified-self/>).<sup>3</sup> During a typical QS meeting, speakers are asked to discuss their personal tracking projects by answering three questions: What did you do? How did you do it? What did you learn? Alongside a presentation focusing on their experiences, QS members often also share their data with the audience and other members of the movement.

QS places particular emphasis on the individual nature of self-tracking data and the potential insights it can provide. The projects of QS members are often discussed as  $n=1$  experiments (Nafus & Sherman, 2014; Ruckenstein & Pantzar, 2017; Swan, 2013). They are a specialised study concerned with an individual and their results are considered applicable only in that individual's unique, personal context. Nevertheless, one person's results are still considered to be informationally valuable to others who are encouraged to draw inspiration from their peers' methods and insights (which are routinely shared during meet-ups and online). It can be argued that QS does not give much consideration to the target scores, norms and recommendations endorsed through many self-tracking devices, instead encouraging an open-ended and highly diverse kind of tracking. This ethos of experimentation prompts some to discuss the Quantified Self in the context of citizen science and other bottom-up initiatives aimed at generating knowledge (Heyen, 2016). Sharon and Zandbergen (2017) even go as far as to discuss QS as a unique system of knowledge comprised of individual, but interrelated data points.

In this sense, QS members do not treat self-tracking as a leisurely activity but consider it a worthwhile epistemological pursuit, as evidenced by the movement's motto: "Self-knowledge through numbers". However, self-knowledge is typically not the ultimate goal of a QS self-tracking experiment. Potential insights about an individual's

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<sup>3</sup> The official QS website no longer lists member numbers, but the affiliated QS Institute boasts about over 70,000 worldwide members as of 2016 (<http://qsinstitute.com/about/what-is-quantified-self/>).

patterns of activity and bodily characteristics often serve as a means for adapting behaviour into a specific pattern. Consequently, as members adopt a goal-oriented attitude towards tracking (i.e., generating new insights *in order to* use them for a specific purpose), the ethos of self-optimisation is a central element of the movement. The mantra “What gets measured is managed” is routinely repeated during QS events as it echoes the members’ belief that the quantification-facilitated self-knowledge can be a tool for exerting greater control over one’s habits and shaping the body into a desired image. QS can be connected to biohacking (Ruckenstein & Pantzar, 2017), as well as strict management practices like Taylorism (O’Neill, 2017). However, according to some critics, the emphasis on behaviour change and control over habits can lead QS members to obsessively micromanage all the aspects of their everyday activity. Chris Dancy, dubbed by the media as the most connected man in the world, is often referenced as a quintessential QS member – he tracks details as minute as the intensity of ambient light and its relation to his eating habits (Murphy, 2014).

Another core assumption of QS is that quantification makes phenomena more transparent (Lanzing, 2016; Ruckenstein & Pantzar, 2017). Quantified representation and analysis of activity and bodily features is claimed to make their perception more objective and less influenced by human cognitive constraints (i.e., bias and limitations of our senses). Sensors and algorithms are often portrayed by the members of the movement as more reliable arbiters of truth about the self than the flawed traditional ways of self-reflection and self-perception (Wolf, 2010a). This can be seen as an example of datafication, dataism or data fetishism: privileging data over embodied, qualitative experiences (Morozov, 2014; Sharon & Zandbergen, 2017). The biggest enthusiasts of self-tracking sometimes even liken the purported accuracy and reliability of the devices to scientific measurement and accept the produced data rather uncritically, in line with their unwavering belief in science and technology (see Kelly, 2010; 2016; Wolf, 2010a). According to such views, even if the existing devices leave something to be desired, their future counterparts are bound to track more factors and with greater credibility, moving self-tracking ever closer to the scientific ideal.

The Quantified Self movement and its promises – cognitive transparency of the self resulting in greater control over body and behaviour, and a community of trackers joining forces to achieve these goals – have found a receptive audience among people curious about self-tracking and the media portraying this emerging technological phenomenon. Although QS reached its peak popularity in the middle of the 2010’s, even in 2022 *The*

*Economist* published a dedicated issue (7 May 2022) containing a series of enthusiastic articles uncritically repeating the main QS talking points. However, the techno-optimistic, highly motivated and experimenting individuals taking part in the QS movement are not necessarily the typical users of self-tracking technologies. While the discourse surrounding the movement might inform many of the practices of self-quantification, most people track at a much smaller scale and with less effort and pressure, usually depending on consumer-grade devices and pre-established tracking goals (e.g. reaching the activity target of 10,000 steps per day). Consequently, experiences of QS members cannot be treated as paradigmatic. An overview of general characteristics of self-tracking should consider the practice both in its everyday and QS varieties.

## **6. Characteristics of the practice**

Before I turn to discussing the ethical issues associated with self-tracking, I would like to present an overview of the most salient characteristics of self-tracking technologies and practices. Section 3 contained a baseline definition of self-tracking meant to differentiate it from other practices of data collection with the help of digital devices, so it only briefly highlighted those features that make it distinct. However, many more characteristics of self-tracking are relevant for the purposes of an ethical analysis, especially since self-tracking is a complex phenomenon and individual cases might differ in scope and kind.

Consequently, I discuss five themes expressing the often competing tendencies present in self-quantification: 1) quantification and qualitative experiences; 2) individual and social dimension; 3) teleology and curiosity; 4) experimentation and existing structures; and 5) mediation and tools. In addition to providing a baseline understanding of the most relevant features of self-tracking, this heuristic serves as a background resource throughout this dissertation and informs my literature review methodology, my choice of ethical theory, and influences the claims I make in my analyses.

### **6.1. Quantification and qualitative experiences**

The first theme deals with the difference between what is being measured and the form in which the data is collected and presented to the users. Although self-tracking primarily focuses on quantified ways of monitoring the body and activity (i.e., in the form of numbers, metrics and graphs), quantification often concerns qualitative

experiences (Swan, 2013). Self-trackers typically attempt to generate data about aspects of their daily life such as morning runs, mood, productivity and others. However, the technology only collects information that is easily quantifiable (e.g., the number of kilometres ran) or has to translate complex phenomena into numbers (e.g., attributing a score to users' self-reported mood).

In this sense, self-tracking can offer a limited or even reductive view of what is being tracked (Baker, 2020; Gabriels & Coeckelbergh, 2019; Sharon, 2017). First, the numbers do not present all the relevant information as your Fitbit does not record how you felt during the morning run or does not recognise that you stopped because you met a friend on your way. Second, the methods through which devices collect and present data influence the results of tracking to various degrees as the same information can be translated into numbers in several different ways. Whether you are asked to evaluate your mood on a scale of one to ten, or to choose a face most in line with your emotions, the approach chosen by the developers to quantify information (including the kind of algorithm employed for this purpose) influences what data is deemed relevant and how it is later framed and interpreted.

Self-tracking might enrich users' perspective and understanding of the tracked phenomena, but it does so at a cost. The narrow focus on numbers might shift the users' attention from, or even marginalise, the aspects of their life that cannot be represented in numerical ways, or it might make them believe that data tells the whole story about their experience, especially as quantified information is sometimes depicted as scientific or objective (Kreitmair & Cho, 2017; Owens & Cribb, 2019). Some researchers discuss self-tracking in the context of datafication: the privileging of quantified ways of knowing over their qualitative counterparts (Ruckenstein & Pantzar, 2017; Sharon, 2017; Sharon, & Zandbergen 2017). While I have already referred to this term in the context of the Quantified Self movement, where datafication or even data fetishism are arguably more prominent, all kinds of self-tracking practices run the risk of overly depending on numbers.

The balance between numerical and non-numerical ways of knowing is fragile in the context of self-tracking. Not everything can be represented in quantified form and any translation of qualitative experiences into numbers has a potential to be reductive. The tension between the quantitative and the qualitative is crucial for any analysis of ethical aspects of self-tracking as it influences all kinds of practices and relations that can arise out of self-quantification.

## 6.2. Individual and interpersonal dimensions

Self-tracking is often considered an individualistic, or even egocentric, pursuit (Morozov, 2014; Vallor, 2016) as users devote considerable attention to, or sometimes even obsess over, their own activities and bodies. Nevertheless, the interpersonal dimension of the practice might be just as pronounced. Typical self-trackers use the discussed technologies to collect personal information related to their everyday life, but the data generated through the devices quickly becomes a part of a larger data ecosystem. This is particularly evident in the case of the QS movement where data and reflections about it are explicitly and routinely shared with other users. However, self-trackers not affiliated with the movement also engage with others through their tracking, even if they are not always aware of this fact.

Data generated through self-tracking is routinely shared with the manufacturers of the device and their partners. As data is shared by default (and sometimes it is not possible to change the sharing options), various parties have access to a digital representation of the user, sometimes called a “data double” (Ruckenstein, 2014). Institutions processing self-tracking data (which can include corporations, government bodies, healthcare providers, employers and researchers) refer to its characteristics to make predictions and inferences, offer personalised content such as recommendations and advertising, and to improve the algorithms responsible for data processing (Barta & Neff, 2016; Lanzing, 2016; Lupton 2016a; Neff & Nafus, 2016). In this sense, self-tracking data can be argued to have a political dimension as it can serve commercial actors and government institutions as a source of power, allowing them to influence the subjects of the data, engage in data-based surveillance, or otherwise exert control by using the data to shape policy (Véliz, 2020).

Accordingly, even users purposefully self-tracking in a non-social way (i.e., by monitoring their solitary activities and opting not to share data with people they know) engage in an interpersonal activity as they and their data enter into relations with various others and institutions. While it is possible to devise a self-tracking regime depending on custom-made devices that do not automatically share data with third parties, most everyday users track with commercially available technologies. The biggest enthusiasts, who are arguably more likely to create their own tools, often do so within the Quantified Self movement and share data voluntarily.

Moreover, many self-tracking technologies are embedded with explicitly social

functionalities (e.g., leaderboards, online forums, friend activity feeds, see Gabriels & Coeckelbergh, 2019) and users often share their data with their friends, family and strangers in order to compare results and generate new insights (Lomborg & Frandsen 2016; Sharon, 2017). Tracking can also take place in contexts where the produced data is meant to be accessed by others (e.g., when patients tracking in clinical contexts share their data with healthcare professionals, see Lupton, 2016b; Neff & Nafus, 2016). Some self-tracking projects are even especially targeted at tracking interactions with others, for example by involving the logging of sexual intercourse or time spent talking to friends and family as opposed to strangers (Danaher et al., 2018b; Nafus & Sherman, 2014). Accordingly, for many self-trackers their practices always involve a degree of sociability, which is further enhanced by the circulation of data of which they might not be aware.

The interplay between the individual and interpersonal dimensions of self-tracking needs to be recognised. Users of these technologies might track on their lonesome and for purely personal reasons, but just by picking up a new device or installing an app on their smartphone they enter into a wide variety of often complex relations with others. As self-tracking data enters into circulation, it has a socioeconomic impact and influences how self-trackers interact with their friends, family and strangers. Potential ethical aspects of self-tracking will relate to both the individual and the interpersonal dimension of the discussed technologies and practices.

### **6.3. Teleology and curiosity**

Self-tracking is often motivated by a desire to reach a certain goal – losing weight, increasing productivity, improving mood. Users can set relevant objectives for themselves (e.g., running 5 kilometres three times a week), but most self-tracking technologies also incorporate pre-established goals and targets in their design (e.g., making 10,000 steps per day) alongside recommendations for users on how to improve their metrics and stick to their newly acquired habits. In this sense, self-tracking has been argued to be a distinctly teleological activity oriented towards behaviour change (Kristensen & Ruckenstein, 2018; Neff & Nafus, 2016). This is particularly pronounced in the case of the QS movement, where “self-knowledge through numbers” serves mainly as a means to influence habits, but regular users of self-tracking often also engage in the practice with a goal-oriented mindset (e.g., when they start to track to better manage a medical condition) or are pushed by their apps to adopt a target, as is common in the case of, e.g., food tracking and weight loss apps (Lupton, 2018, Maturro & Setiffi, 2015). In



fact, many self-tracking tools routinely employ gamification to facilitate the achievement of goals and to motivate users in pursuing them (Maturo & Setiffi, 2015; Whitson, 2013).

On the other hand, curiosity can also be an important driving force behind self-tracking projects (Nafus & Sherman, 2014; Neff & Nafus, 2016, Pink & Fors, 2017). Many users pick up tracking devices as a result of their interest in gadgets, or simply trying to learn something new about themselves. Even marketing materials of self-tracking device manufacturers sometimes promote the idea that by tracking themselves for no apparent reason, users can develop interesting or potentially life-saving insights (Apple Newsroom, 2021). Self-tracking can be also interpreted as a knowledge- or curiosity-driven practice in which users engage without a particular, behaviour-related motivation.

These two approaches can overlap. A user purchasing a self-tracking device in order to lose weight or become more active, might start using other functionalities, such as sleep-tracking to satisfy their curiosity. Similarly, somebody picking up an Apple Watch as a gadget, might realise that they care about a particular activity goal and consequently engage in a teleological kind of self-tracking. The motivations and expectations of self-trackers are diverse and complex, so self-tracking should be approached as a practice that is neither teleological nor curiosity-driven, but a combination of the two. According to such an interpretation, common design elements of self-tracking devices such as nudges (see Lanzing, 2019) will have a varying ethical impact depending on the particular self-tracking project to which they are applied. An ethical analysis examining self-tracking as a practice involving both a teleology and curiosity will be able to consider different kinds of contexts in which tracking takes place and the ethical issues arising in them.

#### **6.4. Experimentation and existing structures**

Similarly how self-tracking can be both goal-oriented and curiosity-driven, it is possible to distinguish between tracking that is done alongside existing structures and one that focuses on experimentation. I already mentioned that developers of self-tracking technologies often provide users with recommendations, example targets and norms which can be followed in order to establish a successful tracking regime. The popular target of 10,000 steps is one such example, but these exist in all kinds of contexts in which tracking occurs. Developers might inform the users about “normal” heart rate and blood pressure, ambient noise levels, body fat percentage, sleep duration and many other factors. Such pre-established thresholds and standards can be very helpful for users as

they make it possible to quickly establish a reference point in a sea of unfamiliar metrics (Schüll, 2016). However, many of the standards endorsed through self-tracking technologies can be arbitrary and can depend on unwarranted assumptions of developers or marketability rather than research (Neff & Nafus, 2016; Sanders, 2017; Sharon & Zandbergen, 2017). For example, the aforementioned association of 10,000 steps per day with a baseline for healthy living is an outcome of successful marketing rather than cutting edge research. When one of the first commercial pedometers was introduced in Japan in 1965, its manufacturers called it “the 10,000 step meter”, allegedly because the Japanese character for 10,000 resembles a walking person: 万 (Mull, 2019). Nevertheless, the standard became widely accepted and it is commonly employed in self-tracking devices.<sup>4</sup> And while it is hardly egregious for self-tracking companies to encourage their customers to walk more than might be necessary, other similarly arbitrary standards can prove woefully inadequate for users or even outright harmful, as in the case of fertility tracking technologies which often reproduce gender stereotypes (Danaher et al., 2018b; Eveleth, 2014; Kressbach, 2019).

Many users of self-tracking technologies adopt a more free-form and experimental approach to tracking. This is particularly common among the members of the already-discussed QS movement who engage in individualised “n=1” experiments, but even independent users can develop a sceptical attitude towards the standards endorsed through technologies and decide to track themselves in a less-structured manner. Consequently, some researchers discuss self-tracking as a practice of resistance against the mainstream practices of big data (Fox, 2017; Nafus & Sherman, 2014; Sharon & Zandbergen, 2017). Resistant users reject the guidelines embedded in technologies, turn off personalised recommendations, follow a self-defined tracking regime and refuse to share data with third parties. It has to be noted, however, that such approach requires more data literacy and more confidence, so it might not be feasible for everyone.

In this sense, even though self-tracking practices might follow standards pre-established by technology developers (as recommendations and comparison to “the norm” are often turned on by default), this is not applicable to all users. Too rigid norms or elaborate nudges designed to push users into conforming with these norms can be

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<sup>4</sup> It is worth noting that while Fitbit was arguably responsible for popularising the metric of 10,000 steps, the company has moved away from this threshold in their latest devices. They now refer to the baseline of 150 active zone minutes, which are meant to capture the WHO recommended minimum of 150 minutes of moderately intense activity per week (see [https://help.fitbit.com/articles/en\\_US/Help\\_article/1379.htm](https://help.fitbit.com/articles/en_US/Help_article/1379.htm)).

relevant from an ethical perspective, but it has to be noted that issues associated with them might be not applicable to all kinds of tracking. In general, self-tracking practices should be understood as ranging between norm-adherence and experimentation.

### **6.5. Mediation and tools**

The final tension worth mentioning in this chapter relates to the influence self-tracking has on its users. As I already mentioned, one of the many claimed benefits of self-tracking is the greater control over behaviour (especially habits) that it can grant its users. However, self-quantification is not only a practice in which users engage voluntarily in order to achieve specific objectives. Self-tracking apps and devices often nudge users into a specific behaviour, potentially without the users' knowledge and consent (Lanzing, 2019; Toner, 2018). I believe it is possible to interpret self-tracking devices as tools functioning in line with users' expectations and helping them in achieving self-defined goals, and as technologies that shape and influence relations between the users, the world and other technologies (for a discussion of technology as mediating the interactions between people and the world see for example Verbeek, 2005; 2011).

In this sense, I argue that self-tracking technologies should be discussed both in the context of what they enable us to do, and what they do to us. In some instances, a self-tracking device might (relatively) passively collect data and inform or enable specific kinds of action and knowledge (e.g., when a user looks at their Fitbit to see how long they slept). In others, they might act in a more agential capacity and influence some forms of behaviour (e.g., when a runner receives a notification that they should increase their pace to reach their target). Admittedly, in most everyday situations, self-tracking devices can be observed to exist at an intersection between these two affordances – being used by us and influencing us in turn. However, I believe it is important to distinguish between these two opposing poles of their functionality in order to accommodate them in the subsequent analysis. I propose to discuss self-tracking devices both as mediation technologies and as tools.<sup>5</sup>

## **7. Conclusions**

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<sup>5</sup> This dual nature of technology is also evident in the philosophical approach I adopt for the purposes of this dissertation – see chapter 4, section 3.3 for a discussion of Dewey's philosophy of technology.

This chapter presents a general overview of self-tracking technologies and practices. It starts with an exaggerated illustration of a self-tracker's day, attempting to demonstrate what self-tracking entails, as well as the contexts and situations in which people might typically track. On this basis, I present a definition of self-tracking and the characteristics that distinguish it from similar technological practices such as lifelogging. The next two sections of this chapter outline some technologies commonly used in self-tracking, and the Quantified Self movement, which for many is the most readily available example of self-quantification put into practice. However, keeping in mind that members of the QS movement might not be representative of the general population of self-trackers, I propose to discuss the practice in connection to its five defining themes: 1) quantification and qualitative experiences; 2) individual and interpersonal dimensions; 3) teleology and curiosity; 4) experimentation and existing structures; and 5) mediation and tools.

This chapter serves as a descriptive foundation for the remainder of this dissertation. It introduces readers to the diverse landscape of self-tracking and presents key characteristics of the discussed phenomenon that will be explored later in more detail. It informs the theoretical tools that I employ for the analysis of the ethics of self-tracking technologies and practices, and the specific issues to which I devote more attention. When in later parts of this thesis I adopt specific methods and discuss particular issues, I do so while keeping in mind the core characteristics of self-tracking that have been identified in this chapter (these decisions are also further justified by the findings of my systematic literature review presented in chapter 3). In this way, I ensure that my ethical analysis reflects the ambiguity and diversity of self-tracking and does not present a one-sided view of the phenomenon.

# Chapter 3. The ethics of self-tracking. A review of the literature

## 1. Introduction

The goal of this chapter is to provide a comprehensive review of the literature addressing ethical aspects of self-tracking.<sup>6</sup> The review presents an up-to-date, exhaustive mapping of the ethical dimensions of quantified self-tracking by reconstructing all the issues identified in the existing literature and discussing them across 13 categories. There are two reasons why such a detailed literature review is necessary for the purposes of the dissertation.

First, even though ethical literature is an important tool both for researchers and policymakers, Sofaer and Strech (2012) noted the difficulties in locating relevant work and extracting arguments made by the authors. Consequently, reviews of ethical issues are an indispensable tool for researchers and policymakers wishing to acquire a full picture of the ethical dimension of a given phenomenon. Ethical arguments are not universally accepted and individual ethical approaches are not able to provide a full overview of all issues that may be deemed ethically relevant.<sup>7</sup> A review outlining all of the ethical issues already identified in the literature provides a more accurate overview of the debate and reduces the risk that readers would focus only on the issues found in the papers published in the most reputable journals or by the most renowned researchers (see Mertz et al., 2016).

Second, the most recent overview of ethical challenges and opportunities arising with the use of technologies related to those forming the focus of this study was published in 2014 (Jacquemard et al., 2014) and the debate on the ethical dimension of self-tracking has expanded significantly in the intervening years. Moreover, the review by Jacquemard et al. dealt primarily with lifelogging and not quantified self-tracking (a difference which I discuss in chapter 2, section 3). Consequently, it did not touch on many issues I discuss

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<sup>6</sup> This chapter was published in paper form in *Ethics & Behavior* (see Wiczorek et al. 2022). The only differences between the two texts result from the need to maintain the coherence of the entire dissertation or guarantee consistency with other chapters or journal style guidelines. It is worth noting that section 3 of chapter 2, dealing with conceptual clarifications, was also incorporated into the *Ethics & Behavior* paper.

<sup>7</sup> For example, a principle-based approach does not place as much emphasis on the character of stakeholders as virtue ethics does, whereas virtue ethics could be seen as privileging the point of view of the individual over the needs of a moral community. Also, no single work contained references to issues belonging to all 13 categories I identified, let alone all of the issues within even just a single category.

here (e.g., the economic-political dimension of self-tracking, impact on autonomy) and the issues found in both reviews (e.g., privacy, impact on social interactions) are discussed in different depth and scope. As Jacquemard et al. deal with an altogether different, even if related practice, I believe that a comprehensive, up-to-date, mapping of the ethical dimension of self-tracking is badly needed. At the time of writing, there are no reviews of ethical aspects of self-tracking.

In what follows, I first present the search methodology and then provide an overview of the results by outlining the types of ethical issues covered as well as the theoretical background and the methodological tools used by the authors. The findings are divided into a reconstruction of the positive (opportunities) and the negative (concerns) aspects of self-tracking as presented in the extracted literature. I finish the review by discussing the current state of the literature and identifying avenues for further research that help me construct a research agenda for the remainder of this dissertation.

## **2. Methodology**

### **Research question/Objective**

My review aims at providing the answer to the following research question: What ethical aspects of self-tracking have been identified in the literature? Following the arguments by Sofaer and Strech (2012) about the need for comprehensive reviews of reasons in ethics, I decided to adopt a maximally broad research question in order to comprehensively summarise the current state of the ethical debate about self-tracking. Consequently, I focus on the ethical aspects of self-tracking rather than merely the ethical issues. In my view, a review of the ethics of self-tracking should provide the readers with a full picture of the ethical dimension of the practice. For this reason, I also summarise the positive aspects of self-tracking, as their inclusion could allow readers to evaluate whether the risks posed by self-quantification are justified by the potential benefits. I also added a complementary research question: Which theories and methods have been used to identify ethical aspects of self-tracking? I adopt a pluralistic view of ethics and believe that competing methods are more likely to provide different, complementary results rather than overlap. Consequently, I believe that an overview of theories and methods used in the works extracted for this review could help the readers determine the depth of the existing discussion and identify potential research gaps.

### **Eligibility criteria**

In order to be considered for the review, extracted papers needed to fulfil the following criteria: (1) Have the practice of self-tracking (as defined in the conceptual clarifications section in the previous chapter) as their primary focus. (2) Discuss ethical aspects of self-tracking. (3) Be peer-reviewed journal articles, book chapters or books. I examined the title, abstract and keywords of each of the papers extracted for the review to determine their eligibility for full reading. I then once again applied these eligibility criteria to each of the papers selected for full reading. Although I recognise that self-tracking could be discussed by authors publishing on a variety of subjects (e.g., smartphones, AI systems, algorithms), the inclusion of all potentially relevant discussions would be impractical (in terms of the search strategy) and unfeasible (in terms of time commitment). Consequently, I limited the scope of the review to the works that deal primarily with self-tracking and specify so in the text. Moreover, as the relevant literature is heterogenous and spans across disciplines, I decided to also include works that do not discuss the ethical aspects of self-tracking in an explicit manner. Particularly, authors from disciplines such as anthropology, ethnography and sociology might discuss normatively relevant features of self-tracking, but do not label them as ethical, instead using language such as “concerns,” “potential,” “challenges,” “opportunities” and others. I decided that the findings presented in these works are important for any review attempting at providing the full picture of the ethical dimension of self-tracking. Consequently, I accounted for this in the eligibility criteria (as works eligible for this review do not need to deal with ethical aspects of self-tracking in an explicit way) and designed a search strategy that would retrieve the maximum feasible number of relevant works from disciplines other than philosophy. Finally, I decided to focus only on peer-reviewed journal articles, book chapters and books as these are the most important sources in the relevant disciplines (particularly in philosophy). I excluded conference materials from this search. While some of them are peer reviewed, the standard is not universal and the quality of conference materials can vary. The publication of conference materials is also less common in the disciplines relevant to this review. Additionally, the inclusion of conference materials would have saturated the search results, most often with not relevant publications.

### **Search strategy**

This literature review is based on searches conducted in four databases: Scopus<sup>8</sup>, Web of Science<sup>9</sup>, Academic Search Complete<sup>10</sup> and PhilPapers<sup>11</sup>. These databases comprise a significant number of journals from across various disciplines, facilitating the search of articles from ethics and philosophy, as well as social sciences, anthropology, ethnography and other fields, which might address ethical aspects of self-tracking technologies and practices. The search strings were created on the basis of two sets of search terms. The first one, was built around self-tracking and its most relevant synonyms and consists of terms: "self-track\*", "quantified self\*", "self-quantif\*", "personal informatic\*", "personal analytic\*" and "lifelog\*", with asterisks added to include other forms of the searched words and quotation marks added to maximize the efficiency of the search.

The inclusion of the term "wearable\*" was considered, but I ultimately decided against it for reasons of practicality and time. Inclusion of the term "wearable\*" would have led to an initial inclusion of an extremely high number of texts that would then have to be manually excluded (e.g., for dealing with wearables that do not allow for self-tracking, such as smart glasses). The term "lifelog\*" was included in the first set even though lifelogging is not the subject of this review and, as I argued in the previous chapter, is a practice distinct from self-tracking. However, despite differences between the two practices, the terms self-tracking and lifelogging are sometimes used interchangeably in the literature. Some authors discuss the practices as synonymous or overlapping (Jacquemard et al., 2014; Lupton, 2016a) while others consider self-quantification to be a subset of a more diverse group of lifelogging practices (Selke, 2016a). Consequently, it is impossible to determine outright that an article discussing what I would label the ethics of lifelogging (e.g., ethical aspects of personal digital archives, video lifelogs and other similar phenomena) would not provide some insight into practices of quantified self-tracking. To address this problem, I decided to include the term "lifelog\*" in the search and manually exclude the works that deal with qualitative, retention-oriented collection of personal data (which do not fit the criteria of

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<sup>8</sup> Scopus indexes over 16,000 peer-reviewed journals. It can be accessed at: <https://www.scopus.com/>

<sup>9</sup> Web of Science covers over 10,000 peer-reviewed journals. It can be accessed at: <https://www.webofknowledge.com/>

<sup>10</sup> It was selected as it provides access to over 7,000 peer reviewed journals. It can be accessed at: <https://search.ebscohost.com/>

<sup>11</sup> PhilPapers was chosen to diversify search results by including more specialised philosophical literature selected by philosophical researchers that might not have been included in other databases. It can be accessed at: [philpapers.org](http://philpapers.org)



this review). This has been done on the basis of their titles, abstracts and keywords as it allowed me to manually select works that also use the term “lifelogging” in their discussion of what we have defined here as quantified self-tracking.

The second set included the terms ethic\*, moral\*, virtue\* and norm\*, thus aiming at returning works explicitly discussing ethical, moral and normative dimensions of self-tracking. The inclusion of the term “value\*” was considered, but ultimately rejected as this would excessively saturate the search results with works discussing numerical values associated with quantified self-tracking. The sets were then combined into search strings adapted to suit the search engines used by each of the four databases (see Table 1).

Scopus search string	( TITLE-ABS-KEY ( "self-track*" OR "self-quantif*" OR "quantified self*" OR "personal informatic*" OR "personal analytic*" OR “lifelog*”) AND TITLE-ABS-KEY ( ethic* OR moral* OR virtue* OR norm* ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) )
Web of Science search string	(( "self-track*" OR "self-quantif*" OR "quantified self*" OR "personal informatic*" OR "personal analytic*" OR "lifelog*") AND (ethic* OR moral* OR virtue* OR norm*))
Academic Search Complete search string	( "self-track*" OR "self-quantif*" OR "quantified self*" OR "personal informatic*" OR "personal analytic*" OR "lifelog*" ) AND ( ethic* OR moral* OR virtue* OR norm* )
PhilPapers search string	("self-track*"   "self-quantif*"   "quantified self*"   "lifelog*") & (ethic*   moral*   virtue*   norm*) <sup>12</sup>

Table 1 – search strings used for the review

The initial search, which was conducted on 28 July 2020, returned 361 results across four databases, and the exclusion of duplicates left 212 results (see table 2). Subsequently, 62 results were excluded as they were not peer-reviewed journal articles, books or book chapters. Out of the remaining 150 results 5 were unavailable to me, which left 145 sources. The titles, abstracts and keywords of available results were inspected to

<sup>12</sup> In the case of PhilPapers, I was forced to exclude the terms “personal analytic\*” and “personal informatic\*” as the search with full sets was too complex for the engine. However, including only either one of those terms in the first set led to zero results in test searches.

determine their relevance for this review, i.e. whether they discussed digital self-quantification in ethical terms. Where abstracts were unavailable (e.g., in case of book chapters), I inspected the introduction.

Consequently, 71 results were rejected for not dealing with self-tracking or not dealing with ethical issues surrounding them. This step left me with 74 results, which were then selected for full reading. Full reading led to the rejection of 34 works leaving 40 identified results discussing ethical issues surrounding self-tracking (Ajana, 2017; Arora, 2019; Baker, 2020; Barassi, 2017; Borthwick et al., 2015; Cederström & Spicer, 2015; Daly, 2015; Danaher et al., 2018a, 2018b; Duus et al., 2018; Fotopoulou & O’Riordan, 2017; Gabriels & Coeckelbergh, 2019; Gertenbach & Mönkeberg, 2016; Gimbert & Lapointe, 2015; Ha, 2017; Hill, 2019; Hoy, 2016; Hull, 2018; Klauser & Albrechtslund, 2014; Kleinpeter, 2017; Klugman, 2018; Klugman et al., 2018; Kreitmair & Cho, 2017; Lanzing, 2016, 2019; Lifkova, 2019; Lomborg et al., 2020; Lupton, 2015b; Lupton & Smith, 2018; Maturo & Setiffi, 2015; Moore & Piwek, 2017; Morgan, 2016; Oravec, 2020; Owens & Cribb, 2019; Richardson & Mackinnon, 2018; Sanders, 2017; Sharon, 2017; Sharon & Zandbergen, 2017; Till, 2018; Toner, 2018)

In order to extract relevant articles from a greater number of disciplines and broaden the results of the database search, I engaged in backwards snowballing (Jalali & Wohlin, 2012; Wohlin, 2014). This was done with the aim of identifying works that discuss ethical concerns surrounding self-tracking, but do not label these concerns explicitly as ethical (using more general language instead, e.g., worries or downsides).

For this purpose, I examined each of the papers referenced in the works extracted through the database search and considered their inclusion in the review by applying the same exclusion criteria applied to the search results (i.e. looking at their titles, abstracts and keywords to assess whether they discuss ethical aspects of self-tracking). The same procedure was repeated for each of the works extracted in this manner. Moreover, where book chapters were examined, I looked at all the other chapters published in the same volume and considered their inclusion in the review by applying the same exclusion criteria as during the previous steps. This was particularly justified as some of the books were specifically devoted to self-tracking and other related practices and technologies. These two steps (backwards snowballing and analysis of other chapters from given books) helped me identify 25 additional relevant works (Ajana, 2018; Barta & Neff, 2016; Challa et al., 2017; Crawford et al., 2015; Frank & Klineciewicz, 2018; Gabriels & Moerenhout, 2018; Kreitmair, 2018; Li & Hopfgartner, 2016; Lupton, 2013, 2015a,

2016a, 2016b; Martens & Brown, 2018; Moore, 2017; Moore & Robinson, 2016; Morozov, 2013; Neff & Nafus, 2016; Nissenbaum & Patterson, 2016; Piwek et al., 2016; Schulz, 2016; Selke, 2016a, 2016b; Sharon, 2018; Swirsky & Boyd, 2018; Till, 2014). Out of these, 21 were extracted through the analysis of the references and four (Li & Hopfgartner, 2016; Schulz, 2016; Selke, 2016a, 2016b) were extracted through the consideration of other chapters in books extracted during the previous steps.

It is worth mentioning that one of the papers extracted through the search (Danaher et al., 2018a) was a response to open peer criticism of an earlier paper by the same authors (Danaher et al., 2018b) which made up for an entire issue of *American Journal of Bioethics*. Although two of the papers found in the discussed issue of the journal were initially returned by our search (Hull, 2018; Klugman, 2018), further five were extracted through backwards snowballing (Frank & Klineciewicz, 2018; Kreitmair, 2018; Martens & Brown, 2018; Sharon, 2018; Swirsky & Boyd, 2018), which might at least partially account for the high number of papers extracted in this step.

Admittedly, even with the above taken into account, the number of results added through backwards snowballing is high in comparison to the number of results extracted through database searches. However, as already noted, a significant portion of research done on self-tracking technologies and practices has been conducted by authors representing other disciplines than ethics and philosophy. Researchers from fields such as sociology, anthropology and ethnography published a relatively large number of highly influential papers discussing the ethical aspects of self-tracking technologies, but they often did not use the same terms employed in philosophical research (i.e., moral or ethical), focusing instead on outlining the concerns surrounding self-tracking or the potential negative aspects connected to its development. I decided that a thorough literature review on the ethical aspects of self-tracking would have to cover these discussions and I considered two potential methods of extracting the relevant work.

The first involved broadening the second set of search terms by using terms such as “concern\*,” “challeng\*,” “disadvantag\*,” “opportunity\*” and others. However, expanding the second set of search terms in this manner drastically increased the number and scope of results, thus making it impossible to conduct this review in a reasonable amount of time. Consequently, I decided to engage in a thorough procedure of backwards snowballing (as discussed above), assuming that ethically relevant papers dealing with self-tracking should be referenced by the authors of works extracted through our search methodology focusing solely on explicitly ethical literature. In my view, this

methodological approach had the biggest chances of extracting a maximum number of works relevant to this literature review while remaining feasible from a practical standpoint. As a result of the database searches, backwards snowballing and examination of book chapters, a final number of 65 journal articles, books and book chapters will be discussed in this literature review.

Scopus	161
WebofScience	111
Academic Search Complete	61
PhilPapers	25
Number of results after exclusion of duplicates	212
Number of results that were not peer reviewed journal articles, books or book chapters	62
Number of results unavailable to me	5
Number of results excluded based on titles, abstracts and keywords	71
Number of results selected for full reading	74
Number of results rejected on the basis of full reading	34
Final number of relevant results extracted through database search	40
Number of relevant works extracted through backwards snowballing	21
Number of relevant book chapters extracted on the basis of full examination of books extracted through search and backwards snowballing	4
Final number of works discussed in the review	65

Table 2 – number of works extracted for the review

### **Data extraction and analysis**

Arguably, there are no universally used methods for interpretation and analysis of works in the field of ethics and authors of other reviews rarely refer to specific approaches (Kahrass et al., 2021; Mertz et al., 2016, 2017). Although Kahrass et al. (2021) recently attempted to provide exhaustive guidelines for conducting reviews of ethical literature, they also contended that due to a lack of established methods, it might be the most feasible for authors to merely stipulate which kind of analysis they performed and present each of its steps.

My review is consistent with the views presented by Sofaer and Strech (2012) on

reviews of reasons in (bio)ethics and attempted to synthesise the current state of the literature in maximum detail. In order to limit the influence of my ethical convictions and preferred theories, I did not construct *a priori* categories that would guide my analysis and systematise the findings of the reviewed literature. Instead, I adopted an inductive approach and decided to develop a set of ethical aspects of self-tracking on the basis of those found within the literature.

I first engaged in close reading of the text to identify the main arguments made by the authors and the methods and theories they used for their analysis. I then tagged individual ethical aspects by identifying either the features explicitly labeled by the authors as ethical (e.g., through the use of terms such as autonomy, privacy, and others), or the features labeled by the authors as areas of concern, challenges, opportunities and others. I drew on my ethical expertise to model the latter set of aspects in ethical terms.

Following the initial tagging, I combined individual ethical issues into larger categories. This was done to simplify the structure of the review and make my synthesis easier to follow. For example, authors identified several unrelated ways in which self-tracking data can be used to harm the users (e.g., discrimination, use of data in criminal activity, function creep, stalking), but for the purposes of this review they were grouped into one category (Data as basis of harm). When creating these general categories, I looked for instances where different authors discussed relatively similar ethical aspects (e.g., different notions of privacy), or where there was significant overlap between the discussions, even if the arguments were modeled in different terms. This was the case, for example, in the discussion about privacy and surveillance which was subsumed under a single category.

Following these procedures, I was able to identify 13 categories of ethical aspects of self-tracking technologies discussed in the literature. As three of these categories relate to the opportunities connected to self-tracking, while ten others can be considered challenges associated with these technologies and practices, I created two higher level categories to distinguish the positive and negative aspects of self-tracking. The division, as well as the number of works at least mentioning each of the categories is reflected in Table 3, and the categories themselves are introduced in more detail in their specific sections.

After the initial tagging and creation of categories, I held consensus meetings with my supervisors to determine the validity of my grouping and agree on the reconstruction of individual ethical aspects. My tasks and those of the supervisors were divided as

follows: I prepared the search strategy, ran the search and performed the initial analysis and coding. Bert Gordijn reviewed the search strategy and the coding. Fiachra O’Brolchain and Yashar Saghai independently reviewed the coding. Everyone participated in the consensus meetings and reviewed the final analysis.

In some cases, an overlap between categories can be observed. Concerns connected to privacy are closely related to the ownership of data, whereas social harms can be associated with either harmful design or data being used to inflict specific harms. However, each of the categories is distinct enough on its own and was discussed by authors in enough detail to warrant separate treatment. Some authors only presented a superficial or unoriginal discussion of the ethical aspects of self-tracking discussed in each of the categories. Where this was the case, I first reconstruct the most common and cursory arguments and later proceed to highlighting the more original and in-depth discussion. However, to ensure that my review provides a full picture of the current state of the debate on the ethical aspects of self-tracking, I mention each of the papers falling under each category and provide enough details to give readers an overview of the arguments present in the debate.

<b>Opportunities</b>	
Empowerment and well-being	29
Contribution to health goals	17
Community and solidarity	15
<b>Concerns</b>	
Social harms	52
Privacy and surveillance	42
Ownership, control and commodification of data	40
Autonomy	32
Data-facilitated harm	30
Datafication and interpretability of data	27
Negative impact on relation to self and others	27
Shortcomings of design	24
Negative impact on health perception	15
Regulation and enforcement of rules	15

Table 3 – number of works in each of the categories

Moreover, I attempted to assess the methodologies and theoretical approaches that allowed the authors to arrive at their findings, but this proved difficult. I was unable to identify the adopted methodologies and theoretical approaches of 26 works discussed in this review (i.e. the authors did not make their methods and theoretical positions explicit, and it was not possible to deduce that from the content of their work or the reference list) and a further 21 works contained references to various ethnographic and sociological methods such as interviews with users or analysis of marketing materials, app descriptions and terms of service. Excluding ethnographic and sociological methods, the philosophy of Michel Foucault was the most commonly invoked context for the analysis of self-tracking technologies and practices, with 8 works explicitly referring to his theories as a basis for the analysis (Ajana, 2017; Baker, 2020; Fotopoulou & O’Riordan, 2017; Gabriels & Coeckelbergh, 2019; Klauser & Albrechtslund, 2014; Lifkova, 2019; Richardson & Mackinnon, 2018; Sanders, 2017). However, as noted in the findings (section 3.1.1), Lupton (2016a) also mentioned Foucault’s idea of technologies of the self and biopolitics without explicitly presenting a Foucauldian approach to self-tracking across the entire work. Other approaches used by more than one author included Marxism (Moore, 2017; Moore & Robinson, 2016; Schulz, 2016; Till, 2014)), Science and Technology Studies (Ha, 2017; Klauser & Albrechtslund, 2014; Li & Hopfgartner, 2016) and phenomenology (Kreitmair, 2018; Kreitmair & Cho, 2017). Some theoretical and methodological approaches were only listed in one paper. These include “neuroethics” (Kreitmair & Cho, 2017),<sup>13</sup> “contextual integrity” (Nissenbaum & Patterson, 2016), legal studies (Challa et al., 2017), philosophy of Paul Virilio (Hill, 2019), philosophy of Bruno Latour (Klauser & Albrechtslund, 2014), “feminist analytics” (Sanders, 2017), “ironies of automation” (Baker, 2020), “vital normalism” (Gertenbach & Mönkeberg, 2016) and a literature review<sup>14</sup> (Morgan, 2016). It has to be noted, however, that some papers incorporated more than one approach (e.g., Sanders (2017) used both Foucauldian philosophy and what she called “feminist analytics”), while it was also difficult to assess what some authors meant by invoking a specific theory or concept (e.g., Gertenbach &

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<sup>13</sup> Of course, neuroethics is a subfield of ethics rather than a distinct theoretical approach. However, this paper was the only work focusing on self-tracking from a neuroethical perspective and did not provide other information about methods or theories used within it. Consequently, I decided that labeling the paper as neuroethical in method would be more informative than classifying it in the “unknown” category.

<sup>14</sup> The article in question presented a literature review dealing with the imposition of self-tracking in a healthcare context, not a literature review explicitly discussing ethical issues.

Mönkeberg (2016) referring to “vital normalism”).

### **3. Findings**

#### **3.1 Opportunities**

##### **3.1.1. Empowerment and well-being**

The effects self-tracking can have on user empowerment and well-being are mentioned in the literature extensively. However, a significant number of authors only make general statements about these aspects that echo the promises of self-tracking professed by enthusiasts and marketing materials, and they often do so as a way to introduce their discussions of other aspects of self-quantification (Crawford et al., 2015; Ha, 2017; Kreitmair & Cho, 2017; Lanzing, 2016; Li & Hopfgartner, 2016; Lupton, 2015a, 2015b; Lupton & Smith, 2018; Moore & Piwek, 2017; Morozov, 2013; Selke, 2016a; Sharon, 2018). The benefits mentioned in the cursory discussions include increased self-knowledge, improved wellbeing, increased productivity, greater fitness, facilitated achievement of goals, facilitated management of habits and behavior, and facilitated decision-making through the use of personalized recommendations.

Ajana (2017) reiterates those advantages, but argues that people have already been achieving similar goals through non-digital means of measurement. However, she notes that self-tracking technologies are much easier to use than analogue means of tracking and their relatively low price makes them more readily available to the general public. A similar point is made by Neff and Nafus (2016) who argue that these technologies are valuable to users because they create opportunities to engage in self-tracking experiments that would not have been possible otherwise and consequently allow users to gain more control over their habits and bodies. Referring to the ethos of self-experimentation present in the self-tracking community, Sharon (2017) observes that the empowering potential of self-tracking technologies can be the greatest when users modify their devices and establish personal parameters and categories that are most in line with their individual needs and goals. In her eyes, the autonomy of users is increased when they actively engage with the technology instead of passively accepting the software and platforms supplied by technology companies.

Several authors (Danaher et al., 2018a; Duus et al., 2018; Lupton, 2013; Sharon & Zandbergen, 2017) discuss self-tracking technologies in the context of human enhancement. In their view, self-tracking devices can serve as technological tools for extending the users' decision-making capabilities (Danaher et al., 2018a; Duus et al.,



2018), “developing new senses” by increasing the users’ epistemic capacities<sup>15</sup> (Sharon & Zandbergen, 2017, p. 1700), and overcoming the limitations of the human body (Lupton, 2013). However, Owens and Cribb (2019) note that even though self-tracking technologies can enhance the autonomy of their users, they cannot change the material circumstances which influence the number and character of available choices. Consequently, users with higher income and greater life chances might benefit from the autonomy-enhancing effects of self-tracking technologies to a much greater extent as they have more means and opportunities to reap the benefits of quantification.

Self-tracking has also been discussed as contributing to users’ self-confidence, helping them deal with anxiety or feelings of inadequacy, and providing motivation and reassurance (Barassi, 2017; Duus et al., 2018; Lomborg et al., 2020; Owens & Cribb, 2019). In such cases, users can rely on data generated by the devices to improve their self-esteem and battle negative feelings. Relatedly, Sharon and Zandbergen (2017) argue that self-tracking could be compared to “a practice of mindfulness,” as it allows the users to become aware and narrate phenomena that would otherwise be outside of their view. Sharon (2017) additionally observes that the use of self-tracking data can broaden the existing self-knowledge by supplying additional information. On a similar note, self-tracking has been described as a Foucauldian technology of the self<sup>16</sup> (Fotopoulou & O’Riordan, 2017; Gabriels & Coeckelbergh, 2019; Lupton, 2016a; Richardson & Mackinnon, 2018). However, it is unclear whether the authors simply want to refer to the drive for self-improvement and self-care inherent in Foucault’s concept of the technologies of the self, or whether they also want to highlight self-tracking as a tool for moral deliberation. In fact, only Gabriels and Coeckelbergh (2019) mention self-tracking in the context of “moral improvement and reflection,” but in their view, this dimension is less pronounced than the orientation toward fitness.

The empowering aspects of self-tracking technologies are observed in the context of work as well. Till (2018) claims that the deployment of wearable devices in workplace wellness schemes could help workers improve their wellbeing, while simultaneously

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<sup>15</sup> By new senses, Sharon and Zandbergen understand self-tracking devices’ sensors functioning as if they were extensions of users’ normal sensory apparatus.

<sup>16</sup> Foucault defines technologies of the self as practices “which permit individuals to effect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct, and way of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality.” (Foucault, 1988, p. 18). Examples of such technologies include the Stoic practices of self-reflexion and improvement, and the Christian practice of confession.

increasing their productivity and thus also proving beneficial to the employers. Moreover, in his view the association of work with greater health and wellbeing could additionally help workers attach more meaning to their professional activity. On the other hand, Schulz (2016) analyses self-tracking from a Marxist perspective, which considers labour as alienating the workers and subsuming their leisure time into processes of production. However, in his view, self-tracking technologies could help workers better manage their free time and ensure that they spend it in quality ways that are more in line with their needs.

Finally, Borthwick et al. (2015) notice that when used in educational contexts, wearable self-tracking tools could increase student engagement and allow teachers to develop new teaching strategies. Moreover, data supplied through these devices could help educators better identify the needs of students with physical disabilities.

### **3.1.2. Contribution to health goals**

Some authors mention how the use of self-tracking devices can help individuals improve their own health by monitoring factors relevant to their condition (Ajana, 2017, 2018; Gabriels & Moerenhout, 2018; Gimbert & Lapointe, 2015; Ha, 2017; Lupton, 2015b, 2016a; Neff & Nafus, 2016; Piwek et al., 2016; Selke, 2016a, 2016b; Sharon, 2017). This can be particularly relevant for individuals living with chronic illnesses that already require them to keep track of a significant number of factors (e.g., diabetics who need to monitor their glucose levels, and people with a cardio-vascular conditions who need to track their blood pressure). According to the aforementioned authors, self-tracking can facilitate everyday management of health, give patients more control over their health, and reduce reliance on professional care, thus reducing healthcare costs and contributing to public health overall. Regular physical activity which is often associated with self-tracking is also seen as improving individual health, for example, by reducing the risk of obesity and cardiac disease (Li & Hopfgartner, 2016). Moreover, self-tracking devices can significantly increase treatment adherence by reminding patients to follow doctors' recommendations and take their medicine at prescribed intervals (Klugman et al., 2018; Neff & Nafus, 2016). It has to be noted, however, that according to Piwek et al. (2016) there is still not enough evidence supporting claims about medical benefits of self-tracking, and many of the promises of self-tracking for health may only be fulfilled in the future.

Furthermore, self-tracking devices can contribute to public health through health

promotion and contribution to increases in health awareness and literacy (Lupton, 2015b, 2016a; Mauro & Setiffi, 2015). For example, Lupton (2015b) notes that fertility and sexual activity tracking applications could greatly educate the general public about sexually transmissible diseases and reproductive health. Such promises have led many healthcare professionals to believe that self-tracking can increase patient participation and democratize medicine (Ajana, 2018). Interestingly, positive public health outcomes do not necessarily have to be connected to health-related initiatives. According to Till (2018), corporate wellness schemes involving self-tracking devices often aim at increasing workers' physical activity, which is believed to have a positive impact on their productivity. However, he argues that this can have a side effect of improving workers' health overall.

Finally, self-tracking data is believed to hold great promises for advancing medical research and preventing or eliminating certain diseases (Ajana, 2017; Li & Hopfgartner, 2016; Neff & Nafus, 2016; Sanders, 2017; Sharon, 2017), especially as self-tracking devices enable continuous collection of health related data and can help medical professionals gather information even outside the medical context (Sharon, 2017).

### **3.1.3. Community and solidarity**

As many self-tracking tools provide opportunities and encourage users to share data with others, some authors contend that this could lead to community-formation and feelings of solidarity (Ajana, 2017; Barta & Neff, 2016; Crawford et al., 2015; Lupton, 2015a, 2016a; Sharon, 2017, 2018; Sharon & Zandbergen, 2017), especially if the sharing takes place in the structured context of the Quantified Self community (Barta & Neff, 2016; Crawford et al., 2015; Sharon, 2017; Sharon & Zandbergen, 2017). Engaging in self-tracking might additionally make it easier for users to become part of communities that are oriented toward fitness or technological gadgets (Crawford et al., 2015; Fotopoulou & O'Riordan, 2017). Disclosing individual interests, vulnerabilities and shared values in datafied form is seen as improving trust and mutual understanding, which helps users establish long-lasting reciprocal relationships and maintain existing ones (Barta & Neff, 2016; Neff & Nafus, 2016, pp. 146–47). This is aided by the fact that some users find it easier to share intimate or embarrassing details in quantified rather than narrative ways (Sharon & Zandbergen, 2017).

Additionally, discussion and aggregation of self-tracked data can help users attribute more meaning to their data, as well as generate insights that would not have been

available at the individual level. This not only gives the sharing community a sense of purpose, but can also motivate users to contribute their data solely for the benefit of others (Lupton, 2015a). Similarly, data-centered communities can come together in establishing their own goals for the use of data, which might go against the interests of third parties that are using the data for their own purposes (Barta & Neff, 2016). Moreover, by analysing data about others, users of self-tracking technologies can gain new and richer knowledge of other people and their relationships with them, which can create a feeling of proximity (Gabriels & Coeckelbergh, 2019; Lupton, 2015b).

On the other hand, even those enthusiastic about the community-generating potential of self-tracking technologies note that the kinds of solidarity and community enacted through such means can be problematic. It is difficult to determine which shared interests and values, if any, serve as a foundation of a community that could be formed through the sharing of data (Barta & Neff, 2016; Sharon, 2017), although according to Barta and Neff (2016), this ambiguity is understood by communities such as Quantified Self as something positive, since it allows for the possibility of multiple values and interests coexisting within a single group.

Nevertheless, it has been noted that a community centered around the sharing of data would be a narrow one and it might include only those already willing and able to engage in self-tracking practices (Ajana, 2017; Sharon, 2017, 2018). As noted by Ajana (2017), it is possible that within the self-tracking world, data sharing and solidarity are being conflated and treated as synonymous. On the other hand, even if communities based on data-sharing are indeed narrower, they might be qualitatively different than the richer communities that are formed in different contexts and this might still provide value to their members (Sharon, 2018). Moreover, according to Sharon the parameters with which self-tracking practices are concerned are not unique to self-trackers, which means that self-tracking communities are, at least in theory, open to a broader range of members and can bond with them through an appeal to universally shared human qualities (Sharon, 2017).

Additionally, it is possible that users could engage with others only because they are prompted by their apps (Fotopoulou & O’Riordan, 2017). This is closely connected to Ajana’s observations that the framing of data sharing as a solidary activity and a contribution to public good lies within the commercial interest of technology companies that profit from sale and access to users’ self-tracking data (Ajana, 2017, 2018). On a similar note, Till claims that the interpersonal dimension of self-tracking is most visibly

manifested in the value extracted by the corporations from the collectively generated data (Till, 2014). As such, he believes that the form of community generated through self-tracking would be most akin to communities formed in the workplace, as it is the shared (digital) labour that provides a basis for bonding.

## **3.2. Concerns**

### **3.2.1. Social harms**

The first ethical issue relating to the social harms of self-tracking and simultaneously the ethical challenge that is most discussed in the literature connects to what I label the norm-prescribing and norm-enforcing effects of self-tracking technologies. Some authors argue that self-tracking technologies are not neutral in their measurement as they present certain thresholds and target scores as recommended, typical or optimal. This might have the added effect of entrenching these scores as normative standards or “correct” results, suggesting that everything outside of a predetermined range might be substandard or abnormal (Ajana, 2017; Barassi, 2017; Danaher et al., 2018b; Fotopoulou & O’Riordan, 2017; Lanzing, 2019; Lifkova, 2019; Lupton, 2016a; Moore, 2017, p. 10, 17; Moore & Piwek, 2017; Neff & Nafus, 2016, pp. 38–44; Owens & Cribb, 2019; Sanders, 2017; Selke, 2016b; Sharon, 2017; Sharon & Zandbergen, 2017; Toner, 2018).

The normative dimension of self-tracking technologies has been criticised from several standpoints. Companies rarely disclose their motivations for promoting specific ideals and thresholds in their apps and devices (Baker, 2020; Crawford et al., 2015) and they often privilege concrete, usually dominant perspectives, e.g., those of young, fit, white, male users (Barassi, 2017; Lupton, 2016a; Moore, 2017, p. 17; Nissenbaum & Patterson, 2016; Sharon, 2017). As such, they are also seen as replicating existing, often harmful, stereotypes (Sharon, 2017). This is particularly evident in relation to stereotypes concerning gender and sexual orientation (Danaher et al., 2018b; Klugman, 2018; Lupton, 2015b, 2016a; Sanders, 2017), for example, when self-tracking technologies assume by default that women of a certain age should be trying to get pregnant, regardless of the life plans of a particular user. Moreover, while discussing how self-tracking devices frame obesity and diet, Mauro and Setiffi (2015) note that these technologies do not acknowledge the possible limitations or risks inherent in them, and they do not reference alternative norms and standards that can be applied to the tracked factors.

Moreover, authors observe that the normative dimension of self-tracking technologies can be internalised by the users, thus instilling in them a sense of obligation

to conform to the norms endorsed by the apps and devices (Ajana, 2017; Fotopoulou & O’Riordan, 2017; Gertenbach & Mönkeberg, 2016; Moore, 2017, p. 17; Owens & Cribb, 2019; Sharon, 2017; Sanders, 2017). As noted by Oravec (2020), this can be particularly problematic when users try to reach the targets that do not fit their individual circumstances. Those who are unable to achieve the scores labelled by the designers of technology as normal might develop a sense of inadequacy (Baker, 2020; Moore & Piwek, 2017), especially as designers of self-tracking technologies could deliberately move the targets so that they remain unreachable in order to convince users that they need to continue working on themselves (Baker, 2020).

Three of the works discussed in this review (Gertenbach & Mönkeberg, 2016; Klauser & Albrechtslund, 2014; Kleinpeter, 2017) support the claim that self-tracking technologies can enforce particular norms, but their authors do not agree that this happens in line with the standards predetermined by the developers. Instead, they all propose that the norms promoted through self-tracking are flexible in character and dynamically change on the basis of supplied data. Consequently, the users are required to engage in “a constant process of optimisation” (Klauser & Albrechtslund, 2014, p. 283), develop “a flexible and adaptable dispositif within themselves, which enables them to compare themselves to [...] various calculations of normality” (Gertenbach & Mönkeberg, 2016, p. 36), and enter a state of “obsessive quantification of oneself” in which “no one would ever be normal enough” (Kleinpeter, 2017, p. 247).

Due to their normative dimension, self-tracking devices are discussed as tools of societal control. A number of authors argue that by monitoring deviations from the norm, self-tracking technologies could be used by decision-makers to push users into patterns of behaviors deemed “standard” or “normal” (Crawford et al., 2015; Lupton, 2016a; Morgan, 2016; Richardson & Mackinnon, 2018; Sanders, 2017; Selke, 2016b; Sharon & Zandbergen, 2017). Direct coercion, punishments and incentives are seen by authors as particularly effective on that front (Crawford et al., 2015; Hoy, 2016; Neff & Nafus, 2016, p. 135; Selke, 2016b; Toner, 2018), but self-disciplining effects on users were discussed as well (Lupton, 2016a; Morgan, 2016; Sanders, 2017). Self-tracking technologies are also seen as enabling those in power to control the users by supplying information about them and their actions (Baker, 2020; Cederström & Spicer, 2015; Gabriels & Coeckelbergh, 2019; Lanzing, 2019; Moore, 2017, p. 10; Selke, 2016a). This can be seen as closely connected to surveillance (see the section on privacy and surveillance). On that note, three works consider self-tracking technologies to be an

extension of Deleuzian “control society” (Gertenbach & Mönkeberg, 2016; Moore, 2017, p. 211; Sanders, 2017).<sup>17</sup> Similarly, several authors voiced concerns that the use of self-tracking technologies can shift power relations in a way that disadvantages the users, for example, by giving employers more information about the employees (Moore & Piwek, 2017; Nissenbaum & Patterson, 2016), or when data is taken over and exploited by large corporations and governments, resulting in a transfer of power from the users (Ajana, 2017, 2018; Baker, 2020; Hull, 2018; Lupton, 2016a).

It has been noted by many authors that self-tracking prompts users to internalize a compulsion to productivity (Ajana, 2017; Fotopoulou & O’Riordan, 2017; Maturro & Setiffi, 2015; Moore, 2017; Neff & Nafus, 2016; Nissenbaum & Patterson, 2016; Richardson & Mackinnon, 2018; Till, 2018) and a desire to be entrepreneurial citizens or one to manage themselves efficiently in a business-like manner (Cederström & Spicer, 2015, p. 104; Ha, 2017; Lupton, 2013, 2015a, 2016a; Lupton & Smith, 2018; Maturro & Setiffi, 2015; Moore, 2017). Moreover, self-tracking has been criticised for encouraging an organisation of life in line with the needs of the economy (Neff & Nafus, 2016, pp. 128–31; Schulz, 2016; Selke, 2016b), for example, by framing leisure time as a period in which users should rest to regain energy for future work (Neff & Nafus, 2016, p. 129). Consequently, many authors argue that self-tracking reinforces the dominant narratives of neoliberal ideology and encourages users to conform to neoliberal values (Ajana, 2017; Cederström & Spicer, 2015, p. 104; Ha, 2017; Lupton, 2013, 2015a, 2016a; Moore, 2017; Moore & Robinson, 2016; Sanders, 2017; Selke, 2016a).

The normative dimension of self-tracking has been discussed by authors in connection with the question of responsibility as well. The narrative surrounding normal, standard and recommended results is seen as creating a sense of responsibility or obligation to track and manage more and more parameters concerning one’s life, such as wellness, productivity, fitness, diet and others (Danaher et al., 2018b; Gertenbach & Mönkeberg, 2016; Lifkova, 2019; Lomborg et al., 2020; Lupton, 2013, 2015a, 2016a,

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<sup>17</sup> (Deleuze, 1992) argued that contemporary societies have shifted from disciplinary modes of maintaining social order (i.e., by keeping the citizens in check through the threat of punitive measures and the deployment of closed-off institutions such as schools, factories or prisons) to societies of control, which create more open-ended and fluid institutions for keeping people in check, replacing factories with corporations and prisons with electronic monitoring. Societies of control exert influence over their citizens, treated as mass instead of individuals, by means of surveillance, data collection, economic incentives and other indirect forms of control. However, it is not completely clear what the authors discussed in this review exactly mean by referring to the concept of control society as self-tracking deals with individuals rather than the masses. It is possible that these comments concern the aggregation of individuals’ data into larger data sets.

2016b; Moore & Robinson, 2016; Richardson & Mackinnon, 2018; Sanders, 2017). Individuals not willing to self-track might be stigmatised as irresponsible (Lupton, 2015b; Selke, 2016b) or even failing to meet a moral imperative (Richardson & Mackinnon, 2018; Sanders, 2017; Sharon, 2017).

On the other hand, the discourse surrounding self-tracking has been noted to shift responsibility from wider social, legal and institutional systems to individuals. One example of that is the pressure put on users to assume responsibility for managing their own data instead of expecting companies and institutions to preserve users' privacy (Lanzing, 2019; Lomborg et al., 2020). Furthermore, authors claim that self-tracking technologies promote a narrative of personal responsibility in the area of health where these technologies are seen as promoting the (neoliberal) idea that staying healthy is primarily an individual effort and not something that should be secured through an institutionalized healthcare system or social support (Ajana, 2017; 2018; Danaher et al., 2018b; Fotopoulou & O'Riordan, 2017; Ha, 2017; Hull, 2018; Lupton, 2013; Maturro & Setiffi, 2015; Sanders, 2017; Sharon, 2017, 2018). Additionally, one work observed that in addition to health the same process occurs in the context of general self-improvement, including fitness, productivity and others (Gertenbach & Mönkeberg, 2016). Such individualization of responsibility places a greater burden on individuals as self-management through self-tracking requires substantial effort (Morgan, 2016; Neff & Nafus, 2016, p. 56; Sanders, 2017; Selke, 2016b). The rise in popularity of self-tracking devices can also have the added effect of shifting attention away from decision-makers, so that instead of facilitating addressing systemic and social causes of ill-health through institutions and policy, they place even greater emphasis on individual management of health, well-being, fitness and other trackable factors (Danaher et al., 2018b; Daly, 2015; Maturro & Setiffi, 2015; Morozov, 2013, p. 253; Sharon, 2017; Richardson & Mackinnon, 2018).

Finally, authors note that the deployment of self-tracking technologies could increase existing inequalities. As the adoption of a new device involves significant costs and requires technical and cognitive capabilities, it is observed that some people are unlikely to be able to afford to self-track (Gimbert & Lapointe, 2015; Kleinpeter, 2017; Klugman et al., 2018; Lomborg et al., 2020). As a result, self-tracking will potentially provide the most benefits to those individuals who are already in the higher strata of society, while leaving others behind (Borthwick et al., 2015; Gabriels & Moerenhout, 2018; Morozov, 2013, p. 240), especially as the underprivileged are often less healthy and face greater



cost of managing their own health already (Richardson & Mackinnon, 2018), while their ability to manage their health and behavior might be more limited by the existing social conditions (Owens & Cribb, 2019; Neff & Nafus, 2016, p. 160).

### **3.2.2. Privacy and surveillance**

Many authors refer to privacy risks surrounding self-tracking that need to be scrutinised, but a significant portion of them do not elaborate on the subject (Borthwick et al., 2015; Challa et al., 2017; Crawford et al., 2015; Daly, 2015; Fotopoulou & O’Riordan, 2017; Gabriels & Coeckelbergh, 2019; Gabriels & Moerenhout, 2018; Ha, 2017; Hoy, 2016; Lupton, 2015a, 2016b; Moore, 2017, p. 25; Moore & Piwek, 2017; Oravec, 2020; Swirsky & Boyd, 2018). Some of the authors treat privacy as something self-explanatory and intrinsically valuable, while others seem to feel the need to at least mention it even while they focus on other ethical aspects of self-tracking. However, some highlight privacy concerns in connection to a more detailed discussion connected to regulation of self-tracking data. Such arguments are reconstructed in the section on regulation and enforcement of rules.

Several authors observe that privacy risks connected to self-tracking data are further exacerbated by substandard security of these devices as well as the common use of cloud storage and network connectivity (Kreitmair & Cho, 2017; Lanzing, 2016; Li & Hopfgartner, 2016; Lupton, 2015b, 2016a; Neff & Nafus, 2016, p. 173; Nissenbaum & Patterson, 2016; Selke, 2016a). Moreover, the practice of anonymisation of user data in aggregated data sets is considered by the authors as insufficient for the protection of privacy, as the data can be easily deanonymised (Ajana, 2017; 2018; Arora, 2019; Neff & Nafus, 2016, pp. 63–64; Piwek et al., 2016). Individual users might also be concerned about the privacy of bigger data sets to which they contribute (Ajana, 2017) and other people’s personal information might be associated with individual users’ data, for example, when self-tracking devices are used in the context of a romantic relationship (Danaher et al., 2018a). As a result, Arora (2019) suggests that user privacy could be safeguarded only if developers of self-tracking technologies are required to enter into a fiduciary relation with their clients.

Moreover, even if privacy breaches do not lead to direct user harms, they can still violate users’ contextual expectations relating to their personal information (Klauser & Albrechtslund, 2014; Lanzing, 2016, 2019; Neff & Nafus, 2016, p. 64; Nissenbaum & Patterson, 2016). According to this view, even if users consent to share their data in a

particular context, privacy breaches disrupt the expected information flows and might make the users uneasy or even make them lose their sense of security and agency. Additionally, it has been observed that privacy violations can be particularly problematic in case of self-tracking technologies as these often collect highly sensitive information, such as data related to mental and physical health, sexual activity, eating habits and other additional information supplied to the device to increase the accuracy of tracking (Kreitmair & Cho, 2017; Lanzing, 2019; Li & Hopfgartner, 2016; Lupton, 2015b). Self-tracking data is often shared by default with third parties, and the vague wording of privacy policies might mean that users will remain unaware of potential violations of their privacy (Danaher et al., 2018b). Moreover, users who depend on self-tracking technologies for management of illness might face the choice of either giving up their privacy or not enjoying the medical benefits provided by the devices (Klugman et al., 2018).

Finally, it has been noted that the increased adoption of self-tracking technologies can change the general public's attitude to privacy (Ajana, 2017; 2018; Hull, 2018; Morozov, 2013, pp. 235–38). Ajana (2017; 2018) notes that privacy is often framed by enthusiasts and developers as an anachronistic concept that privileges individual values over the public good arising from the potential societal benefits of self-tracking. However, in her view this rhetoric serves the commercial interests of technology companies at the expense of individual users and the society as a whole. In turn, Hull (2018) and Morozov (2013) observe that the increasing popularity of self-tracking might result in a situation where collection and sharing of data will become the norm and those unwilling to give up their privacy will face steeper prices or will be forced to pay additional fees for premium services.

Surveillance is another issue related to privacy that is widely discussed by the authors. A significant number of them discuss the potential of self-tracking to be used for workplace surveillance through the employment of workplace wellness schemes and wearable devices designed to monitor the activity and productivity of supermarket and warehouse workers (Cederström & Spicer, 2015, pp. 102–108; Gabriels & Coeckelbergh, 2019; Ha, 2017; Lupton, 2016b; Moore, 2017; Moore & Robinson, 2016; Nissenbaum & Patterson, 2016; Selke, 2016a, 2016b). Interestingly, Moore and Robinson (2016) observe that as workers often use self-tracking devices outside of the work context, companies might consequently gain the opportunity to monitor their workers during leisure time.

Authors mention the possibility that self-tracking data will be used for surveillance purposes by government institutions, especially in the context of healthcare (Barassi, 2017; Ha, 2017; Lupton, 2015a, 2016a; Morgan, 2016; Sanders, 2017; Sharon, 2017). This form of self-tracking-aided surveillance has been discussed in connection to concepts introduced by Foucault, namely biopolitics and biopower (Lifkova, 2019; Lupton, 2015a; Sanders, 2017; Sharon, 2017) as well as his interpretation of the panopticon (Lifkova, 2019; Lupton, 2016a; Sanders, 2017; Sharon, 2017). Surveillance through the use of self-tracking devices has also been scrutinized as a tool of societal control and norm enforcement (Klauser & Albrechtslund, 2014; Lanzing, 2019; Sharon, 2017), issues which are discussed in the social harms section.

Finally, self-tracking has been connected with the phenomenon of *sousveillance* or *co-veillance*, that is, bottom-up monitoring done by the citizens and the monitoring of other people by their peers which can take place when other people access user data that is shared through self-tracking apps and on social media (Daly, 2015; Danaher et al., 2018b; Gabriels & Coeckelbergh, 2019; Lanzing, 2016; Lupton, 2015a, 2015b). As some of these authors note, although voluntary engagement in surveillance practices is not inherently problematic and might even bring positive outcomes (i.e., empowerment and a sense of community), it can open the users to abuse and exploitation from third parties (Danaher et al., 2018b; Lupton, 2015b) or impact social relations (Gabriels & Coeckelbergh, 2019).

### **3.2.3. Ownership, control and commodification of data**

A number of authors observe that the question of who owns the data generated through the use of commercially purchased self-tracking devices is unresolved and controversial (Ajana, 2017; 2018; Borthwick et al., 2015; Ha, 2017; Kreitmair & Cho, 2017; Lupton, 2016a; Morgan, 2016; Neff & Nafus, 2016, pp. 63–65; Piwek et al., 2016; Till, 2014). As a result, users might not have insight into what is collected (Lupton, 2016a; Piwek et al., 2016) as well as what are their legal rights related to self-tracking data (Lupton, 2016a), especially as the companies have commercial motivations to bind the generated data to their products (Till, 2014) and prepare legal documents regulating the ownership and use of data in ways that give them the most power over it (Kreitmair & Cho, 2017). Borthwick et al. (2015) note that ownership of data becomes even more problematic when self-tracking devices are used by a minor and the generated data should, at least in theory, be the property of their parents. Ajana (2017; 2018) and Neff

and Nafus (2016, p. 65) argue that data should not be understood as property as this concept does not adequately reflect the needs and expectations of the parties involved. Neff and Nafus (2016) believe that self-tracking data should be best described as a “child” of the user and the company supplying the device, as it could not be created without either of the parties. In their view, this framework should make it easier to determine the rights and responsibilities of the parties in relation to self-tracking data.

The unclear structure of data ownership is seen as giving companies near full discretion over how and with whom data is shared (Ajana, 2017; 2018; Piwek et al., 2016). Authors who do not discuss issues connected to ownership note that access to data is often granted to third parties, which in their view could be problematic as users may be unaware and unable to control who uses or exploits their data and for what purposes (Barassi, 2017; Challa et al., 2017; Crawford et al., 2015; Daly, 2015; Gabriels & Coeckelbergh, 2019; Klauser & Albrechtslund, 2014; Lanzing, 2016, 2019; Li & Hopfgartner, 2016; Lifkova, 2019; Lupton, 2015b, 2016a). The design of these devices (Lanzing, 2016), their terms of use (Barassi, 2017; Lifkova, 2019), their connectivity (Daly, 2015; Gabriels & Coeckelbergh, 2019; Klauser & Albrechtslund, 2014) and the discourse of engagement and voluntariness that surrounds them (Lupton, 2015b) were all discussed as factors contributing to the users’ lack of awareness about the purposes and destinations of data sharing. On the other hand, Arora (2019) argues that if users were granted more control over and insight into how data is shared, it could “paradoxically increase disclosure of sensitive information” (Arora, 2019, p. 183) as users could be manipulated into consenting to share data or they might not realize all the consequences of their consent. Nevertheless, he still claims that users cannot take it for granted that third parties that gain access to personal data will manage it in ethical and responsible ways.

The use of self-tracking devices as part of workplace wellness schemes is also seen as problematic as it allows employers to access the data collected by the devices worn by their employees, consequently reducing employees’ control over their personal information (Gabriels & Coeckelbergh, 2019) and giving the employers potentially excessive knowledge about the lives of their workers (Moore & Piwek, 2017; Nissenbaum & Patterson, 2016). Klugman et al. (2018) note that the issue of access to personal self-tracking data could be contentious in the healthcare context as well, since patients are sharing their data, often voluntarily, with third parties that include healthcare providers, device manufacturers and friends and family. However, these parties are

bound by different obligations in relation to the data and its confidentiality.

The commodification of self-tracking data and its integration into market processes is also discussed in the literature. However, most of the authors only raise concerns about the exploitative nature of developers' practices of generating profits from users' personal data by selling data to third parties or by monetizing it on their own, for example, through targeted advertising (Ajana, 2017; 2018; Barta & Neff, 2016; Challa et al., 2017; Danaher et al., 2018a, 2018b; Hill, 2019; Kleinpeter, 2017; Kreitmair & Cho, 2017; Lupton, 2015b, 2016b; Piwek et al., 2016; Selke, 2016a; Sharon, 2017; Swirsky & Boyd, 2018).

A small number of authors attempt to expand such claims. Crawford et al. (2015) observe that the value generated through the sale and use of self-tracking data is never returned to the users. Morozov (2013, p. 235) claims that self-tracking data is of particular interest to investors, who are attempting to turn it into a separate "asset class," while Lupton (2015a, 2016a) observes that self-tracking extracts value from the human body. In her view, practices of self-tracking have been designed to facilitate the transformation of bodily information into tradeable commodities that can be described as "digital biocapital" (Lupton, 2016a).

A similar argument is pursued by Till (2014), who claims that self-tracking is an attempt on the part of technology corporations to extract value from users' exercise. In his view, whereas previously companies have been able to profit of people's exercise activity only indirectly (e.g., by selling running shoes), self-tracking devices allow them to turn activity data into a digital commodity that can be sold for profit. Similarly, Schulz (2016) observes that quantification of everyday activity reifies human bodies and phenomena such as well-being, and consequently subjects them to the logic of economy. He claims that as a result, leisure is integrated into labour processes and users' free time is transformed to better fit the rules of capitalist production. On the other hand, Till (2014) and Lupton (2016a) argue that the use of self-tracking devices can itself be described as unpaid digital labour. They both claim that as a result of their activity, users' labour is exploited as they provide monetizable content to the creators of self-tracking technologies without receiving any compensation (Lupton, 2016a), or even pay (i.e., by buying the device) to have surplus value extracted from their labour (Till, 2014). Fotopoulou and O'Riordan (2017) similarly compare self-tracking to labour, but they focused on the amount of effort required to self-track, without mentioning the commercial dimension of the practice.

### 3.2.4. Autonomy

Authors note that the decision to adopt a self-tracking device is not always completely voluntary. For example, when fitness bands are used as part of a workplace wellness scheme, workers could face direct and indirect pressure (such as shame and stigmatization) to wear the device and contribute their data to their employer (Lupton, 2016b; Moore, 2017, p. 166; Moore & Piwek, 2017; Nissenbaum & Patterson, 2016; Oravec, 2020; Schulz, 2016). Moreover, as private health insurance companies can link self-tracking data to health insurance premiums, consumers might lose out on financial incentives or lose a significant amount of money if they opt out of using the devices (Li & Hopfgartner, 2016; Lupton, 2015a, 2016a; Neff & Nafus, 2016, p. 135; Maturo & Setiffi, 2015; Selke, 2016b). Similarly, where self-tracking technologies are used for medical purposes, patients might agree to share their health data only to avoid the risk of losing access to a potentially life-saving device (Klugman et al., 2018). Even in a private context, people might feel increasing pressure to engage in self-tracking and to share their data as these practices become more commonplace (Hull, 2018; Klugman, 2018). Additionally, when data is framed as valuable and beneficial to the community, those willing to opt out of data sharing might be stigmatized as selfish or as having something to hide (Frank & Klinecicz, 2018; Neff & Nafus, 2016, p. 44; Nissenbaum & Patterson, 2016; Morozov, 2013, pp. 238–39). Lupton (2016a, 2016b) observes that it is difficult to draw a line between self-tracking practices that are voluntary and those that are externally imposed on the users (for a more detailed discussion of coercive and punitive dimensions of self-tracking, see the section on social harms).

While the above paragraph delineates the loss of autonomy that might arise when users are forced or pressured to wear self-tracking devices, users' autonomy can be eroded even when self-tracking is taken up voluntarily as the technology and the data it collects can influence users' decision-making processes and behavior (Baker, 2020; Danaher et al., 2018a; Duus et al., 2018; Frank & Klinecicz, 2018; Klauser & Albrechtslund, 2014; Lanzing, 2019; Martens & Brown, 2018; Moore & Robinson, 2016; Owens & Cribb, 2019; Toner, 2018).

When users depend on the information supplied by their device to make choices, they delegate some of their agency to the device and, as a result, it can be difficult to determine the extent to which the devices influence user choice (Danaher et al., 2018a; Duus et al., 2018; Klauser & Albrechtslund, 2014; Martens & Brown, 2018). Consequently, users might feel that their actions are not entirely their own, but shaped by the devices (Duus

et al., 2018). This can be particularly egregious when the devices operate in an untransparent manner, or frame information and present possible choices in an attempt to nudge or manipulate users into specific behavior without their knowledge and consent (Baker, 2020; Frank & Klincewicz, 2018; Lanzing, 2019; Owens & Cribb, 2019; Toner, 2018). Users' autonomy can also be infringed when their personal information is made public. This can hinder users' freedom of choice as other people's knowledge and expectations might limit the availability of some decisions (Lanzing, 2016, 2019) or adversely impact their life chances (Lupton, 2015a). Similarly, autonomy can be reduced when the devices supply so much potentially relevant information that users find themselves overwhelmed and unable to make any decisions (Baker, 2020).

Furthermore, the use of self-tracking devices can make users dependent on them in decision making when the device's authority takes precedence over the user's autonomous decision-making capabilities (Martens & Brown, 2018). Moreover, as user experience is designed to maximize engagement, users can become addicted to their self-tracking devices (Oravec, 2020).

Finally, authors observe that self-tracking technologies can prompt users to engage in activity solely because of the high score that is attributed within an app, or treat it only as a means to achieve an overarching goal, such as fitness (Danaher et al., 2018b; Gabriels & Coeckelbergh, 2019; Hill, 2019; Klugman, 2018; Kreitmair, 2018; Kreitmair & Cho, 2017). In such cases, inherently valuable parts of life, for example, sex and relationships (Danaher et al., 2018b; Klugman, 2018; Kreitmair, 2018), can become instrumentalized and valued by the users only in relation to their impact on the tracked metrics (e.g., sex helping burn calories or contributing to higher mood scores). This can reduce users' satisfaction with some pleasurable activities, such as walking (Kreitmair & Cho, 2017), or change the way users engage with them, for example, by treating them as something competitive (Danaher et al., 2018b; Gabriels & Coeckelbergh, 2019; Hill, 2019).

### **3.2.5. Data-facilitated harm**

Some authors note that self-tracking data can serve as a basis for discrimination against users, although a significant portion of them simply state that possibility without providing a detailed discussion (Arora, 2019; Baker, 2020; Daly, 2015; Kreitmair & Cho, 2017; Lupton, 2015b, 2016b; Maturo & Setiffi, 2015; Sharon, 2017). Examples of discriminatory practices mentioned by these authors include denial of credit, loss of

reputation, denial or loss of employment and denial of health insurance coverage.

The authors who present more developed arguments about the possibility of discrimination on the basis of self-tracking data often discuss discrimination related to health and employment as connected. They note that employers might be likely to discriminate against employees whose data portrays them as less healthy or even less active than average (Challa et al., 2017; Lanzing, 2016; Nissenbaum & Patterson, 2016; Selke, 2016b). In such cases, self-tracking data leads employers to conclude that an employee's characteristics (e.g., living with diabetes or suffering from insomnia) might make them less productive or a "health" risk, thus increasing the price of insurance. As a result, they could be fired, denied employment or ignored when promotions are considered. Moreover, self-tracking data can result in users being refused health coverage or receiving higher prices for health insurance (Ajana, 2017; 2018; Lanzing, 2019; Lupton, 2016a). Borthwick et al. (2015) also noted that data collected through wearable devices in educational contexts might influence teachers' decisions, potentially leading them to assessing their students incorrectly, although it is unclear whether in their view this should be attributed to discrimination, misinterpretation of data, or inaccuracy of the devices. Moreover, as noted by Ajana (2017; 2018), it is possible to discriminate against individuals even if their own data is unavailable. In her view, aggregated data could motivate discrimination against entire categories of people and not specific users. In this sense, people who do not use self-tracking devices could still become victims of discrimination on the basis of self-tracking data.

Authors additionally identify instances where aggregated self-tracking data could be used to motivate layoffs or shift work culture in the company in directions that are not in line with workers' interests (Moore, 2017, p. 165; Moore & Piwek, 2017; Selke, 2016b). Similarly, it has also been observed that self-tracking data can serve as evidence against the user in criminal trials and insurance or disability claim disputes (Ajana, 2017; 2018; Crawford et al., 2015; Lupton, 2016a; Neff & Nafus, 2016, p. 182; Oravec, 2020), for example, when Fitbit data invalidates a suspect's alibi or is used to question a particular accident's impact on user's activity and health. This can be especially troubling as government agencies responsible for security already collect great amounts of information on individual citizens and self-tracking data can be of particular interest in this regard (Li & Hopfgartner, 2016).

Moreover, authors note that self-tracking technologies and the data they collect can facilitate harmful or even criminal behavior aimed against the users. Criminals could use



data for identity fraud, illegal drug purchases, fraudulent health insurance claims and even when planning burglaries (Li & Hopfgartner, 2016; Lupton, 2016a, 2015a; Piwek et al., 2016). On this note, self-tracking technologies could help stalkers (Danaher et al., 2018a), facilitate voyeurism (Gabriels & Coeckelbergh, 2019) and even help abusers control their victims (Danaher et al., 2018b).

Additionally, as data is being accessed by an ever increasing number of actors, authors note that users could fall victim of “function creep,” resulting in harms that are still difficult to predict (Frank & Klineciewicz, 2018; Hull, 2018; Lupton, 2016b; Sharon, 2017).

### **3.2.6. Datafication and interpretability of data**

Many authors observe that the focus on quantified data in self-tracking technologies can be problematic in itself. One kind of arguments posits that self-tracking can privilege numerical ways of expressing particular phenomena, which are often framed as objective and science-driven, while neglecting the embodied, intuitive, experiential and narrative ways of generating knowledge about the self (Danaher et al., 2018a; Hill, 2019; Kreitmair & Cho, 2017; Martens & Brown, 2018; Moore, 2017, pp. 9–12; Morozov, 2013, p. 261; Neff & Nafus, 2016, p. 186; Schulz, 2016; Sharon, 2017, 2018; Sharon & Zandbergen, 2017). This can have the added effect of reducing epistemic self-confidence of the users as they could come to trust the data supplied by their devices over their own impressions of the tracked activity, and consequently become alienated from their body and senses (Danaher et al., 2018a; Duus et al., 2018; Klugman, 2018; Kreitmair, 2018; Kreitmair & Cho, 2017; Lupton, 2016a; Martens & Brown, 2018; Schulz, 2016; Toner, 2018). However, it has to be noted that the opposite effect has also been observed by some authors, as mentioned in the section on empowerment. I discuss this in more detail in the last section of the discussion.

Authors argue that self-tracking can reduce knowledge to numbers by framing data gathered through the devices as the ultimate source of information about the tracked phenomena (Daly, 2015; Kleinpeter, 2017; Kreitmair & Cho, 2017; Moore, 2017, pp. 9–12; Sharon, 2017, 2018; Sharon & Zandbergen, 2017; Selke, 2016b). Moreover, as knowledge is conflated with data, it is possible that only the easily quantifiable aspects of life will be reflected in the numbers presented by self-tracking devices, while relevant contextual information or more complex phenomena will remain out of sight (Gabriels & Coeckelbergh, 2019; Kleinpeter, 2017; Kreitmair & Cho, 2017; Lupton, 2016a;

Moore, 2017, p. 10; Moore & Piwek, 2017; Morozov, 2013, p. 244; Owens & Cribb, 2019). As a result, users might receive a skewed depiction of the phenomena they are tracking. It is also possible that the focus on data will shift users' attention away from reality and toward its representation in the form of data (Kreitmair, 2018; Moore & Robinson, 2016; Selke, 2016b). Such aspects of self-tracking devices are discussed in the literature under the terms datafication, dataism and data fetishism.

Interpretability of self-tracking data is likewise seen as having ethical relevance. Although data supplied by self-tracking devices is portrayed as objective and, consequently, not requiring interpretation (Lomborg et al., 2020), authors note that users need to put time and effort into making sense of their numbers (Lomborg et al., 2020; Neff & Nafus, 2016, p. 39). However, not everyone has the data literacy and general interpretative skills required to do so (Gabriels & Moerenhout, 2018; Li & Hopfgartner, 2016; Lomborg et al., 2020; Piwek et al., 2016; Selke, 2016b). While Selke (2016b) notes that this can result in users internalizing the narratives surrounding self-tracking, other authors observe that misinterpretation of data can have more harmful effects when self-tracking devices are used in the domain of healthcare. They list these harmful effects of misinterpretation of data as inaccurate self-diagnosis (Gabriels & Moerenhout, 2018; Piwek et al., 2016), anxiety (Li & Hopfgartner, 2016; Lomborg et al., 2020) and unspecified dangers arising from medical decisions made on the basis of data (Li & Hopfgartner, 2016; Neff & Nafus, 2016, p. 143).

### **3.2.7. Negative impact on relation to self and others**

Several authors observe that users can develop negative emotions through self-quantification when they become stressed or anxious about their results and their relation to what is considered normal or healthy (Baker, 2020; Gabriels & Moerenhout, 2018; Li & Hopfgartner, 2016; Lomborg et al., 2020; Lupton, 2013, 2015b, 2016a; Morozov, 2013, p. 228; Toner, 2018). Moreover, self-tracking technologies can instill feelings of insufficiency and failure, or, if users are already suffering from such feelings, self-tracking could lower their self-esteem even further (Baker, 2020; Borthwick et al., 2015; Lupton, 2013, 2015b, 2016a; Moore & Piwek, 2017; Owens & Cribb, 2019). As observed by Mauro and Setiffi (2015), the use of self-tracking devices to monitor food intake could also lead people to developing disorders such as anorexia or exacerbate their existing issues with body image and diet. Psychological states such as anxiety can arise when users of self-tracking devices feel that their personal information might be

disclosed to other people in great volume and in ways over which they have no control, such as in cases when self-tracking technologies are used in a workplace and workers' personal data can be accessed by the management (Moore & Robinson, 2016; Moore, 2017, p. 86; Nissenbaum & Patterson, 2016; Oravec, 2020). Devices and apps which encourage competition and comparisons between users are seen as particularly likely to induce negative emotional states (Lupton, 2015b; Oravec, 2020).

Moreover, some authors argue that self-tracking promotes a radically individualistic outlook on life, which can be a form of narcissism or egocentrism (Cederström & Spicer, 2015, p. 107; Hill, 2019; Lupton, 2016a; Morozov, 2013, p. 233; Sharon, 2017). According to this view, self-quantification encourages users to focus on their own metrics in the quest for excellence, while ignoring relations with others as a field irrelevant to their personal pursuits. Even in cases where self-tracking is oriented toward others, the communal dimension of self-tracking can serve merely as a tool for achieving one's aims. Shared data may be used in an instrumental way, without reciprocation on the part of the users, and others can be treated merely as a frame of reference or as competition (Gabriels & Coeckelbergh, 2019; Lupton, 2016b), for example, when people are "encountered" on leaderboards displayed in popular running apps. Moreover data discloses only characteristics that can be and have been quantified, while obscuring other relevant qualities, which leads to a limited view of others (Gabriels & Coeckelbergh, 2019). As noted by Klugman (2018), self-tracking devices used by partners can reduce love to a series of metrics, which can have a significant impact on the nature of romantic relationships.

Relatedly, it has also been observed that self-tracking technologies used in the context of romantic relationships can reduce mutual trust between partners, especially when data supplied by the device is considered more credible than the partner's own testimony (Martens & Brown, 2018), or when the data is used as a means of spying on the partner (Danaher et al., 2018b). Klugman et al. (2018) observe a similar concern in cases of doctor-patient relationships, where reliance on self-tracking devices for monitoring treatment adherence would mean that a technical solution is used in place of a relation of trust developing between the patient and the medical practitioner. Similarly, they note that patients and doctors will often have to trust device manufacturers that devices are safe and kept up-to-date.

Finally, Gabriels and Coeckelbergh (2019) argue that reliance on self-tracking devices might mean that the way individuals are perceived might be more and more

mediated by data and algorithms. As a result, users could be left with less influence over the image of themselves they project to the world and might have to contend with an image presented by their data, possibly disseminated to others without the users' knowledge.

### **3.2.8. Shortcomings of design**

The lack of transparency associated with how self-tracking technologies are designed and used has been mentioned by authors as problematic, especially in connection with other issues such as privacy or the sale of data. It has been observed that technology developers do not disclose how their devices and algorithms operate (Baker, 2020; Challa et al., 2017; Crawford et al., 2015; Frank & Klinecicz, 2018; Klauser & Albrechtslund, 2014; Lanzing, 2016, 2019; Neff & Nafus, 2016, p. 63) or hide relevant information in ambiguously worded and needlessly complex privacy policies, terms of service documents and consent forms (Barassi, 2017; Neff & Nafus, 2016, p. 117; Klugman et al., 2018; Kreitmair & Cho, 2017; Danaher et al., 2018b). As a result, it is impossible for users to know how and why their data is used, as well as to give meaningful consent to these practices or control the flow of their data (Crawford et al., 2015; Frank & Klinecicz, 2018; Hoy, 2016; Klugman et al., 2018; Kreitmair & Cho, 2017; Lanzing, 2019). Moreover, Arora (2019) argues that even if developers opted for transparency, users might still be unable to manage their personal information and fully understand how and why it is used by third parties. In his view, the complexity of these systems and the information they process means that diligent management of data would require a significant amount of time and specialised skills that users might simply not possess.

Furthermore, authors are concerned that self-tracking data can be highly unreliable, and there is often little evidence supporting the claims of the device manufacturers regarding the accuracy of the devices (Barta & Neff, 2016; Crawford et al., 2015; Gabriels & Moerenhout, 2018; Hoy, 2016; Kreitmair & Cho, 2017; Moore & Robinson, 2016; Oravec, 2020; Owens & Cribb, 2019; Piwek et al., 2016). This can be especially harmful when data is used in medical research (Oravec, 2020) or in health monitoring (Gabriels & Moerenhout, 2018). Moreover, as noted by Klugman et al. (2018) patients depending on self-tracking devices for the management of illness can be exposed to risk when devices fail. On this note, Piwek et al. (2016) voice concerns that patients using self-tracking devices might develop a false sense of security, while being unaware of the devices' unreliability and inaccuracy. In this sense, limited reliability of self-tracking

devices can harm users' health.

Finally, some authors note that algorithms can be designed and trained in a way which leads to bias against underprivileged groups (Ajana, 2017; Daly, 2015; Frank & Klinecicz, 2018; Hull, 2018; Lupton, 2016a; Sharon, 2017). In this sense, tracking often does not work as well for representatives of these groups as it might for those belonging to the privileged parts of the society. Vulnerable and minority users are also more often classified by the algorithms as at risk or abnormal. Frank and Klinecicz (2018) and Lupton (2016a) observe that self-tracking apps are often particularly biased in this way against women.

### **3.2.9. Negative impact on health perception**

Some authors note how self-tracking can have adverse effects on users' ideas about health. According to them, self-tracking promotes an obsession with health and fitness by encouraging users to track as many factors as possible at all times, to the point where healthiness becomes excessively desirable to them or even their primary concern (Fotopoulou & O'Riordan, 2017; Gabriels & Moerenhout, 2018; Li & Hopfgartner, 2016; Lupton, 2013; Richardson & Mackinnon, 2018; Selke, 2016b). This can have an additional effect of influencing users' perception of ordinary behaviors and bodily functions as something connected with ill-health that has to be assessed in medical terms, often leading to a form of hypochondria (Baker, 2020; Gabriels & Moerenhout, 2018; Hull, 2018; Kreitmair & Cho, 2017; Li & Hopfgartner, 2016; Lupton, 2015b). In this sense, Baker (2020) and Lupton (2015b) both point out how fertility apps medicalize users' understanding of menstruation and female fertility, but Kreitmair and Cho (2017) note that self-tracking might lead to users worrying that even their mundane and harmless habits, such as sleeping in, might be connected to a hidden illness. On the other hand, Selke (2016b) claims that in the discourse surrounding self-tracking, healthiness and fitness are equated with status and power.

Moreover, self-tracking can shift users' attention to these aspects of health that are easily quantifiable, thus turning medicine into "a science of measurement" (Kleinpeter, 2017, p. 247) and promoting the idea that quantification is the best method for achieving good health (Lupton, 2013). This can have a significant impact on the role of medical professionals, who might be expected to spend more of their time on analysing numbers supplied by self-tracking devices instead of providing face to face care to patients (Gabriels & Moerenhout, 2018; Kleinpeter, 2017; Klugman et al., 2018; Morgan, 2016).

Issues related to duties and liability of parties involved in quantified medicine were also discussed in literature. It is an open question to what extent medical professionals can be held responsible for their interpretations of data and whether they can be blamed for missing a diagnosis by refusing to incorporate self-tracking data into their practice (Gabriels & Moerenhout, 2018; Klugman et al., 2018; Neff & Nafus, 2016). On the other hand, it is unclear how and to what extent users and providers of self-tracking devices can be responsible for self-tracking motivated health outcomes and decisions that have not been consulted with medical professionals (Kreitmair & Cho, 2017; Neff & Nafus, 2016).

Moreover, as noted by Klugman et al. (2018), the use of self-tracking devices might limit the patients' ability to lie to doctors about their behavior, which, while itself potentially morally questionable, might be well within the patients' rights. Klugman et al. (2018) also observe that the use of self-tracking devices might allow third parties, such as pharmaceutical companies, to scrutinize the practices of doctors in more detail and influence medical decisions (for example, by monitoring which medicine is prescribed and when).

### **3.2.10. Regulation and enforcement of rules**

Ethical challenges associated with self-tracking technologies are further exacerbated by the relative lack of regulation of these technologies (Baker, 2020; Challa et al., 2017; Daly, 2015; Hoy, 2016; Kleinpeter, 2017; Lanzing, 2016; Maturo & Setiffi, 2015; Moore & Piwek, 2017; Nissenbaum & Patterson, 2016; Oravec, 2020). This can be particularly problematic when self-tracking devices are used for health-related monitoring. In many countries, health devices face additional regulatory scrutiny, but the classification of self-tracking devices as consumer technology excludes them from meeting requirements pertinent to medical devices (Baker, 2020; Kreitmair & Cho, 2017; Maturo & Setiffi, 2015; Nissenbaum & Patterson, 2016; Oravec, 2020) and allows technology-makers to make unsubstantiated claims about their efficacy (Hoy, 2016). This can have harmful impacts on patients depending on reliable readings connected to their health (Gabriels & Moerenhout, 2018), especially when they use these technologies without the oversight of medical professionals (Daly, 2015). Moreover, even if there are laws in place that could protect users of self-tracking technologies, government institutions might not always be prepared to enforce them or even be tasked do so (Challa et al., 2017).

There is also the problem of which regulations should apply. As data is shared with

parties operating in different countries, it might fall under different regulatory regimes, which might in turn limit protections granted to users and their data by law. This is particularly relevant as data is often transferred from users in the European Union to corporations operating in the United States, which have lower or even effectively non-existent standards for privacy protection (Kreitmair & Cho, 2017; Neff & Nafus, 2016, p. 132).

Relatedly, authors note that there are no established ethical standards for the use of self-tracking technologies in research (Gimbert & Lapointe, 2015; Kreitmair & Cho, 2017; Lomborg et al., 2020). According to Gimbert and Lapointe (2015), this could be important in the context of dual-use research and its associated harms, although they do not provide any examples. Moreover, as Lomborg et al. (2020) note, in qualitative studies which involve researchers interviewing participants about their own data, researchers are often entangled in the process of data interpretation and their input can have significant impact on how participants encounter results of their self-tracking practices and relate to themselves. And yet, as they argue, ethical approval may not be always required here. Another gap in ethical oversight was observed by Moore (2017, p. 178) who notes that there are few organisational and professional codes of conduct that deal with best practices for using self-tracking data in a workplace environment and those that exist might not be sufficiently established. As a result, the kinds of decisions motivated by self-tracking data and their impact on employees may vary greatly depending on the employer and their own ethical standards.

## **4. Discussion**

### **4.1. The contributions to the debate lack depth and consistency**

It has to be noted that the current contributions to the discussion on the ethical aspects of self-tracking technologies lack depth. Even though the number of works discussed in this review is high and the findings cover a wide selection of ethical aspects of self-tracking technologies, the limitations of the existing work negatively factor into the overall quality of the discussion.

There has been relatively little philosophical and ethical attention devoted to the technologies that are the subject of this review. Most of the authors represent disciplines other than philosophy (and specifically ethics) and the content relevant to this review was often underdeveloped in their work. This can be well illustrated by reference to the section on privacy and surveillance. Although it contains references to the second-most

number of works (42), only a handful of them present an in-depth discussion of privacy, with most authors seemingly treating this issue as something self-explanatory or even obvious (i.e., they only mention that privacy is an issue in connection with self-tracking, without explaining why or what it entails). Overall, it should be noted that most of the issues discussed in this review were raised and elaborated upon in a relatively small number of papers.

In general, conceptual clarity is a significant limitation of the current discussion. It is unclear what terms are commonly accepted in the current debate to describe self-tracking technologies and what they entail (i.e., the extent and characteristics of specific types of tracking, or its differences to lifelogging). Similarly, even though some authors refer to the concept of neoliberalism in their discussion, they do not define the term and its implications, rather treating it as encompassing everything that is wrong with contemporary capitalism. Conceptual clarity is also lacking, for example, when discrimination is discussed. It is often unclear which of the examples discussed in the literature would constitute discrimination in the strict sense of the term and which are merely unfavourable or harmful outcomes against individuals that are not discriminatory in nature, because they do not target particular characteristics: employers firing diabetics are engaging in discrimination, but this is not the case when they use self-tracking data to determine which employees perform their duties poorly.

Consequently, a reader only examining the papers referenced in this literature review might be unable to develop a thorough understanding of ethical issues arising from the employment of self-tracking technologies. The current discussion would greatly benefit from more conceptual clarity as well as from more in-depth evaluation of the ethical aspects of self-tracking technologies that have already been identified in various works.

This problem is further evidenced by the fact that the diversity of the current work presenting ethical aspects of self-tracking technologies is limited from a methodological standpoint. Furthermore, even those authors who made their methodological and theoretical positions explicit were not always consistent in applying them throughout the work (e.g., with analysis from a specific standpoint appearing only in one section of the work) or in demonstrating how a given method or theory influenced their findings. Consequently, the current contributions to the literature on ethical aspects of self-tracking can be largely assessed as inconsistent or lacking from the methodological and theoretical standpoint. In my view, this inconsistency should at least partially account for the superficiality of some of the arguments found in the discussed works.



The relative popularity of Foucauldian approaches should be discussed in this context. Foucault's notion of technologies of the self, extensively used by the authors discussed in this review, can indeed be an informative tool for the analysis of self-tracking practices. However, I argue that in many instances, authors extensively focused on the self-care and self-disciplining aspects of self-tracking sometimes at the cost of relatively overlooking the institutional and political context of self-tracking. In my view, despite such strong reliance on Foucault, the current literature does not adequately discuss self-tracking in biopolitical terms, and I see this as a promising avenue for future research. At the same time, the dominant Foucauldian methodology has some inherent shortcomings that need to be acknowledged in future work on self-tracking. By focusing on the notion of technologies of the self, authors might inadvertently attribute more reflectivity and agency to the users than might be in many cases warranted. The outsourcing of habit formation and reflection is arguably one of the major draws of self-tracking technologies and it is doubtful that a majority of the users picks up self-tracking in order to engage in attentive and in-depth practices of the self (instead hoping for guidance and helpful nudges). On the other hand, the Foucauldian notion of power as impersonal and distributed across numerous actors can preclude the reality of self-tracking as predominantly controlled by a handful of large corporations whose particular decisions can be easily identified and evaluated. In my view, Foucauldian approaches are a good tool for discussing the disciplining power of norms endorsed through self-tracking, but not the quasi-sovereign power of specific institutions and actors.

Returning to methodological inconsistency, it is often impossible to determine whether authors discuss actual use cases of self-tracking technologies or whether they base their analyses on marketing materials and the (as of yet unproven) claimed potential of self-tracking devices (especially as many authors do not provide references when they describe the discussed technologies or only refer to press articles). Authors who utilised ethnographic and sociological methods often treated the responses of their interviewees and the content of their observations at face value and uncritically depended on them in their own evaluations (e.g., by arriving at general conclusions on the basis of subjective experiences of individual users), while also drawing on marketing promises and existing discourse surrounding self-tracking when forwarding their own claims. Although the testimonies of the members of Quantified Self, interviews conducted with ordinary users and materials provided by the developers contain a wealth of information about self-tracking devices, they might not be applicable to the experiences of other users and might

not be the best basis for arriving at general statements about self-tracking. Without clearer communication of the limitations and perspective of existing sources and data generated for the purposes of particular studies, it is impossible to determine the level of originality and accuracy of the contributions presented by the authors. This is particularly visible in the discussion of empowerment and well-being, as many of the claimed benefits have not been independently tested and critically examined. As a result, the authors' findings can sometimes resemble a reiteration of Quantified Self talking points and marketing strategies of self-tracking companies.

Furthermore, the skeptical analyses of self-tracking often excessively depend on Morozov's (2013) early evaluation of the discussed technologies, without taking into account more empirical, nuanced and contemporary contributions to the debate provided by anthropologists, ethnographers and social scientists. Morozov's highly critical work clearly influenced a significant part of the current discussion, even though some of the claims made in his book and later echoed in other publications are speculative in nature and have not been substantiated by reference to actual use cases of self-tracking technologies. While some of Morozov's claims might be valid, future work on ethics of self-tracking should attempt to assess them in light of empirical evidence concerning the deployment of the discussed technologies in the real world.

Consequently, a more systematic and in-depth analysis of ethical aspects of self-tracking could be helpful in alleviating the shortcomings of the current state of the literature that result from the lack of depth and methodological consistency of the existing contributions. The current state of the debate does not allow researchers to arrive at an overarching picture of the ethics of self-tracking technologies, while the methodological inconsistency of individual contributions leads to difficulties when works are compared and their relevance is assessed.

#### **4.2. The debate focuses on the present and lacks predictions**

While the current applications of self-tracking are well represented in the reviewed works, their authors do not engage in speculative and future-oriented discussion, which in the recent years has become an important part of ethical evaluation of new technologies thanks to the introduction of systematic frameworks for anticipatory assessment of technology (Brey, 2012; Floridi & Strait, 2020). At the time of writing, there is no recent in-depth academic study devoted to the future of self-tracking devices, and as the works discussed in this review do not provide predictions or include

anticipatory elements, the current state of the literature does not make it possible to foresee the ethical issues that are the most likely to be associated with self-tracking in the next 5–10 years.

That said, I would argue that in the next 5–10 years self-tracking could be expected to remain on its current trajectory as the accuracy of the devices is likely to grow alongside the variety of metrics trackable through the sensors. The self-tracking market has been growing both in value and the number of users in the recent years, and this trend is expected to continue, especially in the health-related applications (Business Wire, 2020; Deloitte, 2017; Ramirez, 2013). Moreover, the market has attracted the attention of the largest technology companies and private investors, as evidenced, for example, by Google's recent \$2.1 billion acquisition of Fitbit (Chee, 2020; Gartenberg, 2019) and Amazon's own spin on self-tracking through the introduction of the Halo Band (Bohn, 2020). As more companies engage in the competition, new devices also offer more accurate and cheaper ways to quantify an increased variety of metrics. Apple's newest Apple Watches are claimed to measure users' blood oxygen levels, with an as-of-yet unsubstantiated promise of eventually being able to detect COVID-19 infections on this basis (Apple Newsroom, 2020). In turn, Amazon's Halo Band offers users a way to quantify and evaluate their tone of voice, a development which has been criticised in the press as an example of tone policing and unwarranted surveillance (Fowler & Kelly, 2020).

Despite some media backlash and consumer skepticism associated with controversial features, the adoption rate of wearable devices should continue to increase. In the foreseeable future, the tracking of a greater scope of variables should become cheaper and require less effort while potentially providing higher accuracy, and consequently, the popularity of self-tracking devices among both the individual and institutional stakeholders should only be growing. This can be expected to have varying degrees of impact on the three major types of self-tracking projects: self-tracking for personal purposes, self-tracking for health and self-tracking in the workplace. Existing literature outlines only the current ethical aspects of these three kinds of self-tracking, without focusing on future ethical risks and opportunities that could already be anticipated. The use of self-tracking devices is even today often prescribed by medical professionals and mandated by management, and as self-quantification becomes more implicated in individuals' health, work and leisure, its impact on users' everyday life can be expected to increase. Consequently, the exclusive focus of the existing literature on the current

applications of the technology is a significant limitation that will need to be addressed in future research.

Anticipatory analyses of self-tracking should extensively cover the potential unequal socioeconomic impact of the devices (i.e., wealthy users being able to reap more benefits of tracking), their future uses in the health sector and the workplace, their norm-prescribing effects (including the expectation that responsible individuals should track themselves in certain contexts), and others. Moreover, anticipatory work on self-tracking considering the impact of quantification on users' self-knowledge should be particularly interesting, as quantitative ways of evaluating the self are a relatively new phenomenon and lie in stark contrast to the traditionally more popular qualitative (e.g., embodied, linguistic and intuitive) modes of self-assessment. While some of the discussion surrounding datafication covered the ways in which users can privilege numerical information over more traditional, subjective and embodied ways of generating knowledge about the self, the future epistemic shifts introduced by self-tracking merit greater scrutiny. The current literature extensively (even if not conclusively) discusses today's most pressing epistemic concerns surrounding self-tracking, but it does not adequately present the plausible future shifts in self-evaluation that might take place as self-quantification becomes more commonplace.

At the same time, the literature accurately captures the existing breadth of application of self-tracking technologies, with purely personal use and fitness, healthcare and workplace monitoring all discussed in the reviewed articles. However, it is worth noting that a significant part of the current discussion on self-tracking is US-centric as authors commonly analyse self-tracking while assuming that users are customers of private insurance companies. This is evident in the volume of discussion devoted to the influence of users' self-monitored fitness and health metrics on their individual insurance premiums, as well as in the concerns voiced over the impact of workers' participation in workplace wellness schemes on the cost of insurance paid by the employer. It is worth remembering that such potential issues are much less likely to arise or be problematic to users from countries with public healthcare systems who do not have to depend on private companies or their employer to receive healthcare.

On the other hand, although Lupton's (2016) distinction between different modes of self-tracking (i.e., private, pushed, communal, imposed and exploited) has received some attention from other scholars, the existing discussion on the current application of self-tracking could benefit from a closer analysis of the reasons why people engage in self-

tracking and how stakeholders motivate or pressure them to take up the practice.<sup>18</sup> At the time of writing, the majority of works do not discuss the potential motivations, incentives, obligations and expectations at play behind individual and organisational decisions to engage in or promote self-tracking. A person's uninfluenced choice to wear a smart band and a worker's membership in a wellness program involve different stakeholders and different contextually relevant factors that need to be considered to provide a thorough ethical analysis. As the potential scope of applications and the variety of interested stakeholders grow, the reasons for which users engage in self-tracking will only become more complicated and involve many more ethically relevant variables. It is worth adding that an anticipatory analysis of possible future use cases of self-tracking technologies conducted in reference to Lupton's scheme of different modes of self-tracking could be of immense help to ethicists attempting to analyse the complicated landscape of self-quantification.

#### **4.3. Certain issues remain unresolved and warrant more attention**

The current debate presents many compelling insights, but it is still in early stages and there are many unresolved and underdiscussed ethical issues that warrant further attention of ethicists.

For example, while the discussion reconstructed in the section on empowerment and well-being would suggest significant positive impact of self-tracking on users' epistemic self-confidence, wellbeing and decision-making capabilities, the findings presented in sections on autonomy, on datafication and interpretability of data and on negative impact on relation to self and others sketch a radically different image of users being alienated from their embodied perception, developing anxiety and self-doubt, and being nudged by the devices' recommendation systems into decisions they might have not made otherwise, which can be problematic in light of the value accorded to individual autonomy. It could be argued that the positive discussion surrounding self-tracking is merely an echo of the unsubstantiated beliefs presented by the members of the Quantified Self movement or the marketing-oriented talking points of technology makers. However, the claims about benefits of tracking are not outlandish and their validity from the users'

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<sup>18</sup> Arguably, many of the institutional practices of self-tracking more resemble surveillance rather than self-quantification done out of one's own volition. However, the authors still consider applications such as workplace wellness and productivity monitoring schemes to fall under the term self-tracking (especially as workers do participate in the practice and often have some influence over it). I agree that the distinction between self-tracking and surveillance can be blurry in such contexts.

subjective point of view has been well demonstrated by authors conducting ethnographic and sociological research, as evidenced by the section on empowerment and well-being. It seems that there are two opposite directions in which self-tracking can lead individual users, depending on their individual circumstances, their unique capabilities, and the goals motivating their tracking. More research is needed to establish the exact impact of self-tracking on users' epistemic self-confidence and their agential capacity. Considering that the potential benefits and harms of self-tracking technologies vary highly across users and different use contexts, I would suggest that ethical frameworks providing contextual, situated and user-oriented analyses (such as virtue ethics) might be better suited for the evaluation of self-tracking than frameworks that employ high-level and abstract principles. Although the latter might have been designed to be universally applicable, the great variety of both beneficial and harmful effects that self-tracking can have on the users might not be accurately captured by reference to general principles such as autonomy and privacy.

Similarly, authors present conflicting conclusions relating to users' capacity to develop and maintain new habits as a result of self-tracking. While the section on empowerment highlights the potential for users to gain more control over their habitual actions and develop individual plans for behavior change, the discussion reconstructed in the section on social harms could lead to a more pessimistic view of self-quantification as a practice influencing users to conform to the already existing social norms regardless of their individual circumstances. More research is required to determine which of these two possible outcomes is more likely and how to design and use self-tracking devices to maximize users' benefit. Ethical frameworks focusing on habitual action and individual disposition toward specific kinds of behavior (such as virtue ethics and American pragmatism) should be useful in achieving this goal as they should allow researchers to examine various use cases of self-tracking technologies and accurately determine their likely effect in particular circumstances. Existing contributions to the literature do not devote much attention to the issue of habit-formation, only providing superficial statements about self-tracking's potential to allow users more control over their everyday habits. The only exceptions were the book by Neff and Nafus (2016) which provides a detailed ethnographic analysis of the ways in which habits can be developed through self-tracking, and the article by Toner (2018), which presents habit formation occurring through self-tracking as an example of nudging infringing on users' autonomy.

The discussion surrounding community and solidarity has also proven inconclusive.

Although influential authors such as Morozov (2013) critique self-tracking for fostering an overly narcissistic view of the individual, the emergence of the Quantified Self movement and the data sharing that lies at the foundation of self-tracking practices show the potential of self-tracking technologies to foster solidarity and contribute to community formation. However, as demonstrated in the section on solidarity, even the authors who develop a favorable view of the solidaristic dimension of self-tracking (Barta & Neff, 2016; Sharon, 2017) voice their reservations and point to the limited scope of self-tracking community or certain ambiguities inherent in self-tracking practices. Moreover, they do not define the concept of solidarity and do not elaborate upon obligations which this concept should entail. The closest attempt to do so is undertaken by Sharon (2017), but even she contends that the kinds of solidarity found within self-tracking communities might not fit definitions found in philosophical literature.

Since the application of different understandings of solidarity could lead to drastically different assessment of public goods, risks and obligations arising within the practice, more work is needed to determine the nature and the extent of communal relations occurring within the self-tracking sphere. For example, the current debate on the solidaristic dimension of the sharing of self-tracking data could benefit from a discussion of obligations to share data and participate in self-tracking communities in light of the potential health and other benefits that are commonly associated with the practice.

Moreover, it should be noted that even when engaging in normative discussion, authors tend to describe particular problems but fail to arrive at recommendations for addressing them. Although this limitation of the existing literature can be observed in relation to any of the categories discussed in this review, I believe that it is best exemplified by the discussion regarding ownership and commodification of data. While authors agree that the ownership structure of self-tracked data is unclear and the common practice of companies selling user data to advertisers and other partners is at the very least ethically problematic, only Neff and Nafus (2016) present an alternative way of thinking about data generated through self-tracking devices (i.e., by treating users and device manufacturers as “parents” of the data who do not own it, but have certain rights and responsibilities to their shared product). To address this limitation, the future normative discussion surrounding self-tracking technologies should contain more recommendations for their regulation, development and use.

Interestingly, as far as commodification of data is concerned, none of the authors develop an argument from the perspective of justice or fairness. These principles are not

mentioned even by the authors engaging with ideas such as distribution of profits generated through self-tracking data or compensation for the digital labour in which the users take part (Lupton, 2016a; Schulz, 2016; Till, 2014). In general, authors raise social and political issues merely from a descriptive standpoint (as seen, for example, through recurring references to the concept of biopolitics) and they do not explicitly engage in normative debates about the politics of self-tracking technologies and practices. Consequently, when discussing politically contentious issues, such as, for example, the distribution of profits derived from self-tracking, authors do not take clear positions in the political debate and do not argue in favor of specific solutions to the problem. An analysis of these issues from the perspective of justice and fairness would be a significant contribution to the existing discussion and would provide a better basis for some intuitions already found in the literature. Moreover, a justice-oriented ethical framework should allow researchers to analyse some of the epistemic issues surrounding self-tracking (such as datafication) from the standpoint of epistemic justice (Fricker, 2007). Many of the problems identified in the section on social harms (e.g., reproduction and enforcement of existing social norms to the detriment of users who do not fit them) should also lend themselves well to a justice-based analysis.

## **5. Conclusions**

This chapter presents a systematic review of ethical aspects of self-tracking practices and technologies. As a result of a database search and backwards snowballing, a total number of 65 works has been extracted and analysed for the purposes of this review. The ethical aspects discussed in the current literature have been divided into thirteen categories, with three dealing with the ethical opportunities of self-tracking (empowerment and well-being; contribution to health goals; solidarity) and further ten collecting concerns surrounding the discussed technologies (social harms; privacy and surveillance; ownership, control and commodification of data; autonomy; data-facilitated harm; datafication and interpretability of data; negative impact on relation to self and others; shortcomings of design; negative impact on health perception; regulation and enforcement of rules).

This review found that the existing contributions to the discussion of ethical aspects of self-tracking lack depth and conceptual clarity, do not systematically employ their leading methodologies, and are largely devoid of anticipatory analyses and recommendations. Most authors focus only on the current normative implications of self-



tracking and do not analyse them in much detail or on the basis of well-defined theoretical and methodological tools. Moreover, when the present literature is analysed as a whole, many of its findings prove inconclusive and several aspects appear insufficiently developed (e.g., discussion of self-tracking from the perspective of justice or solidarity, and recommendations for future development and use of self-tracking devices).

Considering the necessity of further ethical research on self-tracking technologies, it is possible to outline a clear research agenda that could help alleviate most of the shortcomings of the current state of debate. Future ethical research on self-tracking practices and technologies should strive to contribute to our understanding of self-quantification by focusing on questions of justice, solidarity, and the epistemic and behavioural impact of self-tracking (including habit formation), which merit greater scrutiny than what has been presented up to this point. A more systematic normative analysis of self-tracking is necessary in light of the inconclusive and often contradictory findings presented by the existing contributions to the literature, as well as the breadth of potential future applications of self-tracking in all walks of life.

# Chapter 4. A method for pragmatist technology assessment

## 1. Introduction

This chapter outlines the ethical theory that I use for the analysis of the most pressing ethical aspects of self-tracking. Following the findings of the literature review, I identify three problem areas within self-tracking that need to be addressed by any adequate theory.

First, the theory should accommodate issues related to habit formation and provide a basis for determining whether self-tracking technologies have a positive influence on users' behaviour and attitudes. The existing literature does not provide definite findings as to whether the behaviour change facilitated by self-tracking sufficiently respects users' autonomy, needs and desires, or whether it manipulates users to exhibit specific behaviours and conform to rigid norms. Since the habits developed through self-tracking are often understood as a means of personal development designed to help users lead a better, happier or more purposeful life, the ethical theory discussed in this chapter should propose some evaluative criteria (i.e., a notion of good life or guiding ethical ideals) on the basis of which the kind of life and habits promoted through self-tracking could be assessed.

Second, it should serve as a viable tool for analysing the interpersonal dimension of self-tracking. While some might consider self-quantification to be a solitary, or even egocentric, endeavour, existing research suggests that over the course of their tracking practices, users enter into relations with others, share data with third parties, and sometimes even form communities (Barta & Neff, 2016; Sharon, 2017).<sup>19</sup> An ethical theory responsive to the peculiarities of self-tracking should provide criteria for evaluating the interpersonal relationships arising in the field of self-quantification, as well as the kinds of goods, expectations and obligations that should be associated with these relationships.

Third, considering that the discussion about the distribution of benefits and burdens produced through self-tracking (e.g., data, profits, effort) is lacking in the current

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<sup>19</sup> And as I argue in chapter 2, the circulation of data inherent in self-tracking means that users are necessarily at least minimally connected to other people and institutions. They might refuse to share and discuss data voluntarily, but they cannot control all of the information flows.

literature and that the authors do not explicitly refer to the concepts of justice and fairness, the theory adopted in this dissertation should lend itself well to a justice-based analysis of self-quantification.

With these three criteria in mind, I first consider virtue ethics as a viable approach for the purposes of this dissertation. I have already argued in the discussion section of the literature review (chapter 3, section 4.3) that a virtue ethical theory could be helpful in addressing some of the shortcomings of the existing literature. Moreover, as virtue ethics has been enjoying a revival in the recent decades, it has also become increasingly popular in philosophy of technology, with many authors explicitly adopting this ethical approach as their main reference point (Coeckelbergh, 2021; Ess, 2013; Reijers & Gordijn, 2019; Vallor, 2016).

Virtue ethics, especially in its Neo-Aristotelian variety, places great emphasis on the character of the moral agent and the ways in which repeated action can help or hinder us from developing the virtues – dispositions for moral behaviour.<sup>20</sup> Additionally, the virtues are understood in a developmental way – their cultivation is meant to enable individuals to flourish and achieve the good life. Consequently, it seems that virtue ethics is especially adept at assessing the habitual aspects of self-tracking and it could allow for an evaluation of the dispositions that are developed through self-quantification.

Virtue ethical theories also recognise that individuals do not develop virtues on their own, but constantly engage in interactions with others. Virtue ethicists not only argue that interpersonal virtues, such as friendship, compassion and care, are indispensable for human flourishing, they also claim that other praiseworthy dispositions are developed through imitation of others and are exhibited in action taking place in a social context. Moreover, while individuals develop their virtues in a community with others, the virtue ethical tradition recognises that virtues related to distribution of goods (e.g., justice or magnanimity) are important for the moral community as a whole, as well as for its individual members. In this way, a virtue ethical theory should prove responsive to the second and third criteria provided above.

Shannon Vallor's *Technology and the Virtues* (2016) is a good starting point for my theoretical considerations and there are several reasons justifying this assumption. First, at the time of writing Vallor's book is arguably the most important and the most

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<sup>20</sup> Of course, it is also possible to distinguish other virtues, for example, intellectual ones. However, Neo-Aristotelian virtue ethics, which is my main reference point here, focuses on moral virtues in particular.

influential contribution to the growing body of work in virtue ethics of technology and it has garnered much greater attention than other works in the field (see for example Coeckelbergh, 2021; Curzer, 2018; Howard, 2018; McRae, 2018; Reijers & Coeckelbergh, 2020; Reijers & Gordijn, 2019).

Second, Vallor is the first scholar to offer a comprehensive theory of virtue ethics of technology, and she supplements it with a list of technomoral virtues that could guide our understanding of how technologies influence our moral imagination and behaviour. Moreover, as Reijers & Gordijn show (2019), her book could serve as a basis for a systematic analysis of specific technologies and the practices associated with them.

Third, Vallor herself devotes some attention to self-tracking (Vallor 2016, p. 198-202), but does not do so extensively. As I demonstrate in the next section, a closer reading of her analysis can help me assess the suitability of her theory for the purposes of an in-depth investigation of the ethical aspects of self-tracking.

## **2. Vallor's virtue ethics of technology in the context of self-tracking**

### **2.1. Technology and the Virtues**

In *Technology and the Virtues*, Vallor diagnoses a situation of “acute technosocial opacity: rapid technological, sociopolitical, and environmental change accompanied by existential risks that make the ethical pursuit of the good life in the 21st century extraordinarily challenging and fraught with uncertainty” (Vallor, 2016, p. 23). In her view, contemporary technologies pervade all aspects of everyday life in ways that are next to impossible to account for in moral deliberation. The non-transparent nature of technology does not allow us to make accurate predictions about our immediate future, the effects of technological tools extend beyond the scale of the individual, and the development of technology can bring substantial changes to what it means to be human, and consequently, to what it means to flourish as a human being.

To address this difficulty, Vallor proposes to turn to virtue ethics and attempts to develop a “global virtue ethics for contemporary technosocial life” (Vallor, 2016, p. 36) which could prove an adequate answer to the challenges of technologically-mediated life. She draws on three major traditions of ethical thought, Aristotelian, Confucian, and Buddhist, but as her reconstruction of Eastern philosophy has already been criticised (McRae, 2018), for the purposes of this chapter I only focus on her own theory built on these three pillars and do not engage in a discussion of Vallor’s influences.

According to Vallor, all the three virtue-ethical traditions share a commitment to

elements of self-cultivation which she summarises under the following seven steps (Vallor, 2016, p 64):

- “1. Moral Habituation
2. Relational Understanding
3. Reflective Self- Examination
4. Intentional Self-Direction of Moral Development
5. Perceptual Attention to Moral Salience
6. Prudential Judgment
7. Appropriate Extension of Moral Concern”

Building on these foundations, Vallor argues that a global virtue ethics should: 1) provide an account of the development of virtue arising from repeated action, preferably directed through reference to exemplars (Vallor, 2016, p. 74); 2) recognise that morality arises through relations with others and through “obligations, judgments, affections and concerns they generate” (Vallor, 2016, p. 83); 3) depend on a habit of evaluating one’s actions and moral dispositions (Vallor, 2016, p. 90); 4) be teleologically oriented towards a certain moral ideal (Vallor, 2016, p. 97); 5) direct our attention to these features of our life that have moral significance while allowing us to understand/interpret them (Vallor, 2016, p. 104); 6) enable us to evaluate and choose the most appropriate course of action in given situations (Vallor, 2016, p. 109); 7) include others in our moral deliberations and make their well-being one of the goals of ethical life (Vallor, 2016, p. 116-117).

After describing how virtues can be developed and which features should be exhibited by a fully-fledged virtue ethical theory, Vallor goes on to present the main, globally-recognised virtues that could help us navigate our engagement with contemporary, technologically-mediated, conditions of life. She advocates for a commitment to technomoral virtues of honesty, self-control, humility, justice, courage, empathy, care, civility, flexibility, perspective, magnanimity, and technomoral wisdom, a virtue unifying the others and expressing them in a holistically understood character.

Although Vallor develops a theory of virtue ethics of technology, she does not provide her readers with a method for applying her theory to specific technical practices (see Reijers & Gordijn, 2019 for a successful attempt at developing a method on the basis of Vallor’s work). Nevertheless, Vallor proceeds to discuss some technical practices, even if her work up to this point only outlines how to describe them in the context of technomoral virtues, and does not provide good grounds for evaluating technical practices in light of technomoral virtues (i.e., she discusses what these virtues would

entail, but does not elaborate on how to assess whether the virtues have been achieved and applied in given circumstances). Her discussion of self-tracking technologies in the context of the Quantified Self movement (Vallor, 2016, pp. 198-202) is highly relevant to this dissertation, while also enabling me to highlight some of the flaws in her proposed approach.

By focusing on a narrow selection of QS testimonials, Vallor argues that self-tracking does not meet the standards of a virtuous technical practice and consequently does not contribute to the living of an examined life. First, she contends that it distracts users' attention from relevant aspects of their life by oversupplying often meaningless information (Vallor, 2016, p. 200). Second, it does not promote a comprehensive ideal of the cultivated self which users could follow (Vallor, 2016, p. 201). Third, it fails to capture morally significant aspects of users' lives, focusing instead on the easily quantifiable factors related to physical activity and bodily parameters (Vallor, 2016, p. 201). She concludes by arguing that collecting data about oneself does not amount to an examination of oneself.

This criticism is not completely unwarranted. Existing literature does show that users of self-tracking can be overburdened with information (Baker, 2020), that norms endorsed through self-tracking are ambiguous and limited (Crawford et al., 2015), and that self-tracking technologies privilege information that can be easily expressed through numbers (Kreitmair & Cho, 2017; Morozov, 2013). At the same time, Vallor's analysis does not take into account that self-tracking can indeed aid users in developing habits in a purposeful way (see Neff & Nafus, 2016, pp. 89-104 for a description on how it can be done), help them understand how they spend their free time and how much attention they devote to their friends and family (Nafus & Sherman, 2014), create new social relations by encouraging interactions and the sharing of data with strangers (Sharon, 2017), or alert them to the diversity of experiences and circumstances which result in vastly different datasets (Barta & Neff, 2016). On the surface, this discrepancy between Vallor's account of the Quantified Self movement and that of the scholars mentioned above could be explained by her limited selection of sources, the brevity of her discussion and a lack of clarity in how she applies her theory to particular technologies (while her three arguments I discuss above are certainly striking, she does not consider other morally relevant features of self-tracking, for example, habit formation).

However, I believe that the shortcomings of her analysis result from more fundamental flaws in her proposed theory. These flaws include an unclear understanding

of technology and our interactions with it, as well as an understanding of the concept of moral practice which is too narrow to capture the complexity of human behaviour. It is worth noting that my criticism of Vallor resembles the assessment advanced by Reijers and Coeckelbergh (2020), who also point to shortcomings of her theory connected to her view of technology and her problematic concept of moral practice. However, my analysis identifies a greater number of issues, and, more fundamentally, I propose another way of overcoming the weaknesses of Vallor's work, namely by drawing on Dewey's ethics.

## **2.2. Four criticisms of Vallor**

### **2.2.1. Inadequate view of technology**

While Vallor devotes significant attention to the notions of “acute technosocial opacity”, technomoral virtues, and the general technological saturation of our everyday life, she does not comprehensively explain how technology influences our actions and behaviour. In fact, Reijers and Coeckelbergh (2020, pp. 122-127) criticise Vallor for failing to provide an account of technological mediation and focusing instead on anthropocentric notions of human agency as dominant in human-technology relations. It is true that Vallor seems to be placing significant emphasis on technomoral virtues, which should, in her view, enable humans to flourish with, and sometimes in spite of, technology. Her answer to the scenario of acute technosocial opacity appears to focus on human beings and on what they are able to do to avoid the risks associated with the development of technology.

However, my criticism goes in a different direction. I believe that Vallor overemphasises the influence technology has on people, and fails to consider it as a tool for moral deliberation and action. Her account of self-tracking presents a human subject devoid of agency (most likely because it is a subject presumed *not to possess* technomoral virtues). For example, in her reconstruction of self-tracking practices, devices supply an overabundance of information, do not provide users with an overarching moral ideal/exemplar, and present only morally-insignificant information. The sole emphasis is placed on what *technology* does to users. In contrast, other authors present a radically different outlook on self-tracking and its benefits as they outline what *users* do with their devices to achieve positive outcomes: they set up their own goals (e.g., tracking the amount of time interacting with friends and family vs. strangers, see Nafus & Sherman, 2014), and they critically interpret, discuss and compare their data (Barta & Neff, 2016; Sharon, 2017).

On the surface, Vallor's claim that self-tracking itself cannot help users cultivate a better self seems correct – there is no wisdom that can be imprinted by mere collection of data. Here, she rightly argues that the creation of a dataset does not amount to an examination of life. However, she fails to notice that a dataset can be a *tool* for examining life (interestingly, she praises Marcus Aurelius for examining himself in diaristic form, rather than arguing that a diary *on its own* cannot lead to a cultivated life, Vallor, 2016, p. 175). In fact, she holds a rather passive notion of the virtuous life in technological culture. Her account is of technologies encroaching on established ways of living (which, implicitly, enable flourishing), and of technomoral virtues potentially helping us combat this intrusion. Quite notably, all her examples are of different technologies posing a threat to human nature and human flourishing, with technomoral virtues *potentially* allowing us to face this threat. What is missing, is an account of human beings *using* technology to develop their technomoral virtues and to extend their capacity for moral self-cultivation and individual and societal flourishing. And if she happens to discard such a possibility, this would make her account too pessimistic and apocalyptic as technology certainly has been used to cultivate virtues (see, for example, Vallor's favourite case of diary writing) and there is nothing inherent in contemporary digital technologies that would preclude this possibility.<sup>21</sup> However, as I argue in the next section, Vallor's idea of a moral practice is problematic even outside of a technologically-mediated context.

### 2.2.2. Narrow notion of a practice

Reijers and Coeckelbergh (2020, pp. 127-130) argue that Vallor does not adequately describe *what is* a technomoral virtue and does not connect the notions of virtue and practice, consequently failing to provide a rich account of how a virtue can be developed. Instead, Vallor is content with merely providing a list of virtues and claiming that her account follows MacIntyre's (2007) notion of a practice (Vallor, 2016, pp. 45-49). I partially disagree with Reijers and Coeckelbergh, as in my view, many of the shortcomings of Vallor's theory result more broadly from her uncritical adoption of MacIntyre's virtue ethics rather than merely from her inadequate understanding of a practice. However, I certainly agree that her work lacks a viable definition of a virtue and does not adequately show how virtues can be developed.

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<sup>21</sup> Although, as I argue in chapter 5-7, the context and reasons for which technologies are deployed may have negative impacts on the beneficence of new tools.



To illustrate this argument, I propose to start with MacIntyre's definition of practice as

“any coherent and complex form of socially established cooperative human activity through which goods internal to that form of activity are realized in the course of trying to achieve those standards of excellence which are appropriate to, and partially definitive of, that form of activity, with the result that human powers to achieve excellence, and human conceptions of the ends and goods involved, are systematically extended.” (MacIntyre, 2007, p. 187).

As Reijers and Coeckelbergh (2020, pp. 38-39) rightly note, MacIntyre's criteria such as coherence and complexity are unclear and thus provide no sufficient basis for determining which activities are subsumed under this definition and which are not. Similarly in Vallor's extension of MacIntyre's theory, some categories remain underdeveloped and ambiguous. For example, Vallor often refers to a notion of a cultivated moral self, but does not explain what such ideal would entail and does not provide definite criteria for assessing whether an individual has reached the desired level of cultivation. In fact, many of the categories introduced by Vallor, such as “prudential judgment” or “appropriate extension of moral concern”, are not adequately defined which makes it difficult to determine what falls under them and what does not.<sup>22</sup> As a consequence, the delineation between what is and is not a practice proves rather unclear and can fall outside our everyday use of the term.<sup>23</sup> Even some of MacIntyre's examples betray the arbitrary distinctions he adopts in his definition: although he argues that bricklaying and turnip planting are not practices, while architecture and farming are, one can wonder whether skilled and specialised bricklayers and turnip planters would agree with this assessment. Arguably, a form of elitism can be spotted in this distinction (see footnote 27).

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<sup>22</sup> For example, she defines prudential judgment as “the cultivated ability to deliberate and choose well, in particular situations, among the most appropriate and effective means available for achieving a noble or good end” (Vallor, 2016, p. 105). Just like in MacIntyre's definition of a practice, it would be difficult to establish a threshold between key criteria such as cultivation, not to mention the strictly normative categories she employs. Arguably, both MacIntyre's and Vallor's definitions make sense if the reader already endorses the axiology and philosophical positions assumed by the authors. However, as I demonstrate over the course of this chapter, the values embedded in self-tracking are not fully in-line with said axiology, and self-tracking and self-trackers seem to depend on different ideas concerning the self. This discrepancy means that it would be too easy to overlook or discard self-quantification as incoherent, not complex enough, uncultivated, etc., which is precisely what Vallor seems to have done. Not to mention that I do not happen to endorse the assumed axiology and philosophical positions.

<sup>23</sup> At this stage, it should be enough to refer to the common understanding of a practice as a repeated, customary activity, which in itself is much broader than what is proposed by MacIntyre. In later part of this chapter I propose to discuss how such broadly defined practices influence morally salient *habits*, rather than rooting an account of morality in an ambiguous and highly qualified notion of a practice.

So far, I have focused on a discussion of self-tracking *practices*, but many of the activities discussed in this dissertation cannot be subsumed under MacIntyre's and Vallor's understanding of this term. Step-counting, a practice (in the common sense) in which thousands of people engage every day, is arguably neither coherent<sup>24</sup> nor complex, and even if it has already become socially established as its popularity suggests, it does not have to be undertaken cooperatively (although leaderboards embedded in popular apps do enable some form of engagement with others, if in a limited sense, see Gabriels & Coeckelbergh, 2019).

Similarly, it would be difficult to establish what are the goods internal to the practice of step-counting (The achievement of 10,000 steps every day? The pleasure of walking?) and whether these goods are actually why people engage in step-counting in the first place (rather than the external goods of fitness and health). As noted by Reijers and Coeckelbergh (2020, p. 40), the issue with the notion of goods internal to the practice is further complicated when motivations of actors change over time. Imagine I picked up step-counting for the sake of fitness, gradually developed appreciation for the pleasures of walking, but finally realised that I continue using my Fitbit because I enjoy spending time outside and welcome the excuse to do so. Are those three distinct types of activity (with only the second one pursuing internal goods), or rather one continuous practice attributed with different meanings across time?

In this sense, MacIntyre's notion of a practice is too narrow. By stipulating a number of arguably unnecessary criteria, MacIntyre radically limits the variety of activities that could be designated as practices and that could on these terms meaningfully contribute to the development of character. Moreover, as practices are described by MacIntyre exclusively in a positive way, his theory can only account for the type of activity that is praiseworthy and that contributes to human flourishing. However, Reijers and Coeckelbergh (2020, p. 39) argue that it is possible to engage in a practice (at least in what they take it to be an Aristotelian sense of this term) for all the wrong reasons and achieve the opposite of virtue. Similarly, even despite the best of intentions it should be possible to repeatedly fail in this kind of activity so completely that the end result would move the acting subject further away, rather than closer to flourishing.

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<sup>24</sup> For example, there is no logical explanation for why counting steps should be more important than the counting of minutes spent standing up or walking, and the popular threshold of 10,000 steps per day is arbitrary (see chapter 2, section 6.4). In fact, many of the metrics found in self-tracking apps lack scientific foundation and consistency (see chapter 3, section 3.2.8).

Considering the high standards that an activity needs to meet to be considered a practice (and the idea that practices necessarily contribute to human flourishing), self-tracking fails to meet the threshold established in Vallor's analysis. It is an altogether different kind of activity than the one discussed by MacIntyre and would necessitate a different approach, one not rooted in a notion of a practice.

### **2.2.3. Conservative view of moral standards**

MacIntyre's ethical theory is rather conservative (Carden, 2006, p. 2) in that moral standards which should be followed by individuals are ultimately derived from tradition and, in my view, remain inflexible. It is the community of practitioners that determine which standards of excellence should be applicable in a given situation and to which extent it should be possible to broaden our conception of what behaviour is appropriate and commendable. In this sense, Reijers and Gordijn (2019, p. 207) argue that if the established standards of excellence do not fit individuals' conceptions of the good life, there is little opportunity for these individuals to challenge the status quo and establish innovative ways of acting that would still be accepted and considered praiseworthy by others.

The same imitative view of morality is echoed by Vallor, who repeatedly refers to the idea of following exemplars of moral cultivation (see for example Vallor, 2016, p. 74, 91) and argues in her reconstruction of the Aristotelian concept of virtue that “the *imitation* of exemplary persons is a crucial component of early moral habituation.” (Vallor, 2016, p. 68, emphasis in the original). While this view can be linked to Vallor's MacIntyrean influences, I believe that her account as a whole is strictly dependent on the replication of existing cultural values, and, just like in MacIntyre, leaves little room for moral experimentation and innovation. As she uncritically adopts MacIntyre's belief in the universal human telos, she is forced to create a rather rigid ethical theory constructed around a totalising account of flourishing applicable to all human beings across different times and cultures (after all, the desire to create a *global* virtue ethics is a chief motivating factor behind her book). Her insistence on seeing what is good as relatively unchanging (even if sometimes under threat from, e.g., emerging technologies) makes imitation the paradigmatic, if not ultimate, way of achieving virtue. Individuals should observe those who have already cultivated the traits of character found on her “exhaustive” list, and strive to incorporate *the same* qualities in their own life. While she does allow for a degree of variance in line with individual circumstances, she nevertheless sees the

already established view of the moral community as an authoritative one (especially since she believes it is possible to distill the Aristotelian, Confucian and Buddhist virtue ethical traditions into a list of shared commitments which she assumes to be universally binding).<sup>25</sup>

It is no wonder that Vallor is critical of self-quantification on these grounds. Although self-tracking apps and devices sometimes supply users with exemplars, target scores and recommended levels of activity, the Quantified Self movement (which is the focus of Vallor's analysis) places particular emphasis on experimentation and individual exploration of the types of tracking (and associated personal development) that fits users' circumstances, often leading them to resist the dominant practices established by technology developers (Nafus & Sherman, 2014, Sharon & Zandbergen, 2017). Ten thousand steps per day might be an informative baseline, but every member of Quantified Self is encouraged to find their own threshold and ways of reaching it that are the most appropriate in their individual situation. In this sense, the idea of a cultivated self endorsed by QS is not well captured in Vallor's work, further justifying the need to move away from MacIntyre-inspired virtue ethics.<sup>26</sup>

#### **2.2.4. Omission of embodiment and biological factors**

The fourth and final objection I would like to raise against Vallor is that she does not adequately account for the embodied and biologically-determined nature of our practices. Although MacIntyre tries to incorporate these elements in *Dependent Rational Animals* (MacIntyre, 1999), *After Virtue*, which is a central point of reference for Vallor, has no indication of the role human bodies play in morality. Vallor's account is excessively intellectual (although, interestingly, she does not consider narratives, a key part of

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<sup>25</sup> While it is easy to criticise MacIntyre for his conservatism, Vallor seems to at least to some degree sympathise with progressive, left-wing politics. However, I believe that her account of morality cannot accommodate value change and due to its imitative nature, it is more likely to cement the existing moral landscape instead of stimulating its development. In this sense, even if Vallor's theory is not conservative, it is arguably not flexible enough to serve a non-conservative purpose. Of course, some may claim that there is nothing inherently wrong with conservatism, but as I argue over the course of this dissertation, the nature and magnitude of problems associated with self-tracking necessitate far-reaching political changes (see especially chapter 7). This in turn would require an ethical theory that is particularly well-attuned to change – and as I argue, this is not a feature of MacIntyre's and Vallor's work.

<sup>26</sup> Contrary to what Vallor argues, I think that Aristotelian virtue ethics is not necessarily one focused on moral exemplars and imitation. In his central metaphor of golden mean Aristotle does reference both virtues and vices, but emphasises that every individual starts in a different place and will have to achieve their own distinct balance between competing traits of character. I believe this necessitates experimentation and innovative kinds of practice, rather than mere imitation (although the latter can certainly be informative). Especially when confronted with new situations, practical wisdom becomes essential for applying what is called the *orthos logos* (the right rule).

MacIntyre's ethics) and as a result, it limits the scope of morally-relevant activity to an arbitrary set of complex and reflective/intellectual practices driven by standards of excellence and community approval.

However, a significant part of our moral life is based on behaviour that is not necessarily reflective/intellectual and the example of walking can be an especially apt illustration here. The fact that walking is our most basic means of movement has a significant impact on our ways of life and ideas of the good, but walking as such would not constitute a proper practice as conceptualised by Vallor and MacIntyre. At the same time, the necessity of walking influences how we design cities, allows for the possibility of chance encounters with friends and strangers on the street, shapes how we describe moral experience (e.g., we could praise somebody for "taking everything in their stride", or speak about "steps" of moral development), and influences the ways we pursue goods relevant to us (think about marching as a common type of political action, or going for a walk as a common way of socialising).

The omission of these factors is a major flaw in Vallor's theory and it is particularly evident in her analysis of self-tracking. It is true that most self-tracking technologies available on the market focus on factors that can, on the first glance, be labelled as non-moral, such as a number of steps made everyday. However, the practice of tracking can have far-reaching consequences, which Vallor ignores, as her account of practice and ethics forces an arbitrary distinction between factors that are moral and those that are not. And yet, measurements related to variables as mundane and, in Vallor's view, ostensibly non-moral as "calories, muscle mass, or sleep hours" (Vallor, 2016, p. 201) can have a moral substance. Obesity is routinely tied to normative judgments, while long sleep could be associated with laziness.

At the same time, behaviour change connected with the tracking of metrics such as the number of steps made every day can have moral significance – somebody deciding to try to walk more and to measure their progress might join a community and establish new friendships, start advocating for the creation of more walking paths in the city, or become aware of difficulties, such as disability, that others might encounter while attempting to reach their daily target of ten thousand steps. On the other hand, they might just as well use their newly acquired mobility to harass strangers on the street. Any distinction between activities that are moral and those that are not would be highly arbitrary and reduce the diversity, complexity and depth of ethical life. It is not possible to flourish as a human being outside of a body and an adequate analysis of morality

should consider all kinds of activities that shape our morality, rather than focusing on a narrow subset of practices as Vallor is inclined to do in her book.<sup>27</sup>

### 2.3. A way forward

Vallor's theory is initially promising as it corresponds to some extent with the three main criteria I outlined at the beginning of this chapter. However, the weaknesses of her approach make it an unsuitable tool for the purposes of this dissertation, and Vallor's own analysis of self-tracking already hints at the theory's lack of eligibility for the task of ethical analysis of self-quantification. Although her MacIntyrean approach provides a good understanding of how moral life plays out through interactions with others, thus fulfilling the second of my main criteria, a closer analysis of her theory shows that it is not compatible with the first requirement as her view of moral habituation and its connection to flourishing remains ambiguous. Moreover, although she mentions virtues such as justice and magnanimity and criticises unequal "distribution of the benefits and risks of emerging technologies" (Vallor, 2016, p. 128), her theory does not provide a good basis for the translation of individual virtues into political change.<sup>28</sup> In this sense, it is difficult to determine to what extent her theory would correspond with my third criterium and allow for a detailed analysis of the distributive dimension of self-tracking.

Does this criticism mean that despite being a starting point for my own analysis, Vallor's theory should be rejected? Not completely. Her seven steps of moral development provide some insight into how positive traits of character can be adopted and what role they play in ethical life. Moreover, Vallor's list of technomoral virtues is a handy reference point highlighting the traits of character that could help us navigate the complex terrain of technologically-mediated morality (especially when we consider related virtues she discusses in connection with the ten main ones). For these reasons, it

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<sup>27</sup> Vallor could be suspected of a certain form of elitism for privileging intellectual and universally recognised activities such as diary-writing (recall her praise for Marcus Aurelius) over those mediated by contemporary technologies which she approaches with a degree of distance and suspicion. In an earlier paper (Vallor, 2015), she is particularly interested in the capacity of new media for moral deskilling of its users, inadvertently echoing Plato's concerns that the use of writing can have disastrous effects on memory. A hierarchy of practices can also be found in MacIntyre, who considers highly intellectual practices such as playing chess or architecture, as more complex and more morally salient than "lowly" activities of tic-tac-toe or bricklaying. As a result of this elitism, both Vallor and MacIntyre seem to overlook the fact that our ethical life can be shaped *just as much* by tic-tac-toe as it is by chess.

<sup>28</sup> Vallor does mention political concerns extensively in her work, but does not speak in favour of a particular programme meant at addressing these concerns. In line with my criticism of Vallor's theory's conservatism or inflexibility in light of value change, I would argue that her version of virtue ethics of technology is problematic also in the context of political change.

would be worthwhile if the ethical theory chosen for the purposes of this dissertation were compatible with Vallor's list of virtues and her seven steps of moral development.

I believe that a pragmatist and situationalist account of technology ethics inspired by the philosophy of John Dewey would be the most suitable tool for the analysis of self-tracking. In the next section, I outline its most important features, and in section 4 I demonstrate how it will be applied in the following chapters.

### **3. Dewey's pragmatist ethics**

Dewey cannot be accurately described as a virtue ethicist in the strictest sense (see Pappas, 2008) and he himself is hesitant about constructing an ethical theory focusing exclusively on a single factor, such as virtue (Dewey, 1998b, pp. 315-320). However, the notions of virtue and vice, understood as positive and negative traits of character are still important in his ethics (Dewey, 1957, pp. 16, 47, Dewey, 2008, pp. 255-260) and his pragmatism is compatible with a "contextual, instrumental, pluralistic, and experimental" notion of virtue (Pappas, 2008, p. 186). Consequently, even though reliance on Dewey's pragmatism would imply a departure from traditional virtue ethics, his ethical theory allows me to retain many of the advantages of this philosophical approach (i.e., the focus on individual character in the context of a good life in a community with others).<sup>29</sup> As I argue, Dewey's work is suitable for the analysis of self-tracking in two different senses as it fits the main criteria forwarded in this chapter. It presents an account of habit as central to morality, it furthers an intersubjective view of moral life, and is concerned with an equitable distribution of goods and opportunities arising from our activity. Moreover, it allows me to build on my criticism of Vallor as it has demonstrable advantages for the analysis of self-tracking precisely where Vallor's theory is lacking (i.e., in its view of technology, a broad notion of morally relevant activities, non-conservatism, and consideration of the embodied character of morality).

To demonstrate the aptness of Dewey's work for the purposes of this dissertation, I describe his ideas about 1) habits, character and individual development, 2) interpersonal relations and democracy, and 3) technology. I expand this overview by discussing 4) the

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<sup>29</sup> In fact, Dewey was careful to create an ethical theory that would incorporate elements of the main three philosophical traditions as he identified them: virtue ethics, deontology and consequentialism (Dewey, 1998b, pp. 315-320). Due to my objectives and influences, my characterisation of his work places it the closest to virtue ethics and many of the elements I discussed can resemble some elements of mainstream virtue ethical theories. However, Deweyan ethics proceeds from different metaphysical assumptions and is more open-ended and bottom-up than, e.g., Neo-Aristotelian virtue ethics, which makes it a good fit for this dissertation.

ethical relevance of pragmatist epistemology since contemporary philosophers inspired by Dewey devote much attention to the harms arising within the epistemic sphere (Medina, 2013; Sullivan, 2001; 2017) and I believe this debate is also highly relevant in the context of self-tracking. Where possible, I draw directly from Dewey's work, but my own analysis is inspired by secondary literature written by authors such as Elizabeth Anderson (2006; 2010), Stephen Carden (2006), Stephen Fesmire (2003; 2015), Larry Hickman (1992; 2001), Jose Medina (2013), Gregory Pappas (2008) and Shannon Sullivan (2001).

### 3.1. Habit

Habit is the central notion of Dewey's ethics (see Dewey, 1957, pp. 14-42), although his understanding of the term is much broader than just routine, repeated action.<sup>30</sup> As Stephen Fesmire (2006, p. 10) argues, "this concept is deliberately imprecise, covering an almost infinite variety of heritable cultural or subcultural structures for configuring our experience."<sup>31</sup> Habit encompasses all the factors that influence our behaviour and modes of thinking, and make conduct possible.<sup>32</sup> Dewey's habits are similar to what we commonly understand by this term in that they often arise through repetition of an activity (conscious or unconscious), but can also be adopted from others, for example through education. Once acquired, they function almost automatically. In typical circumstances, a person habituated to a certain kind of activity (be it something as simple as walking, or as complex as building a house) immediately knows what to do and what steps they should follow to achieve a certain goal. Habits are not only nagging patterns of behaviour we would like to eradicate (e.g., a smoking habit), but dispositions and

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<sup>30</sup> It is worth noting that other thinkers also refer extensively to a notion of habit and it would be worthwhile to analyse how the work of authors such as Pierre Bourdieu (2008; 2010), Maurice Merleau-Ponty (1989) or even Aristotle (2004) could be used in the analysis of self-tracking. At the same time, I decided to focus on Dewey as unlike the aforementioned authors, he discusses both the moral relevance of habits *and* their technological production (although it is worth noting that Alberto Romele (2020) recently presented an analysis of digital technologies inspired by Bourdieu's notion of *habitus*, and Vallor's project can be seen as an attempt to discuss the influence of technology from an Aristotelian perspective). Moreover, Dewey's philosophy offers relevant insights on all three levels discussed in my dissertation, namely the individual, the interpersonal and the political. I, of course, already outlined some of the shortcomings of (Neo)Aristotelian approaches, but it is also worth noting that Bourdieu's class-centric analysis of *habitus* would, arguably, not be the right tool for the analysis of the individual dimension of self-tracking, whereas Merleau-Ponty's phenomenological perspective would not provide adequate insights on the political level.

<sup>31</sup> Of course, I previously criticised Vallor and MacIntyre for ambiguity. However, whereas their ambiguity leads to narrow concepts that do not correspond well with the phenomena I discuss, Dewey's deliberate imprecision is meant to make the concept of habit maximally broad.

<sup>32</sup> To illustrate the breadth of Dewey's concept, he even writes about political habits as determining how we organise the state and how we develop and evaluate institutions (Dewey, 2016, pp. 61-62).



inclinations to certain kinds of action and judgment. Dewey discusses habits as filters through which all our interactions with the world need to pass – and as habits leave their residue on these interactions, they ultimately colour them in the process (Dewey, 1957, p. 32). Our habit of walking not only enables us to cover a distance, but also makes us see elements of our environment as potential paths or obstacles. Habits are not merely tools we use in our activities, but they actively “project” themselves into our everyday life and influence any possible engagement with the environment (Dewey, 1957, p. 25).

Dewey provides a compelling account of how repeated action and intellectual structures inherited from others influence our behaviour and cognition. However, unlike MacIntyre, Dewey does not argue for a distinction between habits that are unmistakably moral and those that are not. As he claims, “moral conceptions and processes grow naturally out of the very conditions of human life” (Dewey, 2008, p. 308), meaning that values are a direct result of our everyday interactions with the world and are empirically grounded (cf. Hämmäläinen, 2016, pp. 49-57). Even the most mundane elements of our everyday life have an impact on our moral ideas and shape our society, as Dewey argues by invoking the example of moral judgments connected to personal hygiene and the associated fear of diseases (Dewey, 2008, p. 282).

Through evaluations of our existing habits as either contributing to the achievement of some good<sup>33</sup> and broadening the scope of possible experience, we are able to determine which habits are worth preserving and which should be eradicated, or, which kind of conduct should be considered praise- and blameworthy. Carden argues that in Dewey’s philosophy habits are desirable and can be considered virtues when they are capable of “satisfying needs in the changing conditions of the natural and social environment and [...] enhance the capacity for greater and wider experience in the future.” (Carden, 2006, p. 34). This is certainly a pragmatist notion, as Dewey’s idea of the good is closely connected to action and the attainment of specific goals of action. In fact, he characterises virtues by their propensity for “producing specific natural *goods* or *satisfactory fulfillments*” (Dewey, 1957, p. 47, emphasis in the original). In this sense, habits should be evaluated according to their practical relevance in an individual’s life (and as this implies the valuation of the goods which they enable us to pursue, the judgment has a

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<sup>33</sup> And the evaluation of the goods themselves. Dewey does admit that an immediate satisfaction of some desire can be pleasurable, but contends that more intellectual or other-facing behaviour can be infinitely more satisfying in the long scheme of things (Dewey, 2008, p. 187). Interestingly for virtue ethics, Dewey emphasises the necessity for practical wisdom in these kinds of deliberations (Dewey, 2008, p. 208).

distinct moral character).

Moreover, Dewey does not focus exclusively on individual habits, but works with the concept of character understood as an interpretation of habits into a unified whole (Dewey, 1957, p. 38). In his view, even if in given circumstances one habit might seem the most relevant, all our habits are interdependent and our behaviour is always influenced by various elements of our past conduct, upbringing and intellectual ideas. Although it might be possible to speak of independent habits in isolated contexts, it is an evaluation of an individual's entire character that can provide a rich understanding of their engagement with the world.

While Dewey emphasises repeated action, his notion of habit is unlike the common understanding of the term as something rigid, routine and difficult to control. It is true that we often find ourselves in the thrall of habit, unable to break out of acquired modes of behaviour. However, Dewey claims that “the essence of habit is an acquired predisposition to *ways* or modes of response, not to particular acts” (Dewey, 1957, p. 42, emphasis in the original). General habits need to be constantly adapted to the specific and changing circumstances and the habits that contain this flexibility are classified in Dewey's philosophy as intelligent (see Sullivan, 2001, p. 33-40).

To accommodate our established habits to new and problematic situations we are forced to engage in deliberation exploring the appropriate ways of addressing the unusual and changing conditions. Truly intelligent habits are also reflective. They are informed by an analysis of the specific circumstances and are consciously shaped to fit these circumstances. For Dewey, this occurs in the process of dramatic rehearsal, during which we imaginatively explore and experiment with potential courses of action and their consequences, while also considering competing worldviews and perspectives (Dewey, 1957, p. 190; Fesmire, 2006, pp. 69-91; Fesmire, 2015, pp. 132-133). As Dewey argues, by reflecting on and shaping our habits, we attempt to consciously establish “what kind of person one is to become and the kind of world that will be made” (Dewey, 1957, p. 217).

At the same time, the process of deliberation never actually comes to an end, as the virtues of the past might no longer be applicable in the new circumstances in which we find ourselves every day. In a memorable passage, Dewey depicts a vision of the moral life as adapting to constant change: “In the strictest sense, it is impossible for the self to stand still; it is becoming, and becoming for the better or the worse. It is in the quality of becoming that virtue resides. We set up this and that end to be reached, but the end is

growth itself.” (Dewey, 2008, p. 306)

Although Dewey was sceptical of single guiding principles (see Dewey, 1998b, pp. 315-320; Fesmire, 2015, p. 123) and did not believe in a possibility of providing an exhaustive list of virtues (Dewey, 2008, p. 255), Fesmire (2006, p. 98) contends that Dewey’s ethical ideal “can be summed up as inclusive, continuing growing”. Intelligent and reflective adaptation to change resulting from deliberation and an inclination to seek ways of ameliorating our experience are central concepts in Dewey’s ethics (see Hickman, 1992, p. 200). In his view, if such a disposition were enduring, it should be akin to what Aristotle understood as *eudaimonia*, and what Dewey translates as happiness<sup>34</sup> (Dewey, 2008, p. 197-199).

However, I should again stress here that Dewey’s situationalist and contextualist view of morality lead him to contend that despite similarities, individual circumstances are never alike and terms such as right conduct, virtue and happiness always need to be defined in light of the unique contextual factors present in every situation (Dewey, 2008, p. 247).<sup>35</sup> As he argues, a “principle can acquire definiteness only in application to actual issues” (Dewey, 1998a, p. 25). Some authors claim that from a normative standpoint, pragmatism cannot function as an ideal theory and should instead focus on an identification of injustices happening in the real world (Anderson, 2010; Medina 2013). Even though it is possible to refer to Dewey’s ethical *ideals* these concepts remain open-ended and contextual. A pragmatist approach does not imply the need to ground ethics in a top-down, universalistic principle. On the contrary, it follows a bottom-up manner and develops substantive recommendations only on the basis of existing injustices (Dieleman, 2017).

### 3.2. Democracy

Dewey’s philosophy places great emphasis on the character of the individual subject and their unique experience, but it would be inaccurate to describe it as individualistic. Dewey objects to an atomistic view of the society as a sum of the individuals and is sceptical of views that put forward the idea of a conflict between individual will and social needs (Dewey, 2008, pp. 322-328). As Pappas puts it, despite

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<sup>34</sup> And what contemporary virtue ethics usually renders as flourishing.

<sup>35</sup> Incidentally, this complexity and changing nature of life is the exact reason for Dewey’s rejection of abstract, all-encompassing principles and his endorsement of experiment and innovation in ethics (Dewey, 1998b, pp. 315-320).

the emphasis on individual growth and the cultivation of a (virtuous) character, “for Dewey, the quality of our character, and the quality of our associations, may be distinguished but they cannot be separated” (Pappas, 2008, p. 217). In Dewey’s view, experience and the good life might belong to an individual, but they inherently relational and play out in an interaction with others (both because they take place in the social sphere and because they incorporate habits related to social conduct and habits acquired from others). Consequently, Dewey’s ethical ideal of growth is one that can only be achieved in conditions that Dewey himself considers as democratic (see Pappas, 2008, p. 216).

Dewey’s democratic convictions cannot be summarised as a commitment to a set of procedures characterising contemporary democratic states (i.e., equal and fair elections of representatives responsible for the passing of legislation). In fact, Dewey is highly critical of a proceduralist view of democracy (Honneth, 1998). Rather, he advocates for something closer to the views of activists and intellectuals such as David Graeber (2013) who understand democracy as a cooperative approach to solving shared societal problems while creating equitable conditions for individual development of all (cf. Dewey, 2008, pp. 348-349).

Axel Honneth (1998) clarifies that Dewey’s view of democratic life is compatible with Aristotle’s vision of politics, except it extends beyond aristocracy to allow *all* virtuous individuals to contribute to the common good, which is defined, and achieved, intersubjectively through a process of cooperation. In his view, Dewey’s ideal of democracy can be summarised as a “free association of all citizens for the purpose of realising, on the basis of a division of labor, the ends shared by them” (Honneth, 1998, p. 769), with the added implication that the division of labour and the idea of citizenship are just and equitable enough to allow people to flourish in all kinds of social contexts without necessarily constraining them to a specific role. In essence, each member of the society should be granted a chance to meaningfully contribute to shared social goals and assume socially desirable occupations, while simultaneously increasing the variety and quality of their own lived experience.

This commitment is highly evident in Dewey’s criticism of the drudgery of modern labour and the dehumanising conditions endured by the factory workers of his time (see Dewey, 2008, pp. 374-377), as well as the totalising nature of capitalism depriving individuals of agency and responsibility on the personal and the political level (Dewey, 2008, pp. 353-354; Fesmire, 2003, pp.101). Social welfare, as well as a just division of

labour and its products are important for Dewey, and his socio-economic views are distinctly left-wing, progressive and sympathetic to socialism (Dewey, 2008, p. 252; Honneth, 1998).

It is no surprise then, that Dewey sees progress in the social sphere as related to the development of each individual making up the community. Under ideal conditions, social progress would guarantee that all members of society could fulfil their potential, while also broadening the scope and quality of their experiences (however, despite our best intentions, this is by no means inevitable, see Fesmire, 2015, p. 157). As Dewey puts it, “to foster conditions that widen the horizon of others and give them command of their own powers, so that they can find their own happiness in their own fashion, is the way of ‘social’ action” (Dewey 1957, p. 294). Consequently, the ethical ideal of growth should be adopted not only by individuals, but extended to cover all members of the society. As argued by Fesmire (2015, p. 161), Dewey’s social philosophy can be discussed as meliorism – cooperative, deliberate action might not always be sufficient for the improvement of the society, but in all circumstances it is a necessary condition for the *amelioration* of our living conditions and experiences.

However, even though I note above that there are some similarities between Dewey’s view of democracy and Aristotle’s view of politics as contribution to the common good by virtuous individuals, Dewey radically opposes the idea that social progress can be achieved through top-down interventions. Deweyan democracy implies a notion of equality, and assumes that every member of society should participate in democratic processes, especially those who stand to benefit the most from eventual progress. Although inequalities of skill and resources are inevitable, Dewey argues that they should be counterbalanced by equality of participation in the democratic project and equality of chances for individual development (Dewey, 2008, p. 346).

He highlights that such participation most often occurs through the engagement of the public in the political process, that is, groups of citizens gathered around a common cause and voicing their interests in the public sphere (Dewey, 2016; Honneth 1998). Following Hickman’s discussion of Dewey’s political philosophy, it is possible to reconstruct a layered view of democracy in which individuals through their interactions with other individuals form ostensibly non-political friendships and associations (Hickman, 1998, pp. 168-173). Although these might focus on activities such as playing sports or attending church together, in some circumstances they can rise to a broader significance (e.g., as a result of churchgoers trying to extend their religious beliefs

beyond the private sphere). Friendship and associative groups can turn into a public by nominating representatives and creating institutions designed to put their interests forward (in Dewey's view, even the state is an example of a very broad public, see Dewey, 2016, p. 78). In this sense, Dewey presents a compelling, bottom-up account of how individual action and the most basic bonds and interactions between people can translate into bigger structures capable of influencing social reality. Emphasising the grassroots foundations of any greater social structure, Dewey argues that "democracy must begin at home, and its home is the neighborly community" (Dewey, 2016, p. 229), in which people bond over shared interests, only to later raise those interests to political significance.

### **3.3. Technology**

Dewey extensively analyses technology in his writings, but he has not created a single work laying out the foundations of his philosophy of technology. Instead, arguments about the impacts of technology on our experience and conduct appear unsystematically, alongside other, arguably more significant, considerations. I propose to predominantly depend on Larry Hickman's analysis of Dewey's views on technology as he supplies a rich and comprehensive overview and it would be beyond the scope of this dissertation and my expertise to attempt to update it in a meaningful way. However, while Hickman locates Dewey's account of technology predominantly in the field of epistemology (i.e., as a general tool of enquiry mediating our experience of the world, Hickman 1992), here I narrowly focus on the technology-centred elements of Hickman's reconstruction and highlight the ethical salience of pragmatist epistemology in the next section.

In *What I Believe*, a late formulation of his views, Dewey defines technology as "all the intelligent techniques by which the energies of nature and man are directed and used in satisfaction of human needs" (Dewey, 1998a, p. 24) and argues that our understanding of technology cannot be limited to the mechanical and industrial, but should encompass all kinds of human creations that help us engage with reality. In this sense, "technology involves more than just tangible tools, machines, and factories. It also involves the abstract thought and cultural practices that provide the contexts for such things and make them possible" (Hickman, 2001, p. 26).

For Dewey, tools are meant to solve specific problems and can be understood as both physical ways of interacting with reality and the wider intellectual-theoretical framework

that makes such interactions possible. Even our non-technological habits, such as walking, are to various extents influenced by the existence of technologies and habits formulated through their use (Hickman, 2001, p. 23). Somebody engaging in an activity as seemingly non-technological as walking most often still depends on the entire technical ecosystem of roads, pathways and buildings, not to mention their shoes, which to a large extent determine what kind of distance a walker can cover in a given timeframe (or the mere possibility of walking, the walker's enjoyment, etc.). Technologies should be seen as habit-generating and even if they do not play a primary role in a given activity, technology-influenced habits are likely to remain operational and relevant in a myriad of future situations. Following Dewey's views it would be possible to argue that technologies both create new circumstances (e.g., by presenting us with new possibilities of action) and accommodate us to them by helping us develop habits. In fact, Hickman (2001, p. 98) argues that production (of new habits and new circumstances) is the key concept in Dewey's philosophy of technology.

This broad understanding of technology<sup>36</sup> makes it evident that Dewey is more interested in the practical aspects of specific technologies, rather than the metaphysical, capital "T" Technology of thinkers such as Martin Heidegger (1977). Elaborating on Dewey's views, Hickman (2019) argues that what defines a technology are not its physical characteristics, but its use. In fact, he claims that for Dewey individual artifacts "are the way we use them" (Hickman, 2001, p. 184) and it is not possible to distinguish some pre-practical, ideal meanings and applications of a technology (i.e., it is only when a technology is deployed in the real world that its function is established). Whereas designers might have a specific use in mind, the actual, social life of technologies begins once they are presented to their potential users. They are consequently ascribed with new meanings and uses, and contribute to the development of potentially unintended habits, while also having to respond to problems not envisioned at the design stage. There is no single recipe that should, could and would always be followed during the deployment of a technology and, as with habits, our use of technologies ought to be constantly readjusted in light of their potential to satisfy our needs and embody our values

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<sup>36</sup> Although still not as broad as presented by Hickman in an earlier work, where he seemed to suggest that technology encompasses the entirety of human culture and discusses anything that is of epistemological significance as an example of technology (Hickman, 1992). He clarifies this view in *Putting Pragmatism to Work* (Hickman 2001), and this later reformulation is the one I consider more appropriate, even if Dewey's own views on the extent of what can be conceived as technology remain rather broad and ambiguous.

(Hickman, 2001, p. 59). While, in general, production is a central technological concept for Dewey, its particular application is concerned with ways of establishing that our productive capacities are reaching in the right direction: that the possibilities and habits we generate through technologies are constructed with the goal of “increased control of means and enhanced enjoyment of ends” (Hickman, 1998, p. 90), meaning that our capacity to experience and the content of our experiences are constantly being enriched (see Fesmire, 2015, p. 214).

Although this objective is by no means easy to achieve, it should be satisfied through the examination of existing tools and habits in light of their as-of-yet unachieved potential (see Hickman, 2001, p. 84), an operation analogous to dramatic rehearsal occurring during the evaluation of habits. I believe that what we today understand as ethical assessment of technologies, also in cooperation with the involved stakeholders, is already anticipated and implied by Dewey’s philosophy of technology. In this sense, Hickman 1998, (p. 200) defines Dewey’s views on technology as primarily concerned with the notion of responsibility, that is, of people working “to take control of barren and problematic situations in ways that attempt to ameliorate them and render them productive”. Although Dewey believes that it is by no means guaranteed that technologies will contribute to the growth of individual people and entire societies, he hopes that an inquiry into their intended and unintended but foreseeable consequences should allow us to guide the future applications of particular tools, and the habits arising from them, in a more desirable direction.

While this view is largely compatible with contemporary debate on ethics of technology and responsible design, Hickman (2008; 2019), argues that Dewey’s view of technology can serve as an important contribution to today’s debates in mainstream philosophy of technology, particularly those resulting from the so-called empirical and ethical turns (see Reijers & Coeckelbergh, 2020, pp. 25-30; Verbeek, 2011, pp. 161-165). By emphasising the relational, multi-modal and embodied view of technology, Dewey provides an account of how technologies mediate our experience of the world, while also introducing new possibilities of action and helping us develop habits. However, even though Dewey’s philosophy of technology insightfully illuminates how technologies influence our everyday experience, it also extends far beyond the level of the individual on which much of post-empirical turn philosophy of technology operates (Reijers & Coeckelbergh, 2020, p. 29). And since in his work technology is intimately connected to changes in habits and circumstances, Dewey presents a more compelling account of



technology's impact on social-cultural and political reform than much of mainstream philosophy of technology, particularly that of Don Ihde and other thinkers influenced by him (see Mitcham, 2006).<sup>37</sup>

### 3.4. Epistemology and its ethical relevance

An important feature of pragmatism is its rejection of “the false trichotomy among the epistemic, the ethical, and the political in discussions of normativity” (Medina, 2013, p. 81). From a pragmatist standpoint, knowledge and practice are not two separate aspects of our existence, but two sides of the same coin. As Medina argues, in pragmatism “knowing is mainly a matter of *doing*” (Medina, 2013, p. 52, emphasis in the original). Our actions directly influence our knowledge, and our knowledge is intimately connected to, and finds its confirmation in,<sup>38</sup> behaviour – activities and habits in which it is deployed. As already mentioned in section 3.1, Dewey argues that our habits should be intelligent – reflective and flexible – which requires an assessment of the current state of affairs and adaptation to the new situations, as they are identified. Consequently, ethical and political issues cannot be divorced from our ways of acquiring and sharing knowledge.

According to Dewey, the creation of knowledge is a social and situated process in which new beliefs arise as a result of individuals' transactions with others and their environment (Sullivan, 2001). On its surface, the concept of transaction might be synonymous with interaction, but as Sullivan (2001) argues, it implies continuous, rather than occasional, exchanges and rejects clear-cut distinctions between the acting subject and the object with which they are transacting. Consequently, it would be impossible to imagine, in pragmatist terms, the formation of new knowledge as resulting from isolated acts of observation, especially if such acts were considered as directly representative of the actual state of affairs – knowing requires direct and intimate involvement with the world and the people surrounding us (Honneth, 2008, p. 37). Just as an individual's habits cannot be isolated from associations with others and the environments in which they are acquired and in which they play out (Pappas, 2008, p. 217), so knowledge and the

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<sup>37</sup> Hickman (2001, pp. 170-172) argues that among contemporary philosophers of technology, Feenberg might be the closest to Dewey in his consideration of both individual and socio-political impact of technologies. However, Hickman claims that Feenberg's political theory of technology focuses on local impacts and local political action, whereas Dewey's notion of the public and democracy is able to encompass both the local and the (inter)national levels.

<sup>38</sup> Also in terms of truth-value. Pragmatists care little about knowledge as representation of real states of affairs, but instead judge our beliefs according to their applicability to the problems which we face.

formation of knowledge should be considered in democratic terms as cooperative and intersubjective and occurring in a specific context.

Consequently, in line with Dewey's non-proceduralist view of democracy (Anderson, 2006; Honneth, 1998) as a cooperative approach to the equitable solution of shared societal problems (Dewey, 2008, pp. 348-349), as well as his overarching ethical ideal of "inclusive, continuing growing" (Fesmire, 2006, p. 98), we should strive to consider all perspectives in our processes of inquiry and arrive at solutions that are representative of the plurality of views and needs arising within our communities.<sup>39</sup>

From an epistemic point of view, openness to a diversity of views and a fallibilistic willingness to revise individually and communally held views in light of competing perspectives are important since they allow us to arrive at beliefs that are a closer to, even if still not the "correct" approximation of, our actual ways of transacting with the world (Räber, 2020, pp. 122-123). Thus, they may allow us to identify and address problems that arise within these transactions.

However, this view of epistemology also has ethical consequences. When we ignore or even deliberately exclude some perspectives from our epistemic practices, we not only risk forming misguided and plainly wrong beliefs. According to Sullivan (2017, pp. 210-211), non-inclusive epistemic processes can also pressure people to conform to worldviews that may be radically incompatible with their sense of self and inhibit their potential for flourishing. They can also simultaneously limit our shared ability to identify and implement the means for the entire epistemic community to grow and ameliorate their experience. In this sense, exclusionary views of knowledge are ultimately harmful even to those finding themselves in a dominant position and able to assert their individual perspectives as the truth. By limiting the scope of valid worldviews and knowledge claims, they constrain their own opportunities of growth and ossify their existing beliefs and habits. Individual growth can only be fully realised if it is "responsive to the needs and claims of others" (Dewey, 2008, p. 304; see Festenstein, 2008 for a more in-depth discussion of this claim).

Considering the ethical dimension of Dewey's epistemology, some pragmatist scholars (Medina, 2013; Sullivan, 2017) have in recent years turned their attention to Miranda Fricker's (2007) concept of epistemic injustice, that is, harms inflicted upon

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<sup>39</sup> In fact, Dewey's notion of dramatic rehearsal as a method of dealing with problematic situations requires flexibility and inclusion of others so that the future courses of action which we imagine are effectively "co-authored with others and with a precarious environment" (Fesmire, 2006, p. 80).

individuals in their capacity as knowers. While in Fricker's view epistemic injustices are prejudicial in nature and occur due to malicious intent on the part of some individuals or due to the discriminatory nature of the epistemic system, pragmatist interpretations of this concept force us to focus on the reality of epistemic harms rather than merely the reasons behind them. In this context, Sullivan proposes to reinterpret the category of epistemic injustice as referring to situations in which "the speaker isn't allowed to epistemologically transact with the world in ways that enable her own as well as others' flourishing" (Sullivan 2017, p. 210). A world in which individuals and entire groups were systematically and unjustifiably<sup>40</sup> excluded from epistemic practices would not be in line with the ethical ideals found in Dewey's philosophy. For these reasons, Medina (2013, p. 50) proposes two epistemic-ethical principles that should help us avoid epistemic injustice. The principle of acknowledgment and engagement requires members of the epistemic community to recognise competing worldviews and beliefs and employ them in their epistemic considerations (even if only to reject them as incompatible or epistemically harmful). The principle of epistemic equilibrium forces the members of epistemic community to ensure that no single perspective fully dominates the epistemic practices and that competing knowledge claims can also be adequately judged.

Consequently, a commitment to Dewey's ethical ideals might require us to change our ways of listening to others, and to transform our democratic and epistemic life to ensure maximum possible inclusion of varied perspectives (Pappas, 2012). It would be impossible to provide a detailed analysis of the ethical dimension of self-tracking without considering its epistemic significance. Production and interpretation of new information is a key part of self-tracking practices and it is necessary to examine whether it occurs in ways that allow users and the entire epistemic community to grow and cooperatively deal with shared problems.

#### **4. A method for pragmatist technology assessment**

Deweyan ethics is particularly well suited for addressing the gap in the existing literature on ethics of self-tracking as it meets the three criteria presented in this chapter. First, its notion of intelligent and reflective habit and its ideal of continuing, inclusive

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<sup>40</sup> Not all exclusion amount to epistemic injustice. For example, there does not seem to be anything problematic with a rejection of a testimony of a notorious liar. On the other hand, the pragmatist notion of the harms of epistemic injustice gives ground for criticising epistemic exclusion arising from ignorance and thoughtlessness, as it could still limit individual and community capacity for growth.

growing make it suitable for the analysis of the kinds of habits developed through self-tracking and their impact on human flourishing. Second, by stressing democratic and transactional dimensions of life, Dewey provides an adequate basis for the analysis of the interpersonal dimension of self-tracking. And third, as Dewey's philosophy connects ethical and political considerations and implies specific, democratic prescriptions for the distribution of socially relevant goods, it could serve as a foundation for a normative analysis of the distributive aspects of self-quantification.

At the same time, Dewey's pragmatism is not susceptible to the criticism I raised against Vallor's virtue ethics. In addition to its nuanced view of technology as productive but impossible to fully control, it structures moral life around a broad, yet informative notion of habit, is responsive to value change by encouraging flexibility of habits and openness to new experiences, and considers morality as embodied and influenced by physical circumstances. And since it still refers to a concept of virtue, it remains compatible with Vallor's list of virtues as long as these virtues are treated as indicating promising avenues for the pursuit of the good life, rather than as a list of conditions necessary for flourishing independent of the changing circumstances. Dewey's pragmatism also closely corresponds to Vallor's seven steps of moral cultivation as it 1) provides a rich account of moral habituation through repeated action and designates as virtues those habits which help individuals achieve goods relevant to their circumstances; 2) demonstrates how interactions with others and habits acquired through these interactions shape our notions of the good; 3) encourages that and demonstrates how individuals should evaluate their existing habits through the process of dramatic rehearsal and inquiry in light of problematic situations; 4) posits an ideal of inclusive, continuing growing as an open-ended goal for ameliorating our habits and experience and expresses the totality of an individual's habits in a holistically understood notion of character; 5) demonstrates how morality is influenced by all kinds of habits and circumstances, thus helping us recognise and understand all the factors which impact our ethical views; 6) recognises the multiplicity of goods and complexity of circumstances in which moral decisions are made, while also providing guidance on which goods should be chosen (i.e., those that broaden the possibilities and quality of our experience, and those that are chosen through deliberation, which allows us to consciously develop our character); 7) refers to the democratic ideal to demonstrate how others should be included in our moral deliberation and how all kinds of social and individual action should strive to extend the well-being of others and enrich their experience.

A core assumption of Dewey's philosophy is that technologies are productive (see section 3.3) and influence our circumstances as well as the habits generated within these circumstances. In order to apply Dewey's ethical theory to the task of evaluating self-tracking, I propose to refer to his ethical ideals in order to assess whether actual habits arising through the use of self-tracking technologies<sup>41</sup> are compatible with these ideals and increase the range and depth of experiences available to users. Readers may note that this procedure is already expressed in Dewey's notion of dramatic rehearsal that involves the identification of habits present in given circumstances and their evaluation in light of their impact on experience, as well as imaginable possibilities for change that could ameliorate the experience of those involved.

Consequently, a pragmatist evaluation of technology should reflect the process of dramatic rehearsal and follow the following general steps:

1. Identify the habits of thought and behaviour associated with a specific technology.
2. Analyse these habits in light of their fulfilment of the ethical ideals of continuing, inclusive growing, and democracy.
3. Prescribe how technologies should be improved to promote flexibility and accommodate value change.

Moreover, as pointed out by Boenink and Kudina (2021), unlike many other ethical traditions, pragmatism does not consider values as something already existing and discoverable (e.g., through a reference to exhaustive lists or to the collective wisdom of stakeholders), but recognises that they arise through transactions between individuals and groups that occur within specific circumstances and thus change depending on the given context. While specific principles or virtues can serve as a yardstick for comparison and evaluation of technical practices (e.g., virtues of care, friendship and justice can be relevant in the context of the interpersonal dimension of self-tracking), pragmatist ethical assessment should not be conducted with a specific, tradition-driven and essentialist view of human nature, flourishing and viable goods. As Dewey argues in his discussion of ethical inquiry, deliberation should proceed in a bottom-up, investigative manner through the analysis of existing circumstances as "it wants to discover what should be esteemed so that approbation will follow what is decided to be worth approving, instead of

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<sup>41</sup> Which have already been extensively detailed by existing sociological, ethnographic and anthropological literature (see the literature review in chapter 3), as well as the users themselves (e.g., in the forum of Quantified Self testimonials and forum entries).

designating virtues on the basis of what happens to be especially looked up to and rewarded in a particular society” (Dewey, 2008, p. 237).

This is not to say that there is no axiology inherent in Dewey’s philosophy. As it is clear from the discussion presented in this chapter, a pragmatist ethics endorses a set of values (e.g., self-determination, development, diversity and cooperation) and ideals (i.e., continuing, inclusive growing, and democracy) which limit what can be justified or endorsed on pragmatist grounds. Action that violates the rights of others or inhibits their growing, as well as decision-making procedures that override shared deliberation and reduce public participation would be clearly condemned from a Deweyan perspective. At the same time, I must admit that a pragmatism can be seen as less definite than other moral theories since its judgments are based on an ongoing reflection about the situation at hand, rather than on, e.g., immutable principles. Dewey’s ethics can be categorised as relativistic, but that does not mean that moral values are arbitrary. Rather, it implies that they can be discussed and evaluated only relative to circumstances. However, even this greater moral flexibility needs to be understood in the context of the aforementioned axiology and overarching moral ideals.

Consequently, since Dewey’s ideals of growth and democracy are meant to be open and malleable, pragmatist technology assessment should adopt commitments to the *form* rather than the *content* of the ethical life. In this sense, Deweyan ethics advocates for open-ended and inclusive decision procedures that should underly morality and places less emphasis on the specific criteria for determining right and wrong. In the context of habits, it evaluates the form and structure of evaluated habits while leaving it to individuals to determine the goods they want to endorse and pursue (provided of course, this pursuit is not in violation of the overarching ethical ideals of continuing, inclusive growing, and democracy).

Consequently, rather than promoting a specific idea of the good, as happens for example in Vallor’s virtue ethics, a pragmatist approach to technology ethics should advocate for broad and inclusive ethical, social and political structures that can embody the changing values as relevant to the shifting circumstances occupied by the stakeholders. The recommendations forwarded in a pragmatist spirit should focus on skills, dispositions and contextual sensitivity arising in connection with particular technologies, rather than advocating for the inscription of a specific way of life and ideas of the good in the design of new tools. Instead of justifying why certain norms and standards should or should not be incorporated in the design of technologies, pragmatism

should advocate for the extension of user choice and ability to shape the use of a given tool and consequently the technological habits. To provide an example from the field of self-tracking, instead of focusing on the criticism or justification of the standard of the ten thousand steps per day from the perspective of a given value, pragmatist technology assessment would focus on prescribing ways of ensuring that users are able to understand and set standards that fit their own unique circumstances (e.g., an app could ask the user what are their objectives and demonstrate how specific recommendations relate to these and other ideas about exercise).

The recommendations identified in the third, prescriptive step, should be formulated with the changing nature of emerging technologies in mind. The resulting assessment should be seen as a product of its times and a fallibilistic understanding that needs to be constantly updated. Rather than seeking to provide a checklist of considerations for policy makers and developers that could ensure a top-down regulation, development and implementation of a given technology, a pragmatist approach to technology should recognise the work-in-progress, flexible and indeterminate ways in which technologies function in the social reality. Consequently, recommendations formulated in this step should focus on how the future development and implementation of a technology can include the competing interests of stakeholders and equip them with habits of intelligent adaptation to change. In this sense, pragmatist technology assessment should recognise that particular, historically-situated values may no longer be relevant for future use-cases. Overall, it should propose ways to make technologies more adaptable to the needs of their potential users and malleable enough to remain relevant as their social purpose and goods associated with them inevitably change

As Dewey expands the notion of habit well beyond the individual, my analysis will encompass also the interpersonal and political or institutional habits associated with self-tracking (e.g., the sharing of data between users, or the political-economic considerations related to self-tracking). This division corresponds to the three main research gaps in the literature I identified in chapter 3 and I already mentioned that an ethical theory suitable for the analysis of self-tracking would have to be able to fill these three research gaps. Moreover, recent work in ethics of technology has also indicated the necessity to evaluate technologies in accordance with their individual, interpersonal and societal impact, without limiting the researchers' outlook to only some of these dimensions (Reijers & Coeckelbergh, 2020; Crawford, 2021).

In the following chapters, I propose to discuss these three dimensions of self-tracking

under the labels of 1) habit formation, 2) transaction, and 3) distribution (of benefits and burdens). As already noted in section 3.4, epistemic concerns are particularly relevant for self-tracking technologies, and they cannot be separated from the discussion of the ethical and political impact of self-quantification. Consequently, a significant part of each of the three remaining chapters examines self-tracking through an epistemic lens.

In chapter 5, on habit formation, I consider whether users' existing habits and perspectives are adequately recognised, and thus built on, by self-tracking technologies, or whether self-tracking technologies merely impose pre-established habits without adequately engaging with their users. Moreover, I also analyse if users are provided enough insight into the functioning of self-tracking technologies to consciously develop their habits. The main objective of this chapter is to determine whether self-tracking in its current form enables the development of intelligent and reflective habits, and consequently promotes continuing growth.

In chapter 6, on transaction, I discuss whether self-tracking technologies enable the users or prohibit them from transacting with others, both in epistemic and personal terms. As Dewey's notion of growth requires democratic participation, inclusivity and consideration of others, I analyse the impact of self-tracking on interpersonal relations and its contribution to the identification and solution of shared problems.

In chapter 7, on distribution of benefits and burdens, I discuss whether the benefits and costs associated with self-tracking technologies are distributed in a way that presents the involved parties with opportunities for growth and promotes democracy and the good of the community. I focus my analysis on the just distribution of data, profits, knowledge and power generated with the help of self-tracking technologies, as well as on distributive inequalities arising between different users.



# Chapter 5. Habits

## 1. Introduction

In this chapter, I seek to establish whether the habits that users develop with the help of self-tracking technologies are intelligent. While discussing Dewey's notion of habit in chapter 4, I argued that it extends far beyond the everyday use of this term and encompasses all kinds of dispositions or beliefs. In Deweyan terms, all behaviour refers to our habits: it is a continuation or a modification of existing habits (including the habits of thought, political habits, etc.) and in circumstances where existing habits fail to be relevant or are deliberately abandoned, it can lead to the creation of new ones (i.e., even behaviour occurring "out of character" happens in the context of one's character). This does not mean that all habits are equal. Dewey's philosophy praises habits that are intelligent, that is reflective (i.e., resulting from deliberation) and flexible (i.e., adaptable to new situations). Intelligent habits allow us to achieve a wide range of goods across different circumstances and, perhaps more importantly, arise from a genuine reflection on the kinds of goods that are worth pursuing and the kind of life that is worth living. Designation of some habit as intelligent is not merely a description of its utility or effectiveness but is a moral valuation – an intelligent habit is one that is likely to contribute to growing and flourishing.<sup>42</sup>

Consequently, when asking whether habits developed by self-tracking are intelligent, I am interested in more than some internal features of particular habits (e.g., their genealogy or persistence). I ultimately want to determine whether they help self-trackers pursue the good life and allow them to consciously shape the notion of the good life that is being pursued. At the same time, I do not wish to promote a certain vision of flourishing. The notion of intelligence in relation to habits leaves open the exact shape of the good life to be pursued and allows individuals to determine it themselves.<sup>43</sup>

Over the course of this chapter, I analyse self-tracking habits according to their three

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<sup>42</sup> As I expand in chapter 4, growing and flourishing are related concepts in Dewey's philosophy and they are both fundamental parts of the good life. Growing can be characterised as an intellectual and practical attitude aimed at the amelioration of experience, whereas flourishing is a state of happiness resulting from good experiences and the satisfaction of one's goals. Importantly, individuals can still grow in bad circumstances (i.e., by attempting to make them better), but it would be difficult to imagine they would flourish.

<sup>43</sup> However, this self-directedness of moral life is not completely arbitrary. The ideals of continuing, inclusive growing and democracy require that a good life should entail the amelioration of one's own and others' experience, as well as cooperation with others.

features subsumed under the more general notion of intelligence: reflectivity, flexibility, and overall contribution to users' growth. In section 2, on reflectivity, I consider whether the habits arising through self-tracking recognise the variety of users' individual circumstances, build on existing habits, and allow users to deliberate upon the impact of their devices on their behaviour. In section 3, on flexibility, I investigate whether the habits can be adapted by users to different situations and whether self-tracking devices help users develop the ability to respond to change, also without the active influence of a given tool. In section 4, I present an overall conclusion about the impact of self-tracking on growing and flourishing. However, I also note that not all kinds of self-tracking practices are equally susceptible to the negative impact that self-tracking can have on the reflectivity and flexibility of users' habits.

This chapter does not fully engage with the multiplicity of ethical issues already identified in the literature review in chapter 4. Some of the ethical aspects of self-tracking (e.g., empowerment, norm enforcement, or impact on users' autonomy) will reappear in more than one section, while others will not be mentioned at all. As specific ethical issues have largely been well discussed in the literature, even if inconclusively, I aim to deal with those features of self-tracking that are the most relevant from the standpoint of pragmatism – namely, habit formation and users' control over habits produced through the practice.

## **2. Reflectivity**

As already noted in chapter 4, section 3.1, reflective habits are those that are informed by the process of dramatic rehearsal (see Dewey, 1957, p. 190; Fesmire, 2006, pp. 69-91) and arise as a result of active inquiry into the variety of available courses of action, as well as their competing valuations (for example, those coming from individuals approaching the problem from a different perspective and with a different worldview). Imagination is the chief capacity employed during dramatic rehearsal as it allows the deliberating individual to conceptualise what kinds of habits could be relevant in the given circumstances and consider their viability according to their consequences (including the long-term impact on the individual's character).

A successful inquiry should aim to consider the maximum possible extent of viable avenues for action in order to find one that brings the individual the closest to the desired result. In fact, Dewey argues that inquiry that is cut short and fixates on a single approach is likely to fail and confine the inquiring individual to a rigid habit that would not

adequately respond to the situation at hand (Dewey, 1957, p. 211). Instead, inquiry should involve the imagination and pursuit of new avenues in order to maximise the potential for growth.

At the same time, dramatic rehearsal is not arbitrary as it builds on the existing habits of the individual and is rooted in actual circumstances. It should recognise the specificity of the situation with which it deals and propose solutions that are an extension of good tendencies already present in an individual's behaviour. In this vein, Dewey's educational philosophy encourages teachers to focus on what students already know and expand their existing capacities in order to ensure that knowledge and abilities would grow organically – they would thus be better rooted in the student's character than disjointed pieces of information and skills not anchored in practice (see Fesmire, 2015, pp. 173-181 for an overview). I believe that this approach should also be extended to technologically-assisted habit formation – habit-oriented technologies should guide and inform users' own character-building efforts and encourage good tendencies already present in them, rather than depend on universalistic proxies that do not recognise users' character and life situations. In practice, building on a user's existing habits should guarantee greater persistence of new dispositions and be more in line with their individual interests and goals. Simply put, habits guided by the process of dramatic rehearsal should prove more useful (i.e., more likely to bring the desired/projected outcomes). From the normative standpoint provided by Dewey's ethics, such habits would respect users' autonomy and individuality/identity, and thus positively contribute to their growth and flourishing.

These two elements of dramatic rehearsal are encapsulated in Medina's principles of epistemic equilibrium and engagement which I already discussed in section 3.4 (see also Medina, 2013, p. 50). I would argue that these principles entail that habits promoted through self-tracking technologies should be based upon a consideration of a maximal feasible number of alternatives – as follows from the principle of epistemic equilibrium – and should recognise the unique life situations to which they are to be applied (i.e., the specificity of particular users and concrete circumstances) – as follows from the principle of engagement.<sup>44</sup>

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<sup>44</sup> My reliance on Medina's principle does not signal the adoption of a principled approach. The discussion presented in this section could be framed by reference to Dewey's virtue of open-mindedness (see Dewey, 1933, pp. 30-31; Zagzebski, 1996, p. 173), or Mark Tschaeppé's (2018) virtue of humility that he builds on the basis of Dewey's philosophy. I use Medina's principles as they allow me to analyse two distinct, if related, features of reflectivity while still encompassing the core aspects of open-

Moreover, reflectivity cannot be achieved if individuals are unable to interpret and critically evaluate existing and prospective habits, including their content, purpose and motivations. This is especially important when habits arise as a result of some external influence (as is the case with habits developed with the help of self-tracking technologies). A habit developed without the knowledge, consent and understanding of the habituating person should not be considered reflective. Although in many circumstances individuals outsource some of their habit-making to a trusted third party (for example in education), this trust does not imply complete resignation to the will and influence of others. Steered or guided habit formation still requires deliberation on the part of the individual and proper guidance should provide us with enough background information to enable reflection about what is being taught.

In what follows, I analyse self-tracking technologies and the habits they promote in the context of reflectivity, and demonstrate their shortcomings. In the first subsection, I identify some common features of self-tracking that betray a lack of reflection on the part of developers. In the second subsection, I turn to the elements of self-quantification that make it more difficult for users to reflect upon their habits mediated through self-tracking technologies.

### **2.1. Reflection in design**

Self-tracking technologies play an active part in users' habit formation by providing easily digestible metrics, contextual cues and personalised recommendations aimed at the development or reinforcement of specific habits (i.e., good sleep, regular exercise, mindfulness). While potentially helpful, these techniques mean that many of the users' habits are to a large extent a product of specific self-tracking apps and devices. Users can actively reflect on the influence of the device (not without difficulties, as I demonstrate in the next subsection), but some decisions of technology developers to a large extent determine the kinds of habits that are developed and their relevance to specific user groups. The idea of reflectivity makes it possible to identify several problems with the habits promoted through self-tracking technologies. As I argue in this section, some common features and design decisions behind self-tracking would lead to habits that are not motivated by adequate inquiry. Most importantly, the design of self-tracking technologies overly privileges certain perspectives – thus violating the principle of

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mindedness (i.e., openness to views of others, fallibilistic attitude to one's beliefs, anti-universalism).

equilibrium – and fails to recognise and adapt to users’ unique life situations – thus violating the principle of engagement.

The metrics and recommendations found in self-tracking technologies typically depend on a limited number of predefined standards relating to users’ activity and bodily features. Developers might base the functioning of their apps and devices on a reference to baselines such as certain body fat percentages, a specific number of hours of sleep (potentially divided into different phases of sleep), distance travelled, and many others. Users are commonly evaluated according to their performance relative to these standards and the algorithms found in self-tracking technologies suggest actions that might help them achieve or maintain a desired outcome.

However, many scholars observe that the standards endorsed through self-tracking technologies are rarely representative of the diversity of users (Lupton, 2016a; Nissenbaum & Patterson, 2016; Sharon, 2017), that they are often improperly justified (Crawford et al., 2015), and that they sometimes reflect prejudices held by technology developers or the society at large (Sharon, 2017, Lupton, 2016a). In fact, self-tracking is often criticised for mirroring the point of view of its young, male and affluent users (Barassi, 2017; Lupton, 2016a; Sharon, 2017).

Some commonly referenced examples support this criticism. Standards related to activity levels are often unattainable for users with injury history, disabilities, or even care responsibilities (Neff & Nafus, 2016, pp. 38-44). Health-related features of self-tracking medicalise various aspects of everyday life and betray an obsession over fitness, for example by directly and narrowly linking weight and lack of health (see chapter 3, section 3.2.9). Many relevant women-oriented features (such as period tracking) are implemented only in later iterations of devices or not implemented at all (Duhaime-Ross, 2014), and they often replicate harmful stereotypes relating to gender roles, for example by assuming that all women want to get pregnant and that sex is primarily connected to reproduction (Kressbach, 2019). Moreover, female users commonly report inaccurate readings as developers do not anticipate that women are likely to use their self-tracking tools differently to men (for example, by carrying their devices in their handbags rather than their pockets, or using wrist-worn self-tracking devices while pushing prams, an activity still more likely to be undertaken by women, see Criado Perez, 2020). Finally, tools of self-quantification do not consider the material circumstances of users and fail to recognise that not all of them are able to bear the cost of tracking and implementing the recommendations, both in terms of time and resources (Neff & Nafus, 2016, p. 160;

Owens & Cribb, 2019).

These shortcomings, whether arising from a lack of care or attention, point to the absence of epistemic equilibrium in the design, development and deployment of self-tracking technologies. The practices of self-quantification commonly promoted through self-tracking technologies, and consequently the kind of habits they produce, are not a result of a consideration of a maximum feasible number of alternatives. In fact, the narrow scope of many self-tracking practices suggests an inquiry cut short and fixated on a single perspective. In pragmatist terms, this is problematic as self-tracking technologies steer users' growth in a limited number of often arbitrarily selected avenues. They do not guide users following a careful consideration of their diverse needs and the best ways of fulfilling them in specific circumstances.

Moreover, self-tracking technologies do not meet the requirement of engagement as they do not recognise and adapt to their particular users. Standards endorsed through self-tracking are most often applied across a diverse range of users without a consideration of their unique life situations and individual character. It is the users who are expected by the developers (and other parties, such as insurers or employers using self-tracking technologies) to conform to the norms and requirements reproduced through self-quantification, sometimes at the cost of their self-esteem, confidence and mental health. In fact, self-tracking technologies have been criticised for encouraging obsession over the results of tracking and instilling a sense of inadequacy as the scores reported on the screen always stand to be improved (Kristensen et al., 2021; Lomborg et al., 2020).

I argue that the most common implementations of self-tracking seem to be starting habit formation from square one. This approach insufficiently builds on users' existing habits and does not adequately adapt their functioning to the situation at hand. Although users might be commonly asked to input some minor details when they configure their apps and devices (such as gender, age, purpose of tracking, etc.), the personalisation techniques employed in self-tracking recognise only extremely general categories that fail to capture the specificity of actual people (and algorithms can mistakenly infer information, further contributing to misrecognition). As Rosalie Waelen and I argue elsewhere, technologies are constitutive of users' identity and those that fail to recognise users' individual needs and capacities (as well as their autonomy and societal contributions), could have significant long-term negative effects on their confidence and sense of self-worth (see Waelen & Wiczorek, 2022).

Arguably, this problem could be attributed to technological limitations as it might not

be feasible to quantify and account for *all* the features of individuals' lives that might be relevant to habit formation. Metrics and standards employed in self-tracking need to depend on generalisations and proxies, and their reductive nature is to some degree offset by the possibility for cross-comparisons and algorithmic analysis that could lead to otherwise unattainable insights. To propose that all users and all life circumstances are irreducibly unique, would be simply impractical. After all, we are commonly able to speak of "types" of habits and identify similarities between different circumstances.

However, the data-driven perspective endorsed through self-tracking goes a step too far by excessively favouring quantified information and ignoring its deficiencies, such as insensitivity to context and reliance on proxies. The universalisation of standards and the purported objectivity of quantification, often echoed in the marketing and popular discussion of self-tracking (Ruckenstein & Pantzar, 2017; Wolf, 2010a), demonstrate a lack of genuine reflection upon (or, in some cases, wilful ignorance of) competing perspectives and other possible ways to conceptualise self-tracking practices. Ultimately, the design of self-tracking technologies is a balancing act between an emphasis on the generalisable yet reductive quantified data, and a recognition of the actual multiplicity of phenomena that cannot be fully represented and analysed through numbers – at least at the current stage of the technology. Arguably, it might be possible that developments in algorithms and data science eventually enable the developers to quantify an even more diverse range of metrics. However, by their very nature when proxies and categories model some information, they do so by overlooking and generalising other relevant phenomena, especially the phenomena that are better captured by qualitative ways of knowing. It is likely that regardless of technological advances, large parts of our experience will never be properly expressed in terms of numbers (even if the numbers do bring additional knowledge about that experience).

By tipping the scale in the direction of data, self-tracking technologies offer their users some potential benefits. Data and associated recommendations can serve as a genuine source of information and guidance. However, the design of many popular self-tracking tools goes a step too far and neglects the actual diversity of users and their life situations. As a result, those belonging to groups underrepresented in the technology (e.g., women, the disabled, the less affluent, and many others) are not adequately engaged and are less likely to reap the benefits of self-tracking. Moreover, as follows from the assumptions of pragmatist epistemology, the lack of consideration for a broad range of perspectives is likely to reduce the desirability and efficiency of produced habits (as the

lack of reflection reduces the number of situations and consequences of habits that can be anticipated, thus reducing their potential for leading to desired outcomes).

The nature of quantification and the necessarily reductive aspects of recommendations provided through self-tracking are a significant obstacle to reflection, but they are not insurmountable. In chapter 8, I argue that some changes to how self-tracking technologies are framed and developed can at least partially counterbalance their limitations. Some interventions are necessary to adequately recognise self-trackers and to maintain epistemic equilibrium within the reflection accompanying the production of habits.

## **2.2. Reflection by users**

While my concerns outlined in the previous two subsections deal primarily with how the design of self-tracking technologies limits the reflectiveness of the habits produced through the practice, this section outlines the obstacles users themselves face when attempting to deliberate upon the impact of self-tracking on their behaviour. As I argued above, users may be trained into unreflective habits that do not arise out of a consideration of viable alternatives, or out of engagement with the self-tracking individuals and their unique life situations. However, in practice users are not completely passive recipients of wisdom generated through self-tracking and they should have some opportunity to evaluate and adapt the habits promoted by their apps and devices. While this can certainly happen (depending on the level of users' digital literacy and practical wisdom), there are some commonplace features of self-tracking technologies that limit the users' ability to reflect upon their habits. Consequently, they need to be accounted for in this analysis.

Users are not presented with the full extent of information collected by their self-tracking apps and devices. Although self-tracking technologies collect a significant amount of data, often without our knowledge, users can typically access only a portion of it and only in a processed form, for example as graphs (Crawford et al., 2015). Their insight into a given activity is not as deep as that available to those managing the data collected by the device (at least in terms of metrics – they of course have access to information not available to the developers, e.g., on how they felt during the tracked activity). The results displayed to them (e.g., the number of steps taken or heart rate) are often calculated on the basis of a number of different undisclosed variables (e.g., location data). Moreover, the algorithms processing data and their exact functioning are



commonly kept hidden from users (in addition to being too complex for most people to understand). They are often only hinted at in general descriptions of a given product, or mentioned in convoluted and sometimes purposefully obfuscated privacy policies and terms of service documents (Danaher, et al., 2018b).

From the perspective of users, self-tracking devices function as a black box – some unknown amount and type of information is put inside, and a series of metrics and suggestions come out. Users are given little insight into the entire process and this serves as an obstacle for genuine reflection upon the habits that would arise if these recommendations and behavioural cues were followed. Moreover, users are likely to develop some habits merely through exposure to self-tracking technologies and not as a result of deliberate conformity with specific recommendations. Many self-tracking apps and devices have been demonstrated to engage in behavioural nudging (see for example Toner, 2018 who analyses this phenomenon by drawing on some elements of Dewey's philosophy), but even the repeated act of wearing a self-tracking device and regularly checking the scores and metrics displayed on the screen is bound to produce some new habits of thought and behaviour among self-trackers (e.g., a habit of evaluating one's everyday activity according to some pre-defined standards).

At the same time, even if some features of specific self-tracking practices are made explicit, this does not necessarily enable reflection on the part of the users. Specific standards and target metrics are often at the forefront of what is presented to self-trackers, but the reasons for their adoption might be arbitrary or complex enough as to escape users' understanding. As already noted several times in this dissertation, standards such as 10,000 steps per day, recommended activity levels, target body fat percentage often lack scientific, or even well reasoned, foundations and might not correspond to the needs as well as life situations of users (Crawford et al., 2015). However, users might not always be able to determine the validity of specific standards or recommendations and participate in how they are formed and implemented. While it is possible to approach these features with attitudes ranging from scepticism to wholehearted endorsement, in many instances users might be kept in the dark as to their actual content, justification and motivations behind them. This seriously inhibits users' ability to form a deliberate and successful response to their influence.

The reductive nature of quantification can also be an obstacle to genuine reflection. Self-tracking technologies collect only information that is easily quantifiable or construct quantified proxies of qualitative phenomena and this is likely to leave out some valuable

and relevant information. Moreover, due to the perceived objectivity of data, users might be more inclined to trust it over other forms of information (see the discussion of datafication in chapter 3, section 3.2.6). This could lead them to overlooking contextually relevant but not quantified factors in their deliberation upon the habits developed through self-tracking and thus serve as an obstacle to genuine reflection. For example, when the activity of walking is framed exclusively in relation to the distance travelled or the number of steps made on a given day, users might fail to consider the influence of the background infrastructure on their walking habits (e.g., the availability of accessible walking paths) or the inherent value of their activity. Even if self-tracking does encourage and enable reflection upon one's habits, it may be a one-sided, numbers-driven form of reflection that resembles an inquiry cut short and fixated on a single aspect instead of a full-fledged dramatic rehearsal.

All these issues (limited access to information, technological opacity, vagueness of standards and reductive nature of data) impede users' ability to reflect upon the influence of self-tracking and assess the habits developed as part of the practice. The design of self-tracking technologies does not provide users with enough hermeneutic resources for successful deliberation upon "what kind of person one is to become and the kind of world that will be made" (Dewey 1957, p. 217) with the help of self-quantification, and it may even negatively impact existing hermeneutic resources (as in the case of datafication). Moreover, inequalities in the distribution of means of understanding may further complicate this problem as users with lower digital literacy might find it even more difficult to reflect on their self-tracking practices. This could be understood in terms of hermeneutical injustice proposed by Fricker (2007), as users are deprived of means for making sense of their lived experience. At the same time, the pragmatist reformulation of epistemic injustice by Sullivan (2017) is perhaps even more apt here, as the limited epistemic access to the operations conducted by self-tracking technologies prohibit self-trackers from fully transacting with an important element of their daily experience and deprive them of opportunities to reflect upon it and shape it in line with their needs.

Arguably, users cannot fully negotiate what factors will be tracked, how it will be done and for what purposes.<sup>45</sup> Although most common self-tracking apps and devices

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<sup>45</sup> This is even more problematic when users do not engage in self-tracking practices out of their own initiative, but are forced or pressured to do it by some external factors (i.e., as a condition of access to health insurance and public services, or as part of workplace wellness schemes). This further reduces the insight into the habits that are formed as a higher number of elusive factors needs to be considered, such as the interests of a private insurer, or the data practices and objectives of an employer. Moreover, such

make it possible for users to choose which data will be highlighted and what will be the scope of recommendations, the actual data collection and the hidden work of algorithms remains out of users' reach, often by design. Admittedly, by outsourcing some of their reflective work users might reduce the risk of cognitive overload and receive curated information that sometimes might even be sufficient for their purposes. However, this requires them to become epistemically dependent on self-tracking and accept that some of their habits will be steered by factors beyond their control and beyond the scope of their reflection. It is questionable whether this tradeoff is justified, especially since users have to accept its terms as designated by technology developers. Moreover, as Kristensen et al. (2021) show, steering often still leads to adverse effects, such as lower self-esteem and satisfaction, while nevertheless requiring users to perform cognitive work in order to incorporate new habits into their patterns of behaviour.

It should be reiterated here that in pragmatist terms, reflectivity remains a key feature of any successful habit, that is, a habit that brings about desirable outcomes and is an integral part of an individual's life. As I will argue in chapter 8, a change in the design and framing of self-tracking technologies is necessary if users are to possess meaningful reflective capacities with regards to their self-tracking habits.

### 3. Flexibility

Flexibility is another feature of intelligent habits and it plays a significant role in Dewey's philosophy. His pragmatism recognises the unique nature of different life situations, but stipulates that habits are *general* dispositions for specific *kinds* of action. Consequently, useful habits need to be applicable across a wide range of circumstances – malleable enough so as to adapt to new challenges, but still adequately defined so that otherwise irrelevant changes do not require renewed deliberation. By contrast, rigid habits lose their relevance as soon as any variation is introduced. Instead of allowing the acting individual to recognise patterns and skilfully adapt to their minor modifications, they depend upon rote repetition of specific steps and break down the moment something unexpected is encountered. Such inflexibility has a significant impact on the efficacy of habits, as even small changes to the circumstances can reduce an individual's ability to secure desired results and force them to reevaluate their dispositions.

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involuntary uptake of self-tracking might leave users unprepared (in terms of time, ability and opportunity) to reflect on their self-tracking habits, while also limiting their ability to freely shape the tracking practices. I return to this point in chapter 8 and expand upon institutional self-tracking in chapter 7.

Flexibility can be distinguished as a separate feature of habits, but it does not arise on its own. I take it to be a byproduct of genuine reflection that considers viable alternatives and anticipates a wide range of outcomes that can be associated with a given habit. On this note, Shannon Sullivan observes that “the habits that are more likely to be capable of change are those that are formed with an eye for further transformation, rather than those that are formed as fixed grooves into which one settles.” (Sullivan, 2001, p. 33).

Consequently, many of the issues discussed in this section arise directly from a lack of deliberation outlined in section 2 and the analysis presented here could be interpreted as an extension of that related to reflectivity. However, since flexibility is a central aspect of intelligent habits, it is worth highlighting specific features of self-tracking technologies that serve as an obstacle for the development of dispositions that are malleable and responsive to change.

I already argued that the rigidity and limited variety of standards endorsed through self-tracking is an obstacle for the formation of reflective habits. A similar problem can be noted in the context of flexibility. Self-tracking technologies operate with a narrow vision of what is normal or desirable and routinely prove to be unreliable for “atypical” users (e.g., women or people with disabilities) or fail to reflect a wide range of commonplace phenomena in their metrics. Consequently, habits generated through self-tracking are likely to be relevant only in situations that neatly correspond to those imagined by the developers. The rigidity of metrics and standards found in self-tracking technologies means that any unanticipated change is bound to destabilise users’ habits (and as section 2.1 demonstrates, the developers fail to anticipate quite a lot). This could turn commonplace occurrences into what Dewey calls problematic situations that require further reflection rather than reliance on familiar ways of acting.

Moreover, existing research shows that habits developed through self-tracking often lack persistence (Moore, 2017, pp. 172-173). Users typically begin their tracking practices with much enthusiasm and note significant benefits, but many of them stop tracking after several months. Most importantly, these benefits are usually lost when self-tracking technologies are no longer in use. For example, users who manage to increase their level of daily activity with the help of smart wristbands or smart watches, quickly revert to their baseline levels once the device is no longer worn regularly. This suggests that habits aided through self-tracking are too rigid and too dependent on self-tracking technologies to be adapted to changing circumstances that involve the discontinuation of

a given self-tracking practice.

This could be blamed on commercial interests of the developers of self-tracking technologies as their revenue is tied to continued data collection and is thus reliant on users' uninterrupted use of a given tool. It is arguably not in their interests to guide users towards beneficial habits that can remain actionable without a given app or device. Developing users' dependence on technology seems like a quite successful, if ethically suspect, business model.

However, this inflexibility does not have to result from developers' ill will. Even if self-tracking apps and devices are designed with users' best interests in mind, the current state of the technology does not encourage user independence and reflection. The possibility of delegating at least part of the burden of evaluating one's life is arguably one of the most appealing elements of self-tracking. The apps and devices currently on the market promise their users valuable insights and actionable lifestyle recommendations delivered in a seamless manner and without users' intimate involvement in the calculations and decision-making. The users are expected merely to wear or carry their device and promptly react to recommendations supplied by the algorithms. The calculations taking place in the background happen without the users' active involvement and, as already discussed, often without their knowledge.

Consequently, the habits that can be produced with the help of self-tracking typically involve rote repetition and are dependent on the active influence of a given technology. Users are not encouraged to develop practical wisdom and are rarely informed about the motivations and purposes behind specific recommendations. The application of an intelligent habit requires an individual to evaluate a given situation and pass judgment upon the relevance of existing dispositions, as well as the need for their updating. In self-tracking, evaluation and judgment are delegated to technology. Self-tracking tools often serve as a replacement, rather than extension, of users' deliberative capacities and there is little reason to believe that exposure to such techniques could improve users' ability to adapt to change. Although the habits operationalised *while tracking* may possess a degree of flexibility, depending on the design and efficacy of a specific tool, all this flexibility is likely to be lost once tracking stops. Without general skills and repeated inquiry into the relevance of established modes of actions, users will not be able to gain the capacity for adapting their habits to change. While this is certainly true of all habits, self-tracking

technologies often deprive users of the opportunity for developing these skills<sup>46</sup> and take away the necessity for engaging in inquiry – in this sense they certainly succeed in producing habits in the common understanding of the term, but this does not amount to *intelligent* habits. Even if self-tracking technologies produce a habit that is desirable on its surface (e.g., a habit of daily exercise or meditation), they are still lacking in Deweyan terms, as the process of habit formation that they facilitate does not involve meta-reflection on the habit itself and on the means of acquiring it. This ultimately reduces users influence over that habit and their ability to adapt it according to their need.

Moreover, the issues of limited access to information, technological opacity, vagueness of standards and reductive nature of data that I discussed in section 2.1 limit users' ability to counterbalance the inflexibility of habits produced through self-tracking. Even those that possess practical wisdom and a desire to adapt their habits to change are not provided enough hermeneutic resources to do so. Due to the black box design of self-tracking, dependence and delegation are not only the default way of engaging in self-tracking, but the dominant one. Users approaching their self-tracking apps and devices with flexibility in mind, are likely to face significant obstacles.

#### **4. Contribution to growth**

Dewey's productive view of technology allows me to assume that self-tracking technologies will result in the development of some habits among their users, and that these habits will have a degree of influence on users' ability to grow and live a good life. Admittedly, many of the habits encouraged through self-quantification are predominantly corporeal and physical in nature. Even if some users may use their apps and devices to quantify their attention or time spent with friends and family (see Nafus & Sherman, 2014), most self-tracking practices are concerned with the tracking of exercise, body weight, sleep and other such factors, and they focus on the development of habits related to these phenomena.

At the same time, pragmatism provides good foundations for discussing such ostensibly corporeal elements of our daily life in an ethical manner. I noted in chapter 4 that normative judgments surrounding physical activity colour our moral imagination, and that our bodies are irreducibly connected to how we discuss morality. Moreover, as demonstrated especially in section 2 of this chapter, self-tracking habits extend far

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<sup>46</sup> Insofar as they are related to tracking practices and associated habits.

beyond the body. By relying upon and expressing specific norms, they significantly affect users' identity, self-esteem, attention and many other factors. Overall, I argue that they have an impact on users' character and thus co-determine their avenues for growth, as well as the kinds of the good life chosen by them (in addition to impacting the chances for achieving a particular vision of the good life).

Are self-tracking practices conducive to growth and the living of the good life? Over the course of this chapter I presented some deficiencies of self-quantification in regards to reflectivity and flexibility. My argument is that in their arguably most common form, self-tracking technologies do not promote intelligent habits. Instead, they confine users to a narrow understanding of what is normal and desirable, fail to recognise the diversity of the users, and instill rigid habits that are unlikely to withstand change. On the pragmatist view, habits arising from self-tracking are unlikely to bring users their desired ends, or bring them only when users adapt their goals and motivations to fit those endorsed by their apps and devices. Consequently, they should be predominantly seen as an obstacle to growing and flourishing.

This is not to say that *only* intelligent habits are beneficial in terms of outcome – unreflective, rote behaviour often also leads us to desired goals and many unreflective habits produced by self-tracking could also help users achieve their objectives. However, reflectivity and flexibility are inherently valuable in Dewey's philosophy as they are characteristic of a life guided by deliberation – one that is clearly endorsed in pragmatist terms – and they produce good outcomes by design and not mere coincidence. Even if unintelligent and intelligent habits lead to functionally similar results, the latter are more highly esteemed from a Deweyan standpoint as they are motivated by different decision-making procedures.

However, my overall judgment on self-tracking habits does not account for the multiplicity of ways in which users engage with self-quantification. My analysis presented in sections 2 and 3 outlines situations in which self-trackers blindly accept the data presented to them by their apps and devices, and eagerly follow the recommendations supplied by the algorithms. Although such an attitude is certainly possible, many approach their self-tracking technologies with a dose of scepticism and engage in significant amount of work to make self-quantification fit their needs and reflect their circumstances. And while these attempts are certainly commendable and successful to some degree, they do not change the fact that *as designed*, self-tracking is woefully inadequate as a tool for the formation of intelligent habits. In fact, the necessity

for users to modify the basic functions of self-tracking tools could be taken as further justification of my arguments.

Below, I describe some common ways for embedding self-tracking into one's life and demonstrate what impact this may have on the reflectivity and flexibility of the developed habits. Some of the strategies adopted by self-trackers can positively impact the kinds of habits they are able to operationalise through their practices, and thus make self-tracking more in line with the objective of growth. Since these strategies can increase users' ability to choose and achieve a form of good life while engaging in self-quantification, they will also inform some of the recommendations I formulate chapter 8.

As already noted, some users might opt to use their self-tracking technologies uncritically and blindly follow the supplied recommendations. While this limits the risk of information overload by outsourcing evaluation of collected data to the device and offers easy to follow guidance, it is unlikely that a majority of users stand to significantly benefit from this approach. Those that do not fit the image of a typical user or who find themselves in circumstances seen by developers as unusual would likely end up in one of the two following scenarios: 1) they would either see recommendations that do not correspond to their individually held goals and do not recognise their existing habits; or 2) they would have to adapt their behaviour, lifestyle and beliefs in order to fit the norms endorsed through self-tracking and thus pursue the goals determined for them externally. While the latter option could certainly enable the users to pursue some form of a good life, neither of the discussed possibilities can be seen as genuinely contributing to growth. Users would develop their character in a predetermined direction, but this would hardly ameliorate the depth and variety of their experience. Arguably, this form of self-tracking is most likely to result in frustration or conformity.

Users could also opt to merely collect their data and track metrics that they could independently put to a good use. While this would certainly protect them from direct negative influence of personalised recommendations, it is possible to develop habits through self-tracking also unconsciously, especially when developers engage in nudging or manipulative practices. Moreover, it is questionable whether such an approach would open users to the diversity of experience and expand their horizons to alternative forms of behaviour and thinking. Unguided habit formation on the basis of the often rich and detailed self-tracking data could lead to information overload or require a degree of hermeneutic capacities that is not universally possessed. While some digitally literate



and reflective users could benefit from this approach, it is possible that for many it would bring no observable benefit or even entrench existing habits.<sup>47</sup>

Arguably, most users may recognise their tracking practices as falling somewhere on the spectrum between the first and second options described above. They use their self-tracking technologies, including the associated personalised recommendations, as a handy reference point, but approach them with a dose of scepticism. As noted by existing research, users are generally aware that self-quantification requires a lot of interpretative work and are suspicious of universalising and objectivist claims behind popular self-tracking tools (Kristensen et al., 2021; Sharon, 2017). They also form communities in which they exchange insights about their individual practices, compare their achievements and guide each other to achieve the best results (Barta & Neff, 2016; Kristensen et al., 2021; Sharon & Zandbergen, 2017). Some even go as far as “hacking” their devices and their practices by inventing ways for capturing new metrics, developing competing standards, and finding other ways of making self-tracking technologies suit their individual needs (Ruckenstein & Pantzar, 2017; Sharon & Zandbergen, 2017).

Although some have criticised the dataistic and individualistic aspects of the Quantified Self movement, there are tendencies among its members that closely correspond to the attitude described in the previous paragraph (Ruckenstein & Pantzar, 2017). QS members often draw attention to the uniqueness of different users and their life situations, the incomparability of different users’ metrics, and the necessity to make hermeneutic work a part of any practice of self-quantification. There are also similar, less organised and smaller scale groups that demonstrate considerable success in resisting the dominant schemes of self-tracking, while also emphasising user choice and influence over mere reliance on externally-determined metrics and norms (Kristensen et al., 2021). This approach may be most beneficial to users and provides them with the greatest degree of flexibility, while also requiring some reflection on their part. Such decentralised, community-oriented and often unorthodox self-tracking practices should be conducive to the development of intelligent habits and offer the users ample opportunities for determining and pursuing their chosen vision of the good life. However, mainstream self-tracking technologies have not been designed to accommodate this way of tracking and users may only accomplish their own objectives as a result of considerable struggles

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<sup>47</sup> This entrenchment could take form of a feedback loop whereas a motivated user interprets their data as supportive of a specific goal, commits more intensely to a specific behaviour, and ends up with even more data corresponding with the initial assumption.

against competing intentions and interests embedded in their tools.

Consequently, a vocal minority of self-trackers is determined to design their own alternatives to the most common apps and devices. They tinker with and construct tools uniquely cut out for the fulfilment of their particular goals, and report considerable successes.<sup>48</sup> Such an approach requires individuals to become intimately involved with their habits and strive to shape them in ways that promote flexibility and respond to their individual needs. However, it also involves a significant amount of engineering knowledge, time and resources, not to mention general hermeneutic capacities. Simply put, such completely independent ways of tracking may only be available to a narrow group of individuals. While certainly commendable and a source of inspiration for others, a wider audience cannot be expected to go through such extensive efforts if they want their self-tracking technologies to play a more beneficial role in their pursuit of the good life.<sup>49</sup>

Overall, the third and the fourth approaches to self-tracking identified above are comparable in terms of the amount of reflectivity and flexibility with which they can imbue the habits they produce. However, as most users are more likely to depend on mainstream self-tracking technologies rather than develop their own, the extension of user choice and influence embedded within the existing self-tracking tools might be the most practical way forward and I focus on this in my recommendations expressed in chapter 8. I also draw on good practices identified in the above paragraphs to suggest how even existing technologies could be used and appropriated with the goals of reflectivity and flexibility in mind.

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<sup>48</sup> For example, a 2009 post on the Quantified Self movement website teaches members how to make their own mobile self-tracking app (Betts-LaCroix, 2009). QS website is full of recorded presentations about people building their own devices (e.g., <https://quantifiedself.com/show-and-tell/?project=603>), and forum posts with discussions and schematics on DIY sensors (<https://forum.quantifiedself.com/t/im-building-a-meditation-biofeedback-device/478>; <https://forum.quantifiedself.com/t/portable-environmental-sensors-on-arduino/7157>).

<sup>49</sup> I am aware that some liberal or libertarian readers might take issue with the discussion presented in this chapter and refer to the values of personal responsibility and autonomy. After all, even if some users are pressured by insurance companies or employers to pick up self-tracking, most engage in the practice out of their own volition and they should be able to make that choice even if it is ultimately less than beneficial. However, I see my arguments as largely compatible with such liberal sentiments as the issues I discuss through the lens of reflectivity and flexibility can be seen as infringing upon autonomy and run contrary to the ideal of personal responsibility. Users' difficulties in reflecting upon their self-tracking tools limit their ability to make informed choices about self-quantification and their behaviour as a whole, whereas the inflexible nature of the produced dispositions may reduce users' control over their habitual actions (partially delegating it to a device). In this sense, even if users are not coerced to self-track, it is not certain that they are able to fully exercise their freedom while engaging in the practice.

# Chapter 6. Transaction

## 1. Introduction

In this chapter, I use Dewey's concept of transaction to analyse the interpersonal relations arising through self-tracking.<sup>50</sup> Although collection and evaluation of quantified personal data may seem ostensibly to be a predominantly solitary activity (as already noted several times in this dissertation), users of self-tracking technologies routinely engage with others in direct and indirect ways, willingly and unwillingly, as well as knowingly and unknowingly. Many self-tracking projects involve the sharing of data with friends and strangers alike, discussion of results in communities, and comparisons between users through leaderboards or other social features embedded in popular self-tracking apps.

At the same time, even those who do not deliberately attempt to self-track in a social manner, commonly end up intertwined with other people and their data. The algorithms employed in self-tracking aggregate individuals' data into larger data sets and use this collectively-generated resource to provide personalised services. Consequently, a user looking at numbers and recommendations on their device indirectly engages with countless other individuals whose personal information contributed to the displayed results in various ways. And while it might be often difficult or even impossible to trace the influence the other (often anonymous) users have on individual self-tracking projects, any self-tracker is also connected to the developers who have a much more direct influence on the practice. The self-perception of self-trackers is partially shaped by the developers' decisions, and by merely turning on their self-tracking devices, users open themselves to normative evaluations in light of the standards set by the makers of their chosen technology.<sup>51</sup>

While on a basic level, the pragmatist notion of transaction is very similar to that of interaction, Dewey deliberately uses a distinct term to highlight the continuous and fluid

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<sup>50</sup> It is worth noting that Dewey's notion of transaction also encompasses individuals' interaction with their environment. However, I have already discussed the impact of self-tracking on user's relation to the background of their activity and lived environment in an article co-written with Natalia Juchniewicz (Juchniewicz & Wiczorek, 2022). Consequently, this chapter deals only with self-trackers' transactions with other people.

<sup>51</sup> At the same time, the transactions between users and the developers have largely been covered in the previous chapter, where I discussed how the influence of these developers and the technologies they create shape users' habits and identity. For this reason, this chapter focuses on the more lateral transactions between different users, as well as between users and non-self-trackers.

nature of interpersonal relations (see Sullivan, 2001 for an in-depth overview). For Dewey, others are an inseparable part of an individual and their experience since transactions with them are constitutive of one's habits, overall character and circumstances. In pragmatist terms, life and all its parts (habits, circumstances, problems that need to be addressed, the tools for addressing them, etc.) are inherently social (see Dewey, 2008, pp. 322-328; Pappas, 2008, p. 217). Sullivan (2001, pp. 15-16) illustrates this notion by referring to a metaphor of a stew: while it is certainly possible to distinguish individual ingredients placed in the pot, each of them irreversibly changes and influences others in various ways – to the point that a carrot found in a stew has qualities (e.g., taste) far removed from the qualities of a raw carrot, even if it is still recognisably the same vegetable. In this vein, we cannot just stop transacting with others at will and thus get rid of all the residue these transactions have left upon us. In Deweyan terms, interpersonal relations continuously shape us in an irreversible way, and we do not always have the final say about their content and outcomes.

In my view, this notion provides an apt account of the relationships with others arising in connection to self-tracking. The practice is inherently social, users do not have full control over the relations in which they engage, and they are simultaneously deeply affected by these relations. As noted in the previous chapter, self-tracking has a distinct constitutive dimension – it is designed to impact users' identity, self-understanding and behaviour. The current chapter aims at further problematising the impact of others on the shaping of individual habits and character through the practice.

However, the notion of transaction is not merely useful for *describing* the interpersonal relationships arising between different parties involved in self-tracking practices. It has a clear normative dimension, as follows from Dewey's ethical ideals, and it can help in evaluating the relationships arising through self-tracking. In what follows, I will evaluate the interpersonal transactions enabled and mediated by self-tracking in light of Dewey's ideals of continuing, inclusive growing (see Fesmire, 2003), and democracy (see Pappas, 2008).

In relation to the former, I assess whether through transacting with others with the help of self-tracking, users are broadening the depth and scope of their experience. For this purpose, I adapt Sullivan's pragmatist characterisation of epistemic injustice to extend her considerations also beyond the sphere of epistemology. Whereas Sullivan defined epistemic injustice as a situation in which "the speaker isn't allowed to epistemologically transact with the world in ways that enable her own as well as others'

flourishing” (Sullivan, 2017, p. 210), I build on her ideas to pinpoint situations in which self-tracking technologies push users into transacting with others in ways that impact their own as well as others’ flourishing.<sup>52</sup> For this purpose, I once again turn to Medina’s (2013, p. 50, see also chapter 4, section 3.4) principles of engagement and equilibrium as they enable me to discuss whether individuals are properly recognised by others in transactions mediated by self-tracking, and whether this recognition is adequately extended to all the participating parties.<sup>53</sup> Consequently, my aim is to analyse whether transactions with others mediated through self-tracking 1) contribute to the growing of particular users, or 2) contribute to the growing of the people with whom a user is transacting. In this way, I attempt to distinguish the impact of transaction both on specific people engaging in self-tracking as well as on others who might be (indirectly) affected by the practice.

Moreover, I turn my attention to Dewey’s notion of democracy, characterised in chapter 4 as a cooperative approach to the solution of shared problems. In this way, I want to highlight the political dimension of interpersonal relations arising through and mediated by self-tracking. Drawing on Dewey’s (2016) notion of a public, I analyse whether the sociality embedded in self-tracking enables users to band around shared interests and advocate for the recognition of these interests in the political sphere. I discuss instances in which self-trackers form a community focused on specific shared problems (e.g., collection of health data) or in which the participation in different self-tracking practices could lead them to the recognition of shared interests (e.g., tracking as shared labour). On this basis, I evaluate how self-tracking enables or inhibits their solidaristic and democratic pursuits, and whether it is possible to speak of duties and obligations towards a community as arising within the self-tracking sphere.

Consequently, the remainder of this chapter is divided into three sections. In section 2, I discuss the impact of self-tracking-mediated transactions on the growth of individual

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<sup>52</sup> Of course, this does not capture what Fricker (2007) characterised by epistemic injustice. In this argument, I want to focus on the importance of transactions, both in epistemic and non-epistemic terms, for individual development and flourishing. Sullivan’s discussion of epistemic injustice provides me with a language and the tools to do so, and her reliance on a well-established concept allows me to present my points in a more approachable way.

<sup>53</sup> I have already discussed the impact of engagement and recognition as foundational for an individual’s self-development (see chapter 5 and Waelen & Wiczorek, 2022). However, whereas my previous discussion centred on the recognition of individuals (i.e., their unique needs and circumstances) by technologies, this chapter deals with recognition *through* technologies. I am interested in analysing whether transactions by and with self-tracking allow individuals to adequately engage with specific people and thus contribute to their growth (e.g., by providing them with care and friendship).

users. In section 3, I analyse self-tracking as enabling or inhibiting users' care for (unspecified) others. In section 4, I focus on self-tracking as impacting solidarity and (Deweyan) democracy.

However, before I proceed to the next section, I want to provide several notes on the objects of transactions mediated through self-tracking. Although the practice and associated technologies regularly hint at interactions with other people, the level of access (in epistemic and practical terms) to these people is not at all clear.

As already briefly noted in chapter 2, existing research on self-tracking widely refers to the notion of a data double, first introduced by Haggerty and Ericsson (2000) and popularised in the context of self-tracking by Ruckenstein (2014). According to Ruckenstein, self-tracking does not necessarily provide users with more knowledge about themselves and their everyday behaviour. Instead, it would be more accurate to say that a self-tracker engages with a data double of themselves – a likeness created out of data that resembles the user in many ways but, crucially, does not possess all their characteristics and often differs in some regards.

Self-tracking technologies can be inaccurate in collecting data, and where data is missing, they flesh out a user's profile by relying on inferences, which often turn out to be mistaken. Moreover, specific data points might cease to be relevant in a given context, for example, when a user's physical characteristics change over time. Consequently, it is inaccurate to claim that I am represented by the data available through my device. Rather, the data is a representation of my data double, a digital doppelgänger, who in some instances can effectively serve as my replacement, but is a separate, if related, entity to myself.

This problem may seem overblown at a first glance, but research suggests that users engaging with data doubles imbued with characteristics not possessed by the users themselves may end up with a distorted image of themselves. Vegter et al. (2021) argue that it is akin to looking at a funhouse mirror, except that users are likely to privilege the distorted image over their direct sensory experiences. I have already discussed the issue of datafication that is plaguing our interactions with self-tracking data, and this is yet another example of this phenomenon. Users are often inclined to treat the quantified, device-mediated representations as more accurate (more “scientific”) than the testimony of their own senses.

The concept of a data double is especially important for this chapter as the transactions with others mediated through self-tracking are epistemically suspect for

similar reasons. It is difficult to determine whether these transactions should be seen as engagement with particular people or merely with their data doubles. At the same time, even if users were aware of this distinction, they would most often be unable to determine the degree of distance between individual people and their datafied representations, especially when the transactions with them occur primarily in the digital sphere. Moreover, as data doubles are bound to contain only a fraction of the information pertinent to a specific person, they are problematic also from the perspective of equilibrium. It is doubtful whether the information that is most crucial to the transaction is always adequately weighed and represented when data doubles enter into play.

Consequently, the discussion presented in this chapter needs to be qualified. The transactions with others I discuss may often be better characterised as transactions with data doubles. Such indirect contact may not lead to genuine care for others or feelings and performance of solidarity. I try to account in my analysis for the degree of epistemic distance between the transacting individuals, but this is not always possible – data doubles are by their very nature confusing and often blend in with our ideas about the user they represent/copy. Ultimately, while self-tracking allows for the creation of new social bonds and enables otherwise unavailable transactions, these social interactions are problematised by the aforementioned epistemic problems. Crucially, this is not something that can be resolved in my analysis and the above considerations are only meant to highlight this issue and its importance for this chapter. The tension between qualitative phenomena and their quantitative representations is central to self-tracking (see chapter 2, section 6.1) and impacts all aspects of the practice, including its interpersonal dimension.

## **2. Impact of transactions on the individual**

When using self-tracking devices, people are routinely exposed to information and metrics that fall beyond the scope of their everyday experience. Even when self-quantification is used in a familiar context such as running, data supplied by other users on in-app comparison tools like leaderboards and challenges is bound to differ from the data that an individual is able to produce on their own. Other users' results may include values not attainable to the individual in question and serve as a source of motivation, or be obtained in unfamiliar contexts, potentially offering insights into new (to the user) ways of engaging in a given activity. Cross-comparisons can also draw users' attention to metrics they previously ignored and thus allow them to focus on the features of their

activity that they have not previously considered relevant. Finally, exposure to others' data can help users contextualise their own information and activity. In the previous chapter, I extensively discussed the normative dimension of self-tracking and noted that many of the standards endorsed through mainstream devices are far from attainable for a large subset of users. Exposure to similarly "deficient" results achieved by other people can put any perceived shortcomings in perspective and help users deal with the feelings of inadequacy as well as reevaluate and readjust their own practices in light of new insights.

These aspects of data sharing can have a positive impact on users' self-tracking practices and, at first glance, seem to be in line with the Deweyan ideal of continuing growing, as well as Medina's principles of engagement and equilibrium. Exposure to new forms of data can be seen as enriching the individuals' perspective and broadening the scope and quality of their experience. Running data sourced from others may merely improve the efficiency and variety of one's workout, but in contexts such as mental health or sleep tracking, it could have a noticeable impact on users' overall wellbeing (barring hermeneutic limitations discussed in chapter 5, section 2). Still, even the less pronounced or less impactful improvements can be thematised in the context of user empowerment and increased agency. The added insights derived from shared or aggregated data may increase users' ability to shape their everyday behaviour and potentially counteract the universalistic tendency of many self-tracking devices, as discussed in the previous chapter. Ideally, data sourced from others should contribute the necessary context that is not provided by default through recommendation systems and user interfaces, and thus help people approach their self-tracking practices in a more critical manner. Although a significant degree of data literacy and practical wisdom would be necessary to actually reap the benefits derived from shared or aggregated data, users engaging with others may have more tools at their disposal than those tracking in a solitary manner.

Members of the Quantified Self movement have long argued that those willing to share and discuss their data and the insights it provides are better equipped to take control of their habits (Ruckenstein & Pantzar, 2017). The movement's events focus on direct engagement between different self-trackers who disclose their data, as well as its interpretations. By design, the speakers are expected to receive valuable feedback, while others are provided with new ideas and grounds for comparison. Recently, empirical research into the interpersonal dimension of self-tracking has demonstrated that users who discuss and share their data reap palpable benefits – relations with others help them



deal with negative feelings resulting from their self-tracking practices, they find it easier to interpret the metrics, and they aid each other in staying motivated enough to continue their projects of self-quantification (Barta & Neff, 2016; Kristensen et al., 2021).<sup>54</sup>

Additionally, metrics are a powerful tool of expression. They enable individuals to make sense of their experience and communicate it with others. A runner quantifying the features of their exercise may later refer to their data in order to share their accomplishments and receive encouragement and praise. More advanced metrics may allow individuals to discuss some features of their everyday life in all kinds of circumstances, especially when they lack other hermeneutic resources for doing so. For example, a mental health patient tracking their mood (even using a very basic and reductive numerical scale) could refer to this data in discussion with friends, family and medical professionals without necessarily having to engage in a detailed explanation of their mental states. When treated as a communicative shorthand, self-tracking data can help individuals make up for epistemic deficiencies or even respond to some epistemic injustices.<sup>55</sup>

However, the reality of self-tracking is much more complicated. I agree that direct interactions with others mediated by or centred on data can be epistemically and developmentally beneficial to individuals, but I argue that this is less of a feature of the data and the practice and rather just a likely outcome of generally uplifting transactions. It would be more accurate to say that such positive transactions arise alongside or in reaction to self-tracking and not thanks to it (or that they merely use self-tracking as a tool), especially as many of the relationships between self-trackers described in the literature seem to aim at addressing some of the deficiencies of the practice (e.g., the difficulty in making sense of the numbers or the propensity of users to develop negative feelings in relation to their results). The relationships of care arising between different people involved in self-tracking are often discussed as meaning to repair the elements of the practice that do not function according to users' needs and expectations, or to ensure that the users are not negatively impacted by its shortcomings – in this sense, care in the context of self-tracking is a reactive attitude (Kristensen et al., 2021; Schwennesen,

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<sup>54</sup> This is particularly relevant in the context of low persistence of habits generated through self-tracking. Those engaging in self-tracking practices together with others may be able to reap the benefits for longer despite frustrations and a lack of motivation to continue.

<sup>55</sup> In addition to the above-mentioned example of using data as an extension of one's hermeneutic resources, such data could be used by some as a further proof for their otherwise discarded testimony. Although this tactic would not address the underlying structural injustice that leads others to doubt the speaker, it would still allow the speaker to counteract the effects of said structural injustice.

2019).

Consequently, I argue that when evaluating the interpersonal dimension of self-tracking, we should look at the kinds of transactions that are embedded in the design of the devices and are often arising outside of users' initiative. In this sense, the proper subject of analysis in this chapter should be transaction with (typically unknown) others through the technology and in-built social functionalities. After all, people can bond even over predominantly solitary and non-social activities, such as fishing, but it would be a mistake to take the existence of fishing associations as a sign of an inherently pro-social characteristics in fishing. For this reason, I want to discuss transactions *as mediated by* the practices, rather than transactions *occurring around or alongside* the practice, as the latter are generally likely to arise due to our social nature.<sup>56</sup>

I doubt whether transactions with unknown others (e.g., on an anonymous leaderboard) can be classified as engagement in the sense I put forward in this dissertation. The degree of distance as well as fragmentariness of the exchanged information make it difficult to recognise the encountered person as a unique individual with their own needs, desires and qualities. Recognition of a singular trait (often relatively minor in the context of overall character and identity, such as physical performance) is not enough to serve as the basis of an uplifting constitutive bond of the kind discussed by Sullivan. Although data shared through self-tracking can have bearing on individuals' flourishing or their ability to decide what kind of persons they wish to become (see Dewey, 1957, p. 217), this is not an outcome of actual transactions with others (rather, simply the use of data divorced from its original context). Individual users can directly benefit from the input and labour of others (e.g., when user data is algorithmically aggregated and used to offer better recommendations), but the use of infrastructure and products resulting from this labour is not the same as engaging with the labouring people in a mutually constitutive manner. Similarly, using a bridge may be described as a transaction with one's environment and is certainly habit-producing but it would be absurd to interpret it as a transaction with the people who built that bridge.

On the other hand, exchanges of self-tracking data problematise information flows, reducing individuals' ability to project their identity and shape how it is perceived by

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<sup>56</sup> At the same time, it would be unwise to ignore completely the solidaristic potential of direct social interactions arising in conjunction with self-tracking. These transactions offer clear benefits to the users and I will account for them in my recommendations in chapter 8.

others.<sup>57</sup> Users have to contend with being encountered by others through the lens of their metrics, which in some instances entails conforming to or struggling with the distorted and reductive datafied representations of themselves. Other self-trackers primarily or even exclusively encounter a data double of a given person and perceive that individual through the lens of characteristics that the person may not necessarily possess or wish to disclose (see Gabriels & Coeckelbergh, 2019 for a different version of this argument).<sup>58</sup>

In this sense, self-tracking can have a harmful impact on individuals as it reduces their transactional agency – users have little ability to negotiate the terms at which they interact with others. At the same time, the prominence of data doubles in these transactions is problematic from the perspective of engagement and equilibrium. The interaction with an individual’s datafied representation effectively replaces direct and in-depth engagement with that individual, whose unique characteristics are not adequately recognised (instead, their perceived and recognised identity is determined by what has been captured by data). It also reduces the diversity of perspectives and information within the transaction,<sup>59</sup> privileging the narrow range of information that can be described with data and that is typically collected and shared through self-tracking technologies. Arguably, transactions mediated through self-tracking are impoverished both in epistemic and ethical terms, at least according to the pragmatist view that an individual’s ability to transact with the world is foundational to their growing and, consequently, their ability to flourish. Self-tracking introduces a degree of distance between users that casts doubt upon the possibility of using the practice as a medium for meaningful and uplifting transactions – the influence of technology constrains users’ ability to freely shape their roles in interpersonal relations and reduces the variety of identities they are able to

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<sup>57</sup> Naturally, this is also problematic from the standpoint of privacy, but this issue has already been extensively covered in the literature (see chapter 3, section 3.2.2). Lanzing (2016) and Nissenbaum and Patterson (2016) pursue similar arguments to the one I present in this chapter, but do so from the privacy standpoint.

<sup>58</sup> This is particularly interesting in the context of testimonial injustice that can arise in connection to self-tracking devices. Since datafied information is widely seen as more accurate than the testimony of the senses, it can be used to contradict or cast doubt on a speaker’s statement, especially when that speaker belongs to a group already considered less trustworthy. There are reports of wearable data contradicting witness testimony, but it is not difficult to imagine other similar instances, especially when self-tracking devices are also used as tools of surveillance (e.g., in the workplace or when worn by children closely supervised by their parents, see Gabriels, 2016). This casts further doubt on the claims about the positive impact of self-tracking on social relations. Even if data could serve as an extension of an individual’s hermeneutic resources, as mentioned at the beginning of this section, it might just as well facilitate epistemic injustices. The unsatisfying conclusion is that the role of data in the testimonial and hermeneutic context is, at best, ambiguous.

<sup>59</sup> Also, the self-selected sample of the most active users who are likely to share their results on leaderboards and social media is in no way representative of the general population.

adopt/express. In the most egregious cases, it could press upon them social roles far removed from what they desire (e.g., when data about a person results in them being judged or treated in a way incompatible with the identity they actually hold or aspire to).

Finally, I have some concerns about the kind of sociality promoted through the social features typically embedded in self-tracking technologies – namely leaderboards and social media highlights. Although these functionalities enable users to celebrate their individual performance and receive recognition from others for some accomplishments, they could be criticised as encouraging boasting or even a narcissistic obsession with one’s activity. They seem to promote the opposite of virtues such as humility, moderation or honesty. Instead, the set of dispositions instilled in users through these functionalities could be labelled under the umbrella term of digital smugness.<sup>60</sup> Leaderboards and social media highlights lack direct social interactions and connect users with others in an impersonal, comparative and competitive way (see Gabriels & Coeckelbergh, 2019, and my discussion in the next section). Consequently, they are an environment that invites users to indulge their pride and vanity, while reducing the chances that their ego will be checked by others. The character promoted through the social features embedded in self-tracking technologies is an egocentric and vainglorious one.

### **3. Impact of transactions on others**

As the notion of growing promoted in Dewey’s pragmatism is meant to be inclusive, our habits should not only be oriented towards the amelioration of our experience, but also that of others. In the simplest of terms, good habits should make everyone better off, not just the person who possesses them. It is then prudent to focus in this section on the dispositions towards others developed through self-tracking as well as their moral relevance.

As already noted in the previous section (as well as chapter 5), exposure to data of other people can help users combat the universalistic tendencies of self-tracking and expose them to a wider range of perspectives and experiences. This can be beneficial not only for the development of more intelligent habits (see chapter 5) but could result in a greater awareness of the diversity of needs and circumstances of other users. In particular, members of the QS movement claim that the sharing and discussion of data makes them

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<sup>60</sup> I would like to thank Dave Lewis for suggesting this term during one of the PROTECT workshops. It is a better expression of my intuitions than any other words that came to my mind.

more mindful of the specificity of individual self-tracking projects and prompts them not to treat their fellow self-trackers with a one-size-fits-all approach characteristic of the algorithms and recommendation systems embedded in mainstream technologies (Nafus & Sherman, 2014; Ruckenstein & Pantzar, 2017). This increased awareness has been discussed in the literature as potentially leading to care for others and as a foundation for the formation of communities centred around specific self-tracking practices (Barta & Neff, 2016).<sup>61</sup> In fact, empirical research has largely supported these claims, although it has to be noted that the majority of the studied groups formed in an offline environment – in this case, self-tracking seems to be more of a pretext for the establishment of an overall beneficial relationship rather than a tool for the creation of friendships (Sharon & Zandbergen, 2017; Kristensen et al., 2021).

At the same time, many self-tracking practices have a distinct orientation towards others and this is particularly evident in medical contexts. People monitoring their symptoms (e.g., blood glucose levels in the case of diabetes) often share their results online and discuss them with strangers in the hope of finding valuable insights that could facilitate the management of the disease. Even users who do not stand to directly benefit from the social forms of tracking often decide to share their data if they see it as contributing to a common good. For example, some self-trackers share their metrics with medical researchers in the hope that it will eventually be used to further medical knowledge or help in the development of new treatments. While it is arguably not the main motivation behind self-tracking for most users, concern for the wellbeing of others can be an important element of quantification practices and it should be recognised.

On the other hand, it is easy to question whether such attitudes to data sharing are actually a feature of self-tracking, and to what extent they should be considered a form of transacting with others in the pragmatist sense. First, self-tracking seems to be merely making it easier for people to follow their altruistic instincts, especially as the cost is relatively minor or non-existent. Sharing medical data through a self-tracking app usually takes as little as pushing a few buttons and there are no immediately discernible downsides to the users, unlike with acts such as organ donation. Since public health is generally considered a common good, I find it doubtful that users become interested in its advancement merely through their engagement with self-tracking – the functionalities

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<sup>61</sup> Incidentally, this would be in line with Dewey's (2016) hierarchical ordering of social structures in which individuals bond over shared experiences to form communities, and later advocate for shared interests as members of broader publics.

of the device simply make it possible to contribute in yet another, often quite frictionless manner.

Second, while certainly commendable and important, mere contribution of data for the benefit of unknown others does not entail engaging with them in the full sense. In pragmatism, personal interaction and a cooperative approach to the solution of shared problems are a foundation of social life and directly contribute to the growth and wellbeing of the involved individuals. Certainly, the sharing of data for purposes such as the advancement of medical research fulfils some of our obligations towards others, but does not contribute to the creation of personal bonds and formation of communities – in most instances, users in no way engage with others by passively contributing to the data sets and they certainly do not engage with those who might reap the benefits of that contribution in the future (e.g., patients undergoing treatments developed with the help of data). Moreover, this kind of data sharing is not cooperative, at least in the Deweyan sense. Users pool resources and delegate actual work and responsibility to a trusted third party rather than coming together through shared work and deliberation. In this sense, the sharing of data is more akin to the mechanisms of representative democracy (which Dewey recognised as important but insufficient, see Honneth, 1998) rather than the cooperative democracy I characterised as one Dewey's ethical ideals.<sup>62</sup> A political entity that can arise through the sharing of data would not constitute a public in the Deweyan sense, as it would passively delegate the furthering of its interests to third parties instead of getting directly involved in political action and advocacy.

It is true that many self-tracking practices are oriented towards others (through data sharing and other means, see for example the attempts to quantify attention devoted to others described by Nafus & Sherman, 2014) and express some instincts of care, but it does not mean that self-tracking itself is an inherently pro-social and caring practice, despite what some seem to be suggesting (see chapter 3, section 3.1.3). It is far more likely that self-trackers use the tools at their disposal in a social and caring manner. The habits prompting them to do so are not products of self-tracking but exist antecedently to the practice and are merely operationalised through it (as they would be in all kinds of contexts).

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<sup>62</sup> Of course, the aforementioned platforms for the sharing and *discussion* of data are not susceptible to the criticism expressed in this paragraph, but support groups for patients were not created alongside self-tracking technologies – they have existed for as long as people have had to cope with illness. Metrics supplied by apps and devices are an invaluable tool for these communities, but they are not an essential part of their activity.

In fact, I argue that some features of self-tracking are particularly problematic from the perspective of sociality and care – in many ways, the devices actively prompt users to transact with others in ways that are not in line with the ideal of continuing, *inclusive* growing. As I demonstrate over the remainder of this section, this could be largely blamed on the distance between interacting users and the impersonal nature of datafied interactions.

It is doubtful whether self-tracking provides a meaningful way to encounter other people and not their data doubles. The experience of the COVID-19 pandemic has clearly demonstrated the importance of in-person interactions for our overall wellbeing. The indirect interactions offered by self-tracking device can, at best, be an extension of traditional engagement with others and not a viable alternative to it. In other words, it would not be possible for me to offer others through self-tracking the kind of attention that would constitute adequate engagement and recognition – in terms of direct contact, self-quantification offers even less than a Zoom call and can only accompany rather than replace other forms of interaction. Moreover, even if self-tracking can allow us to engage with others at all, this engagement would be limited chiefly to other users (and arguably to similarly active users). It seems that the practice can facilitate transactions only with a narrow community, if at all (see Sharon, 2017).

At the same time, encounters with data doubles are problematic from an ethical standpoint. Translation of a person's characteristics into numbers reduces that person to a definite set of metrics, which mirrors the problems already discussed in the previous section. Despite my best intentions, data will largely determine my knowledge of and attitudes towards the person I encounter (assuming I can only refer to data and not, e.g., direct interactions), which might limit that person's ability to shape and adopt their chosen identity – they might struggle or decide to conform with how self-tracking makes others perceive and evaluate them.

Moreover, self-tracking might have the adverse effect of closing me off from the specificity of others' experience, especially if that experience is not or cannot be (easily) quantified. This has important implications for the overall shape of relations towards others fostered through self-tracking. As some identities and perspectives are not easily captured through data, self-tracking technologies cannot express the diversity of users' needs, desires and circumstances. This raises doubts upon the purported empathy-increasing potential of self-quantification. While it is certainly the case that paying attention to what *does not fit* within the practice can make users more mindful of the

situations of others, self-tracking itself limits the range of perceptible features and characteristics. In this case, any potential benefits are the results of savvy users working against the default make-up of the technology. Here again, the reactive notion of care discussed by Kristensen et al. (2021) seems particularly apt – users feel a need to work together because of self-tracking, but not *thanks to it*.

Additionally, the digital smugness discussed in the previous section is certainly problematic in line of the ethical ideals found in Dewey's philosophy. As noted by Gabriels and Coeckelbergh (2019), the sharing of self-tracking data in the form of leaderboards and comparisons encourages users to treat others instrumentally – as yardsticks useful only for the evaluation of one's individual performance. This is hardly in line with the notion of *inclusive* growing and is certainly not cooperative. Rather, it promotes anti-social, individualistic instincts that are easy to condemn from the pragmatist perspective. The social features embedded in self-tracking apps work predominantly in the interests of an individual and encourage that individual to value others only insofar as their input is relevant to one's own experience with the app or device.

Finally, current literature does not discuss the duties and obligations towards others that arise alongside self-tracking practices. It would be certainly possible to advocate in favour of a duty to share data, especially for altruistic purposes such as medical research, but the current political-economic landscape of self-tracking makes me wary of all forms of data sharing. As I discuss in chapter 7, the circulation of data has an extractive character and lies in the interests of technology companies rather than the users (see also Ajana. 2018). It directly transfers power from users and increases the companies' ability to generate profits (without adequately compensating those who created the data in the first place). Instead, I would like to briefly discuss the obligations and responsibilities towards others arising in relation to habits mediated through self-tracking.

In my view, it is hardly possible for users to assume responsibility for the dispositions and ideas created through self-tracking technologies that impact other people (e.g., those discussed in this section, such as the reductive perceptions and attitudes fostered through quantification, or the instrumental treatment of others encountered through leaderboards). This is not to say that they should not be expected to do so. In pragmatist terms, people have a duty of ensuring that their habits are beneficial to the growing of others and enable the satisfaction of the needs and desires of others. The wellbeing and flourishing of others should be an important consideration during the process of dramatic



rehearsal and should co-determine the habits considered as viable in the given circumstances – this is, in essence, the meaning of the ideal of continuing, *inclusive* growing.

However, as I extensively discuss in chapter 5, habits instilled through self-tracking are hardly reflective and users have a limited ability to shape the dispositions they adopt with the help of their apps and devices. This is not to imply that the blame for potentially harmful habits instilled through self-tracking should fall exclusively on the developers. Rather, the limited reflectivity of habits produced through self-tracking makes it impossible or at least highly difficult for users to fulfil their interpersonal obligations as they cannot fully respond to their responsibilities regarding the impact of their habits on others. Nevertheless, they still ought to bear some responsibility even for the habits of which they are not fully aware or which they cannot fully control. Since self-tracking reduces our ability to transact with others in ways that are beneficial to them, the ideals of continuing, *inclusive* growing and democracy should make us think twice about picking up self-tracking in the first place and encourage us to change the terms in which self-tracking technologies render others and make us encounter them. As I noted in the introduction to this chapter, transacting with others carries certain ethical obligations and the opaque and inflexible nature of self-tracking technologies does not absolve users from the duty to meet them.

#### **4. Transactions, democracy and solidarity**

In this section, I discuss whether self-tracking can serve as a platform or a tool for cooperation. If self-trackers are able to recognise the interests and problems they face together, self-tracking can be understood as a public-making tool and serve some democratic and solidaristic purposes.<sup>63</sup> Even though in the previous section I was sceptical that genuine engagement and community can arise from self-tracking on its own, the practice can still be beneficial in specific contexts.

Members of the QS movement as well patients tracking together to facilitate the management of their disease certainly use self-tracking to tackle specific problems, potentially even forming something at least resembling a public by meeting to discuss

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<sup>63</sup> I use the notion of solidarity as a productive interpersonal relation. Whereas I follow Kristensen et al. (2021) in characterising care as a reactive attitude aimed at shielding others from problems, I take solidarity to be a proactive attitude expressing the willingness to work with others to secure a mutually desirable outcome.

and further shared interests. Moreover, the aggregation of data, even if not cooperative in the strictest sense, can contribute both to the public and the individual good (e.g., by resulting in more accurate recommendations or supplying researchers with valuable information). In this sense, despite being ambiguous or even harmful in the context of the most basic transactions between individuals, self-tracking can still provide discernible benefits to specific communities or the public when used as a tool or platform for cooperation. However, as I demonstrate in this section, some of the features of self-tracking are incompatible with Dewey's notion of democracy as they limit users' ability to shape and direct the socio-political initiatives they mediate.<sup>64</sup>

First, despite the interpersonal dimension of self-tracking, the deployment of quantification technologies has been often (and accurately) criticised as individualising responsibility (see chapter 3, section 3.2.1). According to this view, the attainment of some socially valuable goals, such as provision of healthcare and promotion of public health, is reframed with the help of self-tracking as predominantly within the domain of individual efforts rather than being a prerogative of the wider community or the state. Arguably, this tendency is present in all facets of self-tracking and as I already noted (chapter 3, section 3.2.1), the practice has been justly criticised for promoting and replicating a neoliberal worldview. Users are encouraged to take greater responsibility over their habits and manage different metrics precisely because specific behaviour changes are imagined as within the power of an individual and achievable through local interventions. A large part of the discourse surrounding self-tracking seems to be effectively diminishing the value of cooperation, at least on the socio-political level. The wider institutional and material contexts and their influence over the tracked metrics are rarely mentioned outside of critical and academic articles. The self-tracking community (e.g., the QS movement), as well as the marketing surrounding the practice discusses the individual both as the agent and the subject of change. At most, the sharing of data is mentioned as a way to optimise and coordinate different individual efforts, but initiatives in which self-tracking is used to advance shared or political goals in a cooperative manner are scarce and motivated by factors external to self-tracking. For example, Lupton (2016b) discusses the use of self-tracking data on mobility in the context of urban

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<sup>64</sup> In addition to discussing this problem from the perspective of cooperative democracy, the current section is meant to serve as a bridge to the next chapter which tackles the issue of distribution of the benefits and burdens created through self-tracking. The notion of control over self-tracking and the socio-political processes it mediates will reappear there when I discuss the distribution of power (see chapter 7, section 5).

activism – people use the data on their walking and cycling patterns to motivate policy changes and influence how urban infrastructure is constructed. However, even this example portrays activists who treat self-tracking as another tool available in their pursuits – their pro-social and cooperative activity has been facilitated by self-tracking, but not established through the practice.

Second, self-trackers banding together for a shared purpose face a significant limitation as they possess little control and insight into the infrastructure that makes their cooperation possible. A community or a public using self-tracking as one of its platforms for communication and activity is largely dependent on the whims of the developers, whose interests often differ drastically from those furthered by the users (as technology companies are chiefly motivated by profit). Bottom-up initiatives started with the help of self-tracking devices might quickly find themselves at a loss while trying to backup vital data or glean how some crucial features and metrics are communicated and distributed among the user base. Some scholars have previously argued that the community arising through self-tracking might be akin to communities arising in the workplace since communal tracking is in many respects similar to shared labour – by tracking, users produce a resource that is later aggregated and exploited by the developers and third parties (see Till 2014 and my discussion in chapter 7).<sup>65</sup> However, in many countries workers are capable of achieving some institutional independence from the company structures by forming a union (thus also gaining some ability to influence the organisation of and decisions within their workplace). Currently, users of self-tracking technologies have no institutional means for increasing their influence over the infrastructure on which they depend<sup>66</sup> and there are no legal tools they could use to have their interests recognised. In many respects, self-tracking technologies are governed in a despotic manner and “the power of the people” has little bearing on the decisions surrounding the infrastructure of self-tracking.<sup>67</sup> I will return to this discussion in chapter 7.

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<sup>65</sup> This comparison is particularly interesting in the context of workplace tracking. Workers are sometimes encouraged to track and contribute data to their employer under a workplace wellness scheme nominally meant to improve employee wellbeing (e.g., by promoting physical activity). At the same time, research shows that employers are more likely to introduce such schemes in the hopes of increasing productivity rather than out of concern of employees’ interests. Moreover, workplace tracking is often mandatory (e.g., in Amazon warehouses) or only semi-voluntary (i.e., workers are technically free to abstain from tracking, but at the risk of being labelled uncooperative or not a team player).

<sup>66</sup> For example, the means of communication between one another or the tools for producing data over which the community bonds.

<sup>67</sup> I am of course referring to Elizabeth Anderson’s (2017) argument that most workplaces, at least in the United States, should be characterised as private governments ruled in a despotic manner. In my view, such characterisation is also applicable to self-tracking technologies as outside of some pieces of regulation

This lack of political and material sovereignty of the communities formed through self-tracking is problematic also in the context of the ambitions of technology companies to reach beyond their traditional domains and have a bigger influence over various aspects of our lives. I already mentioned that self-tracking is now commonly being used in contexts such as fitness, healthcare, insurance and the workplace. In addition, elderly care (e.g., through fall detection), education (e.g., in PE classes and mental health counselling), childcare (e.g., child-tracking apps meant to increase safety, see Gabriels, 2016) and many other areas are currently being targeted as “standing to benefit” from the introduction of some self-tracking tools.<sup>68</sup> The saturation of different aspects of our lives with untransparent and undemocratically governed self-tracking tools would reduce the influence we currently have in these contexts and limit our ability to self-organise in order to cooperatively answer the problems arising within them. While on the surface the narratives surrounding self-tracking – data-sharing, community of self-trackers, democratisation of healthcare – sound appealing, they are in fact suspect and could be described as a form of solidarity-washing of these technologies. As noted by Ajana (2018), greater circulation of data and embedding of technology in different walks of life are predominantly in the interests of technology companies who prey on our pro-social attitudes in an attempt to make these features more palatable and uncontroversial. However, if we follow pragmatism in evaluating the content and not the mere existence of interpersonal references embedded in self-tracking, the purportedly pro-social and community-forming aspects of the technology quickly show their darker side.

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(often hardly enforceable), technology companies wield absolute power over self-tracking tools (even though these tools are technically a property of the users!).

<sup>68</sup> Big tech companies expend considerable resources to popularise tracking in sectors perceived as valuable – companies such as Apple, Google and Amazon all attempted to integrate their devices within healthcare contexts, while simultaneously discussing these moves as motivated by public health and user empowerment (Gartenberg, 2019; Fowler & Kelly, 2020).

# Chapter 7. Distribution

## 1. Introduction

Imagine a company largely depending on unpaid, volunteer labour. The workers are required to pay for the tools used to produce commodities, which are then sold and used by the company. In exchange, the company promises that whatever it does with the commodities will sometimes benefit the workers. Does this seem unfair? But what if the workers were required to pay a monthly fee to maintain this relationship or if an optional fee guaranteed them greater access to the promised benefits? And what if the company found a way to make the workers perform labour even through their leisurely activities? What if they could also work in their sleep?

I would expect that most of us would dismiss this business model as inherently exploitative and unethical. In fact, it would not be uncommon to find a similar social arrangement in a dystopian science-fiction novel. It is difficult to believe that anyone would agree to these terms of employment or continue to produce value in such unfair conditions.

And yet, millions of people contribute to this business model every day by installing self-tracking apps and wearing various devices designed for quantified data collection. Although the description from the first paragraph may seem tongue-in-cheek, it is not exaggerated. Most self-tracking companies profit by extracting, using and selling user data without offering any monetary compensation. In fact, money usually flows in the opposite direction, as the users contribute to the bottom lines through hardware purchases and premium subscriptions. In this sense, the access to and ownership of user data can merely seem like an added bonus, but it is an integral, if not the primary element of the business model underlying self-tracking technologies. Admittedly, users do receive various benefits by engaging in self-tracking (e.g., processed data or personalised recommendations), but the extraction of data is not necessarily seen or presented as part of the transaction. Rather, companies put significant effort into obscuring what happens with the data and who stands to benefit from it.

This chapter aims at answering a seemingly simple question: how fair is this? Although various authors have already discussed self-tracking from the perspective of labour (e.g., Lupton, 2016a; Till, 2014), value extraction (e.g., Crawford, et al., 2015, Lupton, 2015a), and ownership (e.g., Ajana, 2017, Neff & Nafus, 2016), existing

literature does not present an in-depth discussion of self-tracking in the context of justice. Consequently, in this chapter I catalogue the kinds of benefits and burdens that are produced through the practice, as well as their distribution among the stakeholders.

In section 2, I discuss how data produced through self-tracking is distributed between the users and self-tracking companies, and argue that inequalities in access to and control over data lead to other inequalities. Consequently, section 3 is devoted to an analysis of the distribution of profits derived from self-tracking, section 4 deals with epistemic inequalities and data-based knowledge, and section 5 covers power imbalances resulting from the use of self-tracking technologies.

In section 6, I discuss the inequalities that arise between users, for example, through unequal access to the benefits offered through self-tracking, as well as the compounding effects that the use of self-quantification can have on structural injustices (e.g., which manifest themselves in unequal access to healthcare or social services).

It has to be noted that I do not work with a substantive notion of justice in this chapter. I already noted in chapter 4 that my Deweyan approach cannot serve as an ideal theory, and argued that from a pragmatist point of view, an analysis of justice should proceed in a bottom-up manner, that is, start with the identification of existing injustices rather than a discussion of general principles.<sup>69</sup>

At the same time, Dewey's ethics is neither arbitrary nor toothless when it comes to justice. The ideal of continuing, inclusive growing entails a concern for the experience and development of others – on its basis Dewey himself often argued in favour of an equitable distribution of wealth and resources, as well as a social division of labour that would positively contribute to the wellbeing of all (see chapter 4, as well as Honneth, 1998). Moreover, the ideal of democracy requires equal opportunity of participation in social practices, as well as equitable distribution of agency and responsibility among the members of the public that would provide them with genuine influence over socially vital institutions.

In places, I put forward similar positions to those found in Dewey's works (e.g., a criticism of the contemporary capitalist economic system) which should not be surprising as my analysis proceeds from the same ethical commitments and many of the issues

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<sup>69</sup> Arguably, the analysis of self-tracking from the standpoint of justice could be performed even without a sophisticated philosophical method. The inequalities between the users and companies supplying self-tracking technologies are so stark as to be self-evident. However, the pragmatist approach of identifying injustices in a bottom-up manner is particularly well suited for the task of cataloguing these inequalities.

discussed by Dewey have not yet been addressed, with some even increasing in severity (e.g., inequalities of wealth). However, my analysis is not a reiteration of points made almost 100 years ago – building on the same foundation, I develop an argumentation consistent with Dewey’s philosophy but update it to fit the contemporary technological, political and economic landscape. In this way, the ideals of continuing, inclusive growing and democracy can serve as a tool for the criticism of unequal wealth, labour and power relations surrounding self-tracking.<sup>70</sup>

## **2. Distribution of data**

Data is the main problem in this section, and it shapes other inequalities (i.e., in profits, knowledge and power) arising between self-tracking companies and users. Although self-tracking technologies are typically marketed as designed for data collection, from a business perspective (and from a justice perspective adopted in this chapter) they might be more accurately described as technologies for data extraction. It is common to discuss the information created through self-quantification as user data, but it is data describing the users and not belonging to them. In fact, authors have already argued (see chapter 3, section 3.2.3, and specifically Ajana, 2017; Arora, 2019; Neff & Nafus, 2016) that the concept of ownership is a woefully inadequate means of describing the relationship various stakeholders have to user data. Effectively, users are the source of data, not its owners. By default, it is the company that developed the means of extracting a particular data set that controls its storage, access, use and potential sales.

Even if we insist on ascribing data ownership rights to a particular user and invoke clauses found in legislation or terms of use documents, that user’s ability to exercise their rights is limited. In fact, it largely depends on the enforceability of legal instruments and the good will of the developers.

The EU’s General Data Protection Regulation is arguably the strongest legal

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<sup>70</sup> Some readers may notice that many of my arguments echo or are compatible with those that could be made by Marxists and critical theorists. Arguably, a Marxist approach or one rooted in critical theory might make for a more intuitive basis for the analysis I put forward in this chapter. However, Dewey’s philosophy itself provides a rich foundation for a critique of capitalism as he was a socialist thinker, even if his concepts and political reference points remain rooted in the context in which he wrote (i.e., mid-twentieth century US). Nevertheless, many, including me, take him to be a much more radical thinker than commonly assumed and his political analyses can be linked to the work of Frankfurt school philosophers (as demonstrated by my references to Axel Honneth throughout this dissertation). At the same time, my reliance on Dewey was also motivated by a desire to adopt a single and consistent theoretical lens that could be applied to the entirety of the analysis presented in this dissertation. By focusing on Dewey rather than on, e.g., critical theory I can present a political critique as well as discuss habit formation in detail.

mechanism for data protection and it also discusses data in terms of control rather than ownership. However, it recognises that in reality control over data belongs to the companies processing it, not the users (see Wong, 2021 for an in-depth discussion of the notion of data controller). Although the so-called “data controllers” have certain obligations in regards to data subjects and the data subjects have rights of their own (as conveniently listed by Hintze, 2021), GDPR merely limits the companies’ control over data rather than giving it back to the data subjects. Moreover, the mechanisms it introduces are not being adequately enforced.

Local data protection authorities have differing standards for the enforcement of GDPR and many technology companies strategically base their operations in notoriously lax countries. According to a report by the Irish Council for Civil Liberties (2021), 98% of major cases sent to the Irish Data Protection Committee remain unresolved. However, the same report also noted that EU-wide decisions made by the European Data Protection board result in fines or orders to stop processing less than half of the time. Moreover, it is common for technology companies to transfer user data to jurisdictions with less demanding data protection standards (such as the US), even though this happens in clear violation of GDPR (Privacy International, 2019).

Users can also find little solace in developers’ own privacy policies and terms of service documents, as these are notoriously vague and incomprehensible even for people with a legal background.<sup>71</sup> Arguably, this lack of clarity is by design (see Danaher et al., 2018b for a version of this argument) as it allows companies a greater degree of control over the ecosystem in which data is extracted, while also providing them with nominal user consent for the secondary use and sale of data that underlies most business models in self-tracking.<sup>72</sup>

For these reasons, the extractive model of data governance effectively deprives the users of control over the data generated through their engagement with self-quantification. However, the companies’ effective control/ownership over self-tracking data is not well justified beyond being a default feature of the adopted business model.

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<sup>71</sup> Anecdotally, every conference on data protection and privacy has at least one lawyer claiming that despite their training, they neither read nor understand these documents. The New York Times’ reporting by Kevin Litman-Navarro (2019) is a good example of just how unintelligible privacy policies typically are.

<sup>72</sup> Moreover, it was recently uncovered that even if some companies ostensibly allow users to opt-out of tracking and data collection features, relevant checkboxes seem to have little impact on the actual amount of data extracted (see Germain, 2022 for reporting on Apple’s seemingly non-functional tracking opt-out boxes).



Even if we conceptualise data as a product of users' labour or as a good exchanged for services, it is still worth asking questions about fair compensation or reasonable and negotiable terms of exchange. However, these discussions never have a chance to materialise, as self-tracking data is simply handed over to the company that extracts it.

The understanding of user input as labour makes it possible to conceptualise data as co-created by the users. While it would be common to assume that under capitalism the goods should belong to those that own the means of production (i.e., the digital infrastructure that makes the collection and processing of data possible), it would be shortsighted to overlook both the amount of effort expended by users to produce the data, as well as their personal entanglement with it. Users are active participants in the processes of data production and they approach it with specific expectations, needs and desires (ranging from a need to monitor one's health to a desire to learn more about one's body). A just distribution of data and associated benefits should recognise the claims of *all* parties responsible for the creation of data, rather than privileging the perspective of the more influential entity.

I propose that the ethical assessment of the distributive dimension of self-tracking should once again refer to Dewey's ideals of continuing, inclusive growing and democracy. Dewey's criticism of tedious, mechanical labour under capitalist conditions, as well as his outrage at the unequal distribution resources within the capitalist mode of production (see my discussion in chapter 4, section 3.2) provides great guidance on how these ideals should be reflected in distributive discussions.

First, the ideal of continuing, inclusive growing entails that all members of the society should have access to the resources necessary to satisfy their needs and desires, to the extent that it does not deny a similar opportunity to others. In the context of self-tracking, the low agency over the data and its associated benefits deprives users of the ability to consciously shape the habits produced through self-tracking – as I discuss in more detail in chapter 5. A data governance regime which transfers control over a socially valuable tool to a narrow group of actors guided by the profit motive is likely to promote particular interests at the expense of the experience of others – thus violating the principle of inclusivity. Still, even if a centralised and unaccountable institution (such as a private self-tracking company) distributed some amount of data among other involved stakeholders, users would still be largely deprived of the opportunity to guide their growing in a self-directed manner (since, as I discussed in chapter 5, their habits would be strongly influenced by those that control the means of habit formation).

Second, as demonstrated by Honneth (1998), the cooperativeness inherent in Dewey's democratic ideal should extend to the social division of labour and guarantee people adequate participation and desirable occupations within the processes of production. Dewey was critical of the capitalist division of labour that delegated workers to routine, thoughtless tasks, while leaving the decision-making in the hands of factory owners (see Dewey, 2008, pp. 374-377). A data governance regime in which data and associated benefits are managed and distributed without input from all the parties participating in their creation lies in stark contrast to Dewey's democratic ideal. Instead, the involved stakeholders should revise their desired distribution of data as required and share the required efforts in a cooperative manner.

In the next three sections, I discuss specific data-derived benefits in more detail by pointing out how they fall short of Dewey's ethical ideals. Furthermore, the notion of cooperativeness and democracy will help me in evaluating alternative data governance regimes that should be employed in the domain of self-tracking (see chapter 8).

### **3. Distribution of profits**

In many contexts, self-trackers are positioned as customers and the companies' profit is justified through the sale of a product or the provision of a service. Many users will first encounter their platform for self-quantification by purchasing dedicated hardware or a smartphone app. On the surface, this seems like a typical consumer decision (money exchanged for a product), but hardware and software sales are not the only profit driver behind self-tracking (and, arguably, they cannot support a sustainable self-tracking business model on their own, as the processing of data requires continuous expenditure of resources and labour). Instead, many firms depend on other revenue streams such as subscriptions, associated product purchases (e.g., the Apple Watch has to be connected to an iPhone and integrates with other Apple services and devices), App Store cuts, as well as data sales and advertising. Although my main criticisms will be leveraged at the latter category and the distribution of profits associated with it, it would be worthwhile to briefly note some concerns raised by the other revenue streams.

First, subscription fees attached to self-tracking technologies often lock out important features without necessarily impacting the scope of collected data. In these cases, subscription fees are charged on top of the profits extracted through data sales and advertising, while offering functionalities that should have been a part of the product in the first place. Moreover, the expectations and standards associated with self-tracking

can be a source of anxiety for emotionally vulnerable users (as already noted in chapter 5). Fitbit's business model exploits these feelings by offering the ability to change daily target exercise scores (or take a day off from exercise without impacting long-term metrics), provided the users pay the premium subscription fee (which, incidentally, does not preclude the company from selling user data).<sup>73</sup>

Second, the model of tying a self-tracking device to a wider ecosystem of tools and services is problematic when the device offers limited (or almost non-existent, as in the case of the Apple Watch) functionality without additional purchases, as it effectively locks out less wealthy users from enjoying the benefits of the technology. For example, despite Apple's above-average privacy protection practices, the combined cost of an Apple Watch and an iPhone means that many have to compromise and reach for cheaper, more invasive alternatives (I will expand upon this point in section 6). Moreover, such practices also limit the ability of users to tweak their set of devices according to their needs (in Apple's case, users are unable to install third party apps that are not hosted on the App Store or repair their devices on their own).

Third, Google's and Apple's practice of collecting a 30% cut of software and subscription purchases through a device built on their operating systems is not ethically worrisome on its own. However, the desire to maintain revenue from this stream could incentivise these companies to maximise user spending (e.g., through targeted ads and dark patterns) or disincentivise them from intervening in the cases of egregious profiteering on the part of partner developers (e.g., by abstaining from regulating the digital market if some offenders generate significant revenue).

However, while the above revenue sources can be justified as falling under the commonly accepted market model of consumer-provider relations, the selling of data and its use in personalised advertising is much more problematic. Privacy experts routinely remind consumers that if a digital good is free, then its users are probably the product. However, in the case of self-tracking it is perfectly common to pay for a product and still end up being one, as companies turn users into labourers and their data into a tradable commodity. The users' involvement in the creation of value (which some authors compare to unpaid digital labour, see Till, 2014) requires us to question the data

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<sup>73</sup> There are, of course, subscription-based companies operating at the other end of the spectrum. German fertility tracker Clue offers its basic functionality for free, but users can opt-in to the subscription model to receive more detailed statistics and analysis. In either case, no data is sold by the company. See the following statement from the company's CEO for more details (Tin, 2020).

extraction model as a whole.

From a pragmatist standpoint, the inclusion of users as active participants requires the recognition of their needs and rights in relation to the value produced through self-tracking. It is important to stress that no profit can be derived from data without users' activity. While some might be tempted to argue that users exchange their labour for services (i.e., data processing, personalised recommendations, habit formation), the existence of other revenue streams, as well as the unclear and non-negotiable nature of this transaction make such arguments problematic. Currently, Fitbit users are expected to pay for the device, subscribe to the premium service *and* still supply their data.

Moreover, the value of data extracted through self-tracking is incommensurable with the benefits offered by the technology. In an ironic twist, it would be difficult to quantify the value offered to the users and translate it to monetary terms, but the magnitude of profits that can be derived from data is not clear either. The market of personalised advertising is rife with speculation, which is best evidenced in the case of Fitbit. The company reported losses in both 2018 and 2019, but this did not stop Google from acquiring it in 2019 for 2.1 billion USD (Gartenberg, 2019).<sup>74</sup> Companies differ in their ability to extract value from data, with major advertising firms like Google/Alphabet being able to reap more profit (or gain more power, as I discuss in section 5). This limits the users' ability to assess the terms of the exchange,<sup>75</sup> and the obfuscated nature of the data extraction business model further problematises this issue. Users willing to calculate the fairness of the deal offered by self-tracking companies in exchange for their data would need to possess a significant degree of data literacy, and even then, not all of the relevant information would be available to them.

The ideals found in Dewey's ethics make the assessment of this business proposition rather straightforward. First, under the extractive business model, profits derived from self-tracking are used for the benefit of the shareholders, the company and its management, rather than the users (even though both groups could claim that they

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<sup>74</sup> Of course, the losses might be more of a clever accounting trick to avoid paying taxes, rather than indication of the company's actual performance. Nevertheless, the company's revenue also fell in each of the two years in question.

<sup>75</sup> Moreover, as Prainsack and Forgó (2022) point out, data extraction is problematic in terms of tax revenue. If the users "pay" for a service with their data, no sales tax is collected, which removes a layer of taxation that would have been present had the transaction been conducted with money. Similar form of tax avoidance occurs if we think of data extraction in terms of labour – paid workers would have be subject to an income tax, and employers would be required to pay social security contributions. Regardless of the framing, data extraction is a convenient way for the companies to reap profits without contributing to state revenue.

contributed to their creation). The ideal of continuing, inclusive growing would entail that the extraction of profit from users' everyday activity should contribute to the amelioration of the depth and the variety of their experience. Instead, users are exploited and alienated from the fruits of their labour and their experience often suffers as a result (see the discussion in chapter 5, as well as the argument about habituation in section 5 of the current chapter).

Second, the ideal of democracy requires that the users fully participate in and are able to shape socially important practices. In the process of (data) production, this could be reflected in their influence over the conditions of labour/value creation, as well as their ability to co-determine how the fruits of their labour are used and how the profits are distributed. Despite their productive involvement, users are excluded from decision-making processes surrounding the profits, which are managed in a unilateral way. A Deweyan point of view does not preclude the possibility of profiting from data, but assumes cooperation as a condition for just and equitable creation of value. Self-tracking companies expend resources and labour to maintain the infrastructure underlying self-tracking and to process the data collected from users. As such, they are entitled to compensation for their services. However, their desire for a year-to-year increase in profits should not be fulfilled at the expense of users' well-being.

#### **4. Distribution of knowledge**

Since data serves as a source of information, its unequal distribution can lead to knowledge asymmetries. As I discussed in chapter 5, typically users are only presented a fraction of the data collected by their self-tracking technologies, whereas companies have full knowledge of the contents of the collected data set, the methods of processing it, as well as the secondary inferences made on its basis (e.g., you might not have disclosed your gender or age, but it is possible to approximate these and other characteristics with the help of other data points). This is not merely an issue of transparency (as discussed in chapter 5), but a distributive problem. Inequalities in the distribution of knowledge can have significant impacts on self-understanding, credibility and power (see Coady, 2017, as well as section 5 of this chapter).

The advantage the companies have in the context of data-sourced knowledge is particularly evident in the persuasive and manipulative effects of targeted advertising and personalised recommendations. As users are not aware of the amount of information about them held by the companies, they can find themselves more susceptible to the

techniques employed in advertising and recommendations. Without knowing which preferences and tendencies are targeted, it is difficult to evaluate the purposes and rationale for a recommendation, and thus incorporate or reject it in an intelligent manner (in the sense of intelligence discussed in chapter 5). Conversely, those recommendations and advertisements that are based on potentially inaccurate inferences would appear to users as more credible than they really are, as the weakness of the connection between actual data and the supplied suggestions would not be readily apparent. In such situations, users might assume a level of accuracy that is not necessarily warranted by the underlying algorithms. However, the promise of personalisation and perceived relevance of the provided content gives an impression of reliability (similarly to how the scientific framing of data collection makes users think of self-tracking as accurate measurement).

Knowledge asymmetries are a source of concern in the context of healthcare (Kidd & Carel, 2017) and those arising through self-tracking are no exception. If a significant portion of patient monitoring were delegated to self-tracking devices, patients would end up knowing less about some of their symptoms, have a lower understanding of the procedures employed in the provision of care, and have their epistemic status further reduced in comparison to that of healthcare professionals (who are already epistemically privileged in the context of their relationships with patients).

Since a large portion of the collected data is not communicated to users, patients do not have access to relevant metrics, even though those are collected by their devices or even sent to healthcare professionals. Although during tests conducted with conventional medical equipment patients are similarly not always provided the entirety of the collected information, they are able to ask follow-up questions and demand explanations from healthcare workers. This is not the case with measurements conducted with the help of self-tracking as users are not given a chance to consult human professionals to gain more insight about their data – the company responsible for the app or device unilaterally decides which data should be communicated and how.<sup>76</sup>

This lack of information about one's data is further problematised by the lack of transparency already discussed in chapter 5. Patients self-monitoring their symptoms are unable to determine how exactly their data is collected and how the final results are calculated. This is concerning from an informed consent standpoint, as the secret nature

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<sup>76</sup> Even if healthcare workers help patients make sense of their data, their access is similarly gated off by the companies.

of the proprietary algorithms employed in self-tracking means that patients are unable to receive accurate and complete information about the procedures involved in their care.

The constant flow of patient data between self-tracking technologies and healthcare professionals would also limit patients' ability to deceive doctors (see Klugman et al., 2018). Although this may be objectionable, the possibility of controlling what information is communicated to healthcare professionals and how is an important aspect of patient autonomy and a way for patients to establish or preserve epistemic agency. Patients using self-tracking for the monitoring of symptoms would be less aware of the extent of the doctors' knowledge about their predicament and thus have a lower influence on the outcome of care.

Such reduction of patients' epistemic status is also connected to credibility deficits that could arise in the context of self-tracking data. I have already discussed that data is often treated as more objective and complete than embodied perception, and this can be problematic in the context of medicine, justice and access to social services. In cases where self-tracking data is transferred to relevant authorities, it would often be considered more credible than the testimony of users and other witnesses. Data from fitness trackers has already been admitted in court proceedings (e.g., to deny a user's insurance claim, see Gibbs, 2014, or to contradict a testimony on the basis of location data, see Moon, 2015), but it is possible to imagine that it could be used to determine eligibility for the provision of social services (e.g., similarly to how unemployment benefits are paid out only when claimants are actively looking for work, sick leave payments might be dependent on activity patterns reported through self-tracking). Such developments are concerning due to the low accuracy and biases embedded in self-tracking, as erroneous data or data reflecting some prejudices may be prioritised over users' statements in judicial and administrative decisions (not to mention the overall technological encroachment into vital institutions).

Consequently, from the pragmatist standpoint, the knowledge asymmetries created through self-tracking are ethically suspect as they limit users' access to potentially valuable and useful information (thus impacting their ability to reflect upon and shape their habits, as discussed in chapter 5), and prohibit them from fully participating in and co-shaping the practice of self-quantification. Due to the informational advantage held by the companies, users would find it difficult to identify problems arising in the context of self-tracking and propose solutions that further their interests. For this reason, the knowledge asymmetry resulting from unequal control over data reinforces the company's

grasp over the self-tracking ecosystem and renders the practice undemocratic.

## **5. Distribution of power**

The analysis of knowledge in the previous subsection touched on the issues of power by discussing how informational advantages are used by self-tracking companies to exert influence over their users. Knowledge is, of course, commonly discussed in philosophy as one of the facets of power (Foucault, 1977) and the literature on self-tracking widely refers to disciplinary and surveillance aspects of the technology (Lanzing, 2019; Sanders, 2017; Sharon, 2017). Similarly, the profits extracted from data help companies improve their market position, as well as increase their influence in many other areas (e.g., by purchasing or building socially relevant infrastructure, as discussed below). Most importantly, as observed by the sociologist David Beer (2018), metrics themselves exist as functions of power by creating and enforcing norms, and technology companies regularly exploit them to their advantage.

The well-documented privacy harms resulting from self-tracking (Gabriels & Coeckelbergh; 2019, Lanzing, 2019; Nissenbaum and Patterson, 2015) are problematic not merely due to the inherent value of privacy. The provision of real-time information on users' activity and location, as well as the opportunity to predict future behaviour on the basis of observed patterns makes it much easier for companies to manipulate and influence users. Much of the data collected by self-tracking technologies contains sensitive user information (relating, e.g., to daily movement patterns, medical conditions, or fertility) and can be abused by malicious actors. While data is commonly used to target users with ads and recommendations with the hope of directing their behaviour, there are legitimate concerns about power-hungry individuals and institutions using it to exert influence over users through other, more direct means. For example, following the repeal of the right to abortion established in the US by the *Roe v. Wade* decision, many activists prompted women to uninstall their fertility tracking apps as fertility data (available to purchase from data brokers) could be used by law enforcement and bad faith actors to target women who had abortions (Elliott, 2022).

Moreover, the process of habit formation itself can be abused to further the interests of the companies, rather than the users. The production of habits is desirable from a capitalist, profit-oriented perspective as users habituated to routine, predictable behaviour are more easily integrated into profit-making plans. For example, it is much easier to plan marketing campaigns around users who go for a jog every morning than



around those who do so in a haphazard manner (not to mention that the former produce data in a more reliable manner). Discussing the normative power of numbers, Beer (2018, p. 140) argues that metrics and standards are a very efficient means of (self)disciplining since as a result of quantification “the self shifts from being a site of potential to a site of limited possibilities”. Numerical descriptions not only present the current state of a phenomenon, but encourage people to keep their metrics within the ranges designated as normal.

Arguably, by influencing habit formation, self-tracking companies do not have to expend resources to analyse patterns in users’ data and adapt to them. They are able to promote the kind of behaviour that is the most desirable to them and hope that the users adapt to the algorithms. While recommendations to exercise by running or cycling may seem innocent and sensible to many users that receive them, their validity should be questioned when the company supplying them has business ties to firms producing running or cycling equipment, or if for various reasons it requires specific data points to further improve its knowledge or influence related to a particular type of activity (e.g., running in an urban context, or cycling in a group).<sup>77</sup> In this sense, the narrow set of standards and recommendations promoted through self-tracking discussed in chapter 5 is problematic also from a standpoint of justice, as (self)disciplining effects further entrench the power of actors already wielding disproportionate influence over the users. Any benefits offered to the users should be treated with suspicion, as the promise of empowerment is intertwined with the company’s incentives to extend its power and form easily governable/exploitable consumers.

Admittedly, it is questionable to what extent companies can manipulate the users, especially when we consider the general lack of efficiency of targeted advertising – it seems that people have simply learned to ignore ads (Hwang, 2020). Nevertheless, some persuasive effects are well documented in the literature on self-tracking and the norm-enforcing potential of the technology is a significant source of concern, especially when used to further the companies’ interest (as already noted in chapter 3, section 3.2.1, self-tracking seems to promote an ideal of a person predominantly focused on productivity and consumption, see Ajana, 2017 or Sanders, 2017).

The use of data to exert power is also fairly common in institutional contexts and the

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<sup>77</sup> In this context, Google’s purchase of Fitbit can be interpreted as the company’s attempt to expand into health data after its own initiatives such as Google Health and failed.

literature has already widely discussed the use of self-tracking to monitor employees and patients (Moore & Robinson, 2016; Gabriels & Coeckelbergh, 2019; Sharon, 2017). However, it is worth pointing out that by promoting self-quantification in healthcare, the provision of social services or private enterprise, self-tracking companies establish a degree of power within domains that would otherwise fall outside their reach. If a healthcare system depends on self-tracking technologies for disease prevention and management, this does not merely mean that companies supplying the tools gain access to valuable patient data. In such cases, these companies would be able to, at least indirectly, influence how healthcare is provided and how resources are allocated. For example, once hospitals reorganise to delegate a significant part of patient monitoring to self-tracking devices, a company could lock vital features behind a subscription fee. Alternatively, by shifting what metrics are reported to medical professionals and how it is done, a company could promote specific medical decisions over others. While such scenarios are extreme, it is worth stressing that despite being used in medical contexts, self-tracking devices are not regulated as medical devices. The companies supplying them are not obligated to provide accurate readings<sup>78</sup> and have fiduciary duties only in relation to their shareholders.

I understand this problem as another facet of the lack of control over infrastructure discussed in chapter 6, section 4. Here, the use of self-tracking in vital social institutions transfers power to privately owned companies and deprives affected communities (and the public as a whole) of the ability to freely and fully shape these institutions. Democratic governance of healthcare and social services would be complicated, if not downright impossible, if parts of the infrastructure on which these institutions rely depended exclusively on unaccountable, privately owned companies.<sup>79</sup>

It should not be surprising that I see the power relations embedded in and reproduced through self-tracking as incompatible with Dewey's ethical ideals. As I already hinted, concentration of power within a series of private governments is fundamentally undemocratic as it deprives the public of control over self-tracking technologies, consequently stifling public participation in their governance. Dewey's cooperative view

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<sup>78</sup> In fact, the metrics provided by such technologies are framed as predictions, not measurements (see Mussgnug, 2022 for a detailed discussion), which could be seen as absolving the developers from providing fully reliable readings.

<sup>79</sup> I am fully aware that this argument extends beyond self-tracking and should equally apply to private ownership of companies producing medicine and medical equipment. Both ideas are in line with my philosophical (i.e., Deweyan) and political convictions.

of democracy requires power to be distributed in a largely horizontal manner (concentrated only within publicly controlled institutions), and exercised as a result of public debate and in line with commonly shared interests and objectives. The political and economic model underlying the governance of self-tracking allows private companies to privilege their business objectives at the expense of the users and should be seen as contributing to the progressing concentration of power within the hands of technology giants.

Moreover, as I discussed in more detail in chapter 5, the potential for using self-tracking as a tool for manipulation is problematic from a perspective of growing as it undermines user autonomy and privileges the interests of a narrow group of stockholders over the experience of self-trackers.

## **6. Distribution of benefits and burdens between users**

In addition to the inequalities arising between users and companies discussed above, self-tracking technologies can also lead to inequalities in the burdens placed on various users and the benefits provided to them. Although some differences of outcome and effort across user groups that are likely to arise are largely unproblematic (e.g., because some users will engage in self-tracking to a much greater degree), unequal distribution of burdens and benefits is worrisome when it correlates with structural injustices already present in the society and adversely affects the already underprivileged groups. In this sense, self-tracking can serve as an obstacle to social justice and equity by creating new inequalities or compounding existing ones.

The material, temporal and cognitive cost of engaging in the practice is problematic in the context of the potential benefits offered by self-quantification (e.g., greater self-awareness, production of desirable habits), as well as the implication of the practice in the provision of healthcare and social services. Those who do not possess enough money, time or mental capacity required to fully engage in self-tracking are likely to be impacted by the practice to a lower extent, might have to compromise on some of the features (e.g., by purchasing devices with less advanced sensors), or accept other burdens in order to reap the benefits. For example, I already mentioned that the relatively high cost of purchasing an Apple Watch is additionally compounded by the requirement to connect the device to an iPhone. Less wealthy users are likely to compromise by purchasing a cheaper device that offers lower privacy protections and thus resign (perhaps unwittingly) to much more intensive extraction of data. Similarly, users unable to

purchase premium subscriptions are presented with less advanced metrics, whereas those who do not possess digital literacy to deliberate upon the data and recommendations supplied by the device are limited in their ability to control the habits produced through self-tracking.<sup>80</sup>

This is concerning, because underprivileged users are often in a much greater need of the behavioural interventions offered through self-tracking, as their relatively lower lack of control over their environment (resulting from, e.g., insufficient resources) is reflected in their habits. For example, the historian Rutger Bregman (2017) demonstrates that many differences in character between poor and wealthy people can be traced to the experience of chronically lacking money. Moreover, marginalised groups are more likely to be negatively affected when digital technologies are introduced in institutional contexts, such as healthcare. As argued by Sadowski (2020) people from underprivileged backgrounds are disproportionately more likely to have their access to vital social services regulated through their engagement with digital technologies such as self-tracking (e.g., in the form of interactive insurance policies that offer “reduced” pricing in exchange for data extraction).

At the same time, marginalised communities are more likely to experience adverse effects when self-tracking is used in institutional contexts as a cost-cutting measure. For example, if in-person consultations with doctors and clinical tests are replaced by self-monitoring, poorer patients would be unable to afford conventional care and would have to accept the temporal and cognitive burdens entailed by self-tracking for health. Although patient self-monitoring can potentially reduce health inequalities, for example by increasing access to care in remote areas, it could actually achieve the opposite effect when deployed without consideration of existing structural injustices.

In fact, self-tracking privileges the needs and perspectives of the dominant social groups and thus contributes to the “rich getting richer”. As marginalised users lack resources to fully engage with the practice, or have their circumstances and goals misrecognised by the algorithms (see Waelen & Wiczorek 2022 for a discussion in the context of women), white, heterosexual, male, able bodied and affluent users are presented with a platform much more adapted to their point of view and social status. In this sense, the non-diverse and demanding character of metrics and recommendations

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<sup>80</sup> And since digital inequalities strongly correlate with other inequalities (Van Dijk, 2020), such differences in digital literacy and associated impacts in habits are likely to compound existing injustices.

discussed in chapter 5 further widens the gaps between social groups. Although it is certainly commendable to achieve the elevated standards endorsed through self-tracking, many of those are unattainable to a large subset of users (due to injury histories, care responsibilities, etc.). In a way, the practice, as mediated by mainstream technologies, is elitist since it is focused less on the amelioration of the experience of a maximally diverse group of users and more on the promotion of narrowly defined excellence.

Overall, in its current form self-tracking negatively contributes to inequalities between users and fails to live up to the ideals guiding my analysis. First, the noninclusive nature of the technology privileges the experience and growing of a limited number of already advantaged users. Second, the monetary, temporal and cognitive cost of self-tracking limits the participation of disadvantaged groups in the practice, while the deployment of self-tracking in institutions (such as healthcare or insurance) limits the ability of marginalised users to gain access to and benefit from the services offered through these institutions. A discussion of the distribution of burdens and benefits among users demonstrates that in its current form, self-tracking has a negative impact on equality and does not contribute to social justice .

# Chapter 8. Recommendations

## 1. Introduction

Although many of the issues discussed in this dissertation may seem severe, many other technologically mediated practices enjoy a much greater popularity and have more significant social impacts than self-tracking. While concerns over autonomy, quality of social interactions, power dynamics or the compounding of inequalities between users should not be downplayed, these same problems are more pressing in the context of technologies that are more prevalent (e.g., social media platforms) or potentially more influential (e.g., artificial intelligence). Nevertheless, the ethical issues surrounding self-tracking should still be addressed and the lower prevalence of the practice, as well as the enthusiasm and organising efforts of user communities, may make far-reaching changes more feasible. In what follows, I propose recommendations that should be introduced on three levels: political decision-making and regulation, design and development, and use.

The pragmatist theoretical perspective adopted in this dissertation leads me to consider the functioning of technologies as multifaceted and resulting from a variety of influences. No single entity can independently determine how a technology should function nor can it unilaterally introduce changes in the technological landscape. As I noted in chapter 4, I take the meaning and outcomes of a technology to be created in use, and thus consider users as actively shaping the goals achieved through self-tracking, as well as the norms and values endorsed through it. However, even though this implies that designers do not have complete control over the eventual functioning of technology, design teams are still capable of embedding certain values in the developed technologies and enabling or cutting off potential use cases through their decisions. Finally, technologies function in a socio-political environment and their operations are largely determined by political, economic, infrastructural, and other factors. In this sense, regulation and political decision-making are also of great importance, as they can lead a technology in a specific direction, or bar certain possibilities altogether. For these reasons, I argue that any issues surrounding self-tracking relate to and need to be addressed by three kinds of parties involved with self-tracking: users, makers and regulators.

However, despite my emphasis on the bottom-up involvement of individuals, I do not believe that changes to self-tracking should be primarily implemented at the level of

the individual. I already noted that the intransparency of algorithms and the knowledge asymmetries resulting from the unequal distribution of data make it difficult for users to assess and consciously shape their practices of self-tracking. Moreover, individuals do not possess adequate power to enforce and demand change on the part of large technology companies. In a sense, these recommendations are put forward to change this state of affairs – to recognise and empower users and communities as co-authors of technology and the sociotechnical environment (cf. Coeckelbergh 2022).<sup>81</sup>

In the current socio-political climate, I consider political decision-making processes and regulation to be the main sources of change in the landscape of self-tracking. In Dewey's political philosophy, institutions are a means through which members of the public can forward shared interests (see chapter 4, and Dewey 2016 for a discussion of this process). Legislation introduced by national governments, as well as international bodies can have a great impact on the functioning of the technology, as well as the distribution of the benefits and burdens it entails. However, not all political entities are equally equipped or equally willing to address the issues raised in this dissertation. Although it would be certainly possible for any national government to introduce some of the regulatory measures I propose, smaller countries might find themselves at a loss when trying to negotiate with powerful multinational corporations or enforce sanctions. The great power amassed by companies such as Apple, Google, Amazon and many others means that the political actors capable of successfully challenging self-tracking companies in the regulatory arena might be limited to just the United States, China and the European Union.

On the other hand, the amount of corporate power and money entrenched in US politics, as well as the *laissez-faire* tendencies among American political elites (at least in the last 50 years), mean that the United States' government is not the appropriate target for my recommendations. And although China has proven efficient in limiting the influence of Western corporations within its borders, it, arguably, does so in an effort to entrench its own power over its citizens rather than to promote their rights and interests. Overall, due to its autocratic nature, the Chinese government cannot be seen as an

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<sup>81</sup> The arguments found in Coeckelbergh's (2022) book run parallel to many of the recommendations I put forward. There, he considers social change and orientation towards others as the appropriate alternative to the individualistic drive for self-improvement that is central to contemporary culture and technologies. My recommendations are similarly characterised by a belief in the value of community-oriented solutions and cooperation, although they are derived from different philosophical reasons and focus on a singular technology rather than AI technologies in general.

institution representing public interests, so it would be inconsistent of me to propose it as an appropriate agent of change within my pragmatist framework. Moreover, the Chinese makers of self-tracking technologies are just as ethically reprehensible as their Western counterparts, if not more so. Among other issues, Chinese state-controlled or state-influenced companies such as Huawei and Xiaomi also rely on unfettered data extraction, but they are much more likely to turn over users' information to an authoritarian regime.

In turn, the EU already has a track record of regulation that limits the power of technology companies and promotes user rights. Despite enforcement and conceptual issues surrounding GDPR that I discuss in chapter 7, the directive brought considerable changes to the data economy by introducing new constraints and mechanisms that significantly limit what companies are able to do with data. New initiatives such as the Digital Markets Act and Digital Services Act would further increase the standing of individuals and reduce power inequalities. Moreover, although EU regulation is binding only in 27 countries, other jurisdictions often follow suit and introduce a range of similar measures. For these reasons, I see the EU as the ideal target of my recommendations. Granted, some of my proposals would not be considered mainstream within the current political debate in the EU. However, the diversity of views expressed in the European Parliament, as well as the influence of the public on European politics mean that similar ideas could gain traction within the next few years and provide a real alternative to the current landscape of self-tracking (and other digital technologies).

Since I consider that many of the issues discussed in this chapter stem from the unequal distribution of data and companies' unilateral control over self-tracking technologies, my most important recommendations concern alternative data governance and business models that should be adopted to promote the interests and the well-being of actors beyond the narrow group of technology companies. Of course, the adoption of these recommendations would pose a practical problem, as well as a political one. A lack of political will on the part of decision-makers and opposition from technology companies would influence whether and in what form the proposed changes would be introduced. Consequently, while I see the greatest opportunity for change in democratically-run legislative and governance procedures, I also propose more general recommendations aimed at self-tracking companies that would ensure a more ethical functioning of self-tracking technologies – also in the absence of relevant regulations. However, since some of these proposals would run contrary to the business and other



interests of these corporations, I am not entirely optimistic that they will be readily accepted. In the meantime, I provide some suggestions for users on how to engage with self-tracking in a way that would minimise the ethical risks discussed in this dissertation and grant them greater awareness of and control over their practices. As Neff and Nafus (2016, p. 96-103) already presented a good practical guide for using self-tracking for habit formation, I only focus on suggestions that could help users make their habits more reflective and flexible, as well as increase the quality of their transactions with others.

In what follows, I divide my recommendations into three sections: recommendations aimed at regulators (mainly the EU), technology companies, and individual users.

## **2. Recommendations aimed at regulators**

### *1. Disentangle profit-seeking from social institutions and create publicly owned platforms*

The pervasiveness of the data extraction model dominating the landscape of self-quantification can be attributed to the unchecked profit motives pursued by self-tracking companies. Similarly, the unilateral control over self-tracking that is a source of many other issues discussed in this dissertation can be directly attributed to the private ownership and governance of these firms. In this sense, I would be remiss not to connect the problems outlined in my analysis to capitalism. Capitalism can be seen as the root of many of the issues plaguing our society<sup>82</sup> and in recent years many authors connected the ills of capitalism to the deficiencies of contemporary technologies (see, for example, Coeckelbergh, 2022; Zuboff, 2019). The discussion I present in chapter 7 illustrates how capitalist profit-seeking and exploitative tendencies have also had a negative impact on self-quantification.

However, even though it would be possible to present capitalism as the main culprit, a complete restructuring of the ruling socio-economic order would by no means constitute an actionable and practical recommendation or one that falls within the scope of this dissertation. Moreover, anticapitalist sentiments are not readily expressed by leading EU politicians, so it would be unwise to expect them to adopt such drastic measures.

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<sup>82</sup> Although Marxist critiques of capitalism are the most prevalent in philosophical literature, anticapitalist positions are also consistent with pragmatism. Dewey considers capitalism to be an undemocratic system and argues that “the greatest obstacle that exists to the apprehension and actualization of the possibilities of experience is found in our economic regime.” (Dewey, 1998a, p. 26)

At the same time, I still argue that profit motives should be divorced from the provision of socially necessary services. Self-tracking technologies offer real benefits when used in healthcare (and could potentially offer benefits when used in the context of social work, for example to stimulate physical activity among those needing it the most), but when they are delivered by for-profit private companies, they commonly serve as a tool for the extraction of rent (in the form of data) and entrenchment of corporate power in public institutions. Typical medical equipment can be owned and controlled by a hospital, but when self-tracking technologies are purchased, manufacturers retain near-absolute control over their functioning – they are able to continuously extract data from the users and can shape what information is collected, presented and used, as well as determine how and why this happens (which also leads to problems of an epistemic nature resulting from the lack of transparency of the devices).

For this reason, I suggest that when self-tracking technologies are involved in the provision of public services (e.g., healthcare, elderly care or social benefits), they should be manufactured and controlled by publicly owned institutions. This would ensure adequate democratic oversight over their design and deployment, while also enabling the state to regulate access to health-related (and other) data that is vital for medical research and the provision of care. Although such an endeavour would be costly and challenging, many states already invest in public healthcare infrastructure and fund research and development of medical devices. By bringing self-tracking under democratic governance, the public would be able to ensure that potentially life-saving tools are not appropriated by private actors for the purposes of parasitic rent extraction. Moreover, the promise of patient empowerment would be easier to fulfil if the benefits offered through self-tracking would not have to be undermined by a desire to increase profits.

## *2. Promote and mandate alternative data governance models*

Although the data governance model in which control over data belongs to the company processing it is all-pervasive in the world of self-tracking (and within other data-intensive technologies), alternative stewardship of data is possible and, as I argue, much more ethically desirable. For the purposes of this argument, I discuss three potentially viable data governance regimes – individual stewardship of data, data trusts, and data cooperatives – and outline their compatibility with Dewey’s ethical ideals.

### *A) Individual stewardship of data*

Instead of storing self-tracking data in a central database managed by a company that designed the tool for its collection, it would be possible to store the data locally on a user's device or in user-managed online data stores. Advocates of individual data stewardship have already created a technology of Personal Data Stores (PDS) which would enable the individuals to remain in control of their data, while also facilitating the sharing of information with interested third parties (Kirkham et al., 2013; Janssen et al., 2021). With the help of PDS and associated interfaces, users can review their data and manage third party access. Such a solution is admirable from the perspective of user autonomy and enables data subjects granular control over their privacy. Moreover, it does not preclude the use of data in research, advertising or recommender systems, but rather empowers users to consciously choose who is able to reuse data and for what purposes, as well as demand fair compensation. PDS are particularly relevant for the enforcement of privacy policies accepted by the user as they could be set up to authorise only the release of data to which the user consented.

However, I doubt whether individual stewardship of data is a viable solution. Data of individual users is not particularly valuable and only becomes useful when aggregated into larger data sets – it is estimated that an individual's personal data is worth at most 1 to 10 USD (Malgieri & Custers, 2018), which raises doubts over the feasibility and desirability of individually managing one's data.<sup>83</sup> Moreover, even if users were to demand compensation for the use of their data, an individual's bargaining power is greatly limited in comparison to that of large-scale actors such as technology companies. Negotiations of agreements would also be time consuming, which would be especially problematic for non-profit actors (such as research bodies) who are already in dire need of resources and might find it difficult to coordinate data release with thousands of isolated individuals. At the same time, users themselves might be less willing to actively manage their data due to the required temporal and cognitive commitment.

Moreover, this solution would be less than desirable from a Deweyan standpoint as it promotes an atomistic and self-concerned perspective on the part of the users. Individual stewardship of data is meant to empower *individuals* and fails to recognise the potential for cooperation in the context of data management and reuse. Moreover, when

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<sup>83</sup> It is worth noting that the calculation presented by the authors takes into account only the revenue related to advertising. The persuasive effects and power related from data are arguably much more valuable, if impossible to quantify. Moreover, market negotiations between users and data-driven companies might result in much higher prices as alternative data governance models would stop data from being a virtually limitless and easily extractable resource.

the sharing of data is framed as a purely monetary transaction affecting only the individual, users may be incentivised to look merely at their interests and ignore the position of others.

### *B) Data trusts*

Another approach postulates that personal data should be managed in a collective way through the institution of a data trust – a fiduciary body responsible for representing the interests of a user group and negotiating on their behalf with other stakeholders (see O’Hara, 2019; Rinik, 2020). In the context of self-tracking, all users of a particular app could be represented by a single data trust which would be legally obligated to protect those users’ data from unauthorised use and determine the terms at which third parties may access the data for their purposes (such as research or targeted advertising). Data trusts are convenient for the users as they make it possible to delegate responsibilities related to the stewardship of data without sacrificing privacy and control (to the contrary). As such, they might be particularly desirable for vulnerable user groups or those otherwise lacking the ability to individually manage their data. Moreover, as a primarily legal instrument, they are technologically agnostic. While it would be possible to store the governed data in a single database, PDS may also be used as a form of decentralised storage if control over them is turned over to the trust. In this way, data governance enabled by a data trust could preserve many advantages offered by more individualistic solutions such as PDS. Moreover, since data trusts are designed to manage data in a collective manner, they are much better equipped to negotiate with sizeable institutions (since a data trust representing thousands of users would have a considerable bargaining power), while also making mass-scale data sharing more feasible in terms of expended resources.

However, the hands-off model of data trusts is not entirely compatible with the values endorsed in this dissertation. Although it does promote the interests of a wider community, it requires the users to delegate the responsibility over the management of data, thus limiting their participation in the process. Data stewardship within a data trust is treated as a shared problem, but one addressed in a centralised manner, rather than through user engagement and cooperation.

### *C) Data cooperatives*

Considering that I discuss cooperation as an inherent feature of Deweyan democracy

(see chapter 4, section 3.2), it should not be surprising that data cooperatives are my preferred approach to data stewardship in the context of self-tracking. Already fairly prevalent in the landscape of health data (it is worth noting, for example, the Swiss MIDATA health data coop), data cooperatives are institutions responsible for the management of their members' data through democratic and participatory procedures (Blasimme et al. 2018). Although data cooperatives offer a central instrument through which third parties can negotiate with large groups of users and access aggregated data, individual users are able to influence the decisions made by the structure as a whole, as well as determine their level of engagement in the organisation. In the context of self-tracking, users of a particular app could belong to the same data cooperative and democratically decide how their interests are represented and how their data is used, while also benefitting from potential profits and other incentives in a proportional manner. Just like data trusts, data cooperatives are also open in terms of the preferred storage solution and it would be feasible for a data cooperative to pool user data federated in PDS whenever users decide to process or share an aggregated data set.

It has to be noted that data cooperatives require a significant degree of data literacy and effort from their members as, by principle, everyone should be included in the democratic decision making regarding member data. However, since data cooperatives should exist to further the interests of their members, it is conceivable to expect them to provide digital literacy training and prepare information packages regarding upcoming votes. Moreover, similar to traditional cooperatives, some members might take on more responsibilities in exchange for a greater share of the benefits offered by the cooperative (assuming that any appointments are also made on a democratic basis).

Data cooperatives are the most in line with Dewey's ideals out of the three proposed models for data stewardship. By encouraging participation and cooperation they correspond to Dewey's ideal of democracy. Moreover, as their purpose is the promotion and fulfilment of user interests relating to personal data, they can positively contribute to the ideal of growing.

Most importantly, these three data governance model are not tied to specific substantive choices regarding the use and distribution of data. Rather, they are concerned with the procedures put in place to ensure that users will have a say in determining the fate of their personal information collected through self-tracking. In this sense, it would be perfectly acceptable for users to give away their data completely, provided they make

this choice freely. My concern is merely with proposing a model that would provide them with more choice and all three solutions fulfil that task to various extents.

Moreover, I would be remiss not to mention the rights held by self-tracking companies in the context of data governance, as I do not wish to suggest that users and their representatives should unilaterally decide what happens with the data. Self-tracking companies offer users a service by processing their data and they should be fairly compensated for that service (even if due to existing injustices my main concern lies in criticising the existing model allowing them to appropriate user data in exchange for that service). However, my proposed solutions leave open the question of how that should happen and I believe that especially data cooperatives would be able to negotiate an arrangement satisfactory to all parties.<sup>84</sup> Even when control over data is transferred to the users, the companies responsible for the processing of that data could be compensated in the form of fees, preferred purchasing rates, or a cut of the profits – regardless of the solution, however, it is vital that the interests of all affected stakeholders are adequately represented. Moreover, it would be conceivable that in the foreseeable future, user groups (particularly data cooperatives) would be able to develop their own technological solutions and become independent from today’s main actors in the self-tracking market. Cooperatively owned digital platforms already thrive in many sectors of the digital economy (driver owned transportation app coops are a good example), and there is no reason to doubt why cooperatively owned self-tracking platforms would not be able to follow suit, even if we account for obvious obstacles such as the lack of capital or the complexity of the infrastructure (see Bunders et al., 2022, Scholz, 2016). The device-hacking and design experiments conducted by the members of the Quantified Self movement give some optimism that such a future is feasible and desirable at least to some users. Moreover, the self-organising ability of QS gives great hopes that data and platform cooperatives could work in the context of self-tracking.

### *3. Ban data extraction*

As an alternative to the data governance models discussed above, I propose a complete ban on data extraction. Although this may seem like an excessive step, I have already extensively argued that the extractive business model unilaterally instituted by

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<sup>84</sup> I am also not concerned with the data trusts’ ability to do so, although, as already noted, I am worried about power imbalances affecting the fairness of bargaining in the context of individual data stewardship.

self-tracking companies is inherently exploitative (see chapter 7). Moreover, when given a choice, users themselves decide to opt out of data collection, as evidenced for example by the 96% of Apple users who blocked the tracking functionality in their devices (Axon, 2021),<sup>85</sup> or by the legions of people who go out of their way to block website trackers in their browsers.

This is not to say that this ban would deprive the companies of the ability to generate profits. It would be conceivable to continue data selling and reuse, but complement it with a revenue-sharing system that would transfer some part of the value to the users that generated it. However, if such a system does not entail independent representation for the users (e.g., in the form of a data trust or a cooperative), it would still be ripe for exploitation, and it would not address the problem of unilateral control over data belonging to the companies (and the associated issue of knowledge and power asymmetries).

For these reasons, I believe that a subscription model is a better way for self-tracking companies to attain a continuing revenue stream without engaging in exploitative data extraction. While it would be possible for a company to generate significant profits through hardware and software sales, the continuous processing of user data requires the expenditure of a considerable amount of resources, as well as engineering and customer service labour.<sup>86</sup> Consequently, subscriptions might be the most feasible way to balance business and ethical concerns (at least if the alternative data governance models are off the table).<sup>87</sup>

Admittedly, I have already noted that subscription fees can effectively lock out poorer users from enjoying the benefits of self-tracking, especially if they gate access to fundamental features. Moreover, the subscription model, as it is widely used in contemporary technologies, can be criticised for exploiting users by attempting to hook

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<sup>85</sup> Although as noted before, there are doubts whether this particular checkbox had any effects on the amount of data collected by Apple (Germain, 2022).

<sup>86</sup> It is also worth noting the significant environmental cost of data processing and device manufacture (see Crawford, 2022), which should also be taken into account in an ethical analysis. However this would require considerable environmental and business expertise which I do not possess. For the purposes of this dissertation it should be enough to mention that the production of self-tracking devices requires the extraction of rare minerals, which disproportionately affects communities in developing countries, while the data processing entails the expenditure of a considerable amount of energy, which contributes to the current climate and energy crises.

<sup>87</sup> Of course, traditional advertising could also be used as it does not rely on data extraction and offers a clear business proposition to users – their attention is exchanged for services provided through the technology. Many TV and radio networks provide good examples of non-predatory and sustainable business models based on traditional advertising. Moreover, as Hwang (2021) demonstrates, non-personalised ads are at least as effective and demonstrably more transparent than personalised ones.

them on subscriptions that they do not need or by presenting hardly any additional functionalities.

However, the self-tracking market already offers a commendable example of a business model that manages to achieve commercial sustainability without negatively affecting the users. The already-mentioned Clue fertility tracker distinguishes itself from its competitors by offering a completely free app that does not profit from user data (however, users are able to voluntarily share their information for research purposes). The company is supported by a premium subscription that presents users with more granular insights into their fertility, but a basic set of period tracking functions is available to everyone for free. While I have some concerns over how the Clue Plus subscription is marketed and what it promises (e.g., a new feature Clue Conceive promises the users a greater chance to get pregnant, which might prey on users' expectations), the model offered by the company is viable and much more ethically desirable than data extraction or subscription models merely accompanying data brokering.

Despite my clear endorsement of data cooperatives, each of the proposed solution would significantly limit the distributive inequalities arising within the current data governance regime surrounding self-tracking. However, a combination of the three solutions discussed in this section might be the most feasible way forward. An uncompromising commitment to one of them would require significant political power and would certainly be met with opposition from the companies that are currently making a killing by exploiting their users. Consequently, I propose that in the near future, EU-level regulators should focus their efforts on setting up publicly owned companies developing self-tracking technologies for social institutions, promote the formation of data cooperatives to improve user control over data and public participation in its management (and mandate user representation/input in decision-making regarding data reuse), and ban the existing practices of unilateral data extraction. Such solutions would go a long way in promoting the ethical ideals endorsed in this dissertation. Moreover, to various extent, they would increase user agency in the context of self-tracking (e.g., as data cooperatives would have influence to shape the functioning of specific self-tracking tools) and facilitate transaction and democracy understood as a cooperative approach to the solution of shared problems. However, interventions concerning data governance regimes and business models would not address all of the issues discussed in this



dissertation. Below, I offer some more general recommendations that should be adopted by regulators, especially in the context of the findings from chapter 5 and 6. It should be noted that while the majority of the recommendations remain targeted at the EU, the final two suggestions should be implemented at a more local level.

#### *4. Safeguard against the persuasive power of self-tracking technologies*

Regulators and political decision makers should recognise that self-tracking technologies are persuasive in nature and that they shape user behaviour and imagination. As I demonstrated in chapter 5, the standards and metrics endorsed through various self-tracking devices have an influence on the character and self-esteem of users, and should thus be treated as potentially psychologically harmful. Regulators should especially focus on manipulative practices employed in many self-tracking tools, and an outright ban or a curtailing of dark patterns<sup>88</sup> and nudging that limit user choice and make them dependent on technology should be a major part of ongoing regulatory efforts.<sup>89</sup>

#### *5. Mandate greater transparency*

My discussion in chapters 5 and 7 demonstrated that knowledge asymmetries and inequalities in access to information produced by and pertaining to self-tracking limit the users' ability to shape their self-tracking habits and practices, and allows the companies' greater control over their user base. The data governance recommendations proposed above would go a long way in ensuring greater transparency by moving control over some form of self-tracking to public bodies or by involving users or their representatives in the management of data and the design of algorithms. At the same time, even within the current political-economic landscape of self-tracking, it would be possible to mandate greater disclosure of relevant information. The already mentioned Digital Services Act is one possible approach to this issue, as it requires companies to provide detailed

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<sup>88</sup> These may include practices such as opting users into services by default, disguising ads as standard content and many others. See <https://www.darkpatterns.org/types-of-dark-pattern> for an accessible yet comprehensive overview, as well as Ahuja and Kumar, 2022 for an in-depth discussion.

<sup>89</sup> The Digital Services Act was signed into law as I was writing these recommendations, and it contains many welcome restrictions on the kind of content that can be delivered through digital technologies and the techniques that can be used for this purpose (e.g., a ban on dark patterns). However, as the DSA is a new legislation and targets primarily social media companies, it remains to be seen what the restrictions will involve in practice and how they will pertain to self-tracking technologies. Moreover, it is still unclear to what extent the Commission will use its enforcement prerogatives. In the absence of decisive action and oversight at the EU level, I worry that the limitations of national enforcement mechanisms will reduce the protections offered by the DSA (see chapter 7 for a discussion of this problem in the context of GDPR).

information on the functioning of algorithms embedded in recommender systems and personalised advertising, including the metrics which were used to deliver specific content, as well as the means of influencing these metrics.<sup>90</sup>

*6. Mandate adequate representation of different social groups in design teams and data sets*

Self-tracking devices are not neutral tools of measurement, but embody and actively promote specific norms and worldviews. However, as noted in chapter 5, self-tracking tools do not adequately reflect the diversity of their user base (i.e., as white, male, able-bodied, Western, etc., users are treated as the default) and design teams fail to consider the perspectives of social groups that are underrepresented in technology companies. In the absence of self-correcting action on the part of self-tracking companies, mandating proportional representation of various social groups in design teams and training data sets could ensure that the needs and circumstances of various types of users are sufficiently reflected in self-tracking technologies. Similar measures are already part of, e.g., EU parliamentary elections which mandate gender parity of candidates, and the EU is also debating the introduction of gender quotas in corporate boardrooms. Enforced reflection of social diversity in design teams and data sets would go hand-in-hand with such efforts.<sup>91</sup>

*7. Regulate user participation in the shaping of self-tracking and legally recognise users' rights and interests*

As discussed in chapter 6, the environment created by self-tracking technologies is an important part of users' lives. Consequently, their agency within that environment should be recognised through legal means and should not be dependent on the good will of the developers or the ability of different user groups to organise and further their interests. The data and the communities produced through or alongside self-tracking could not emerge if not for the labour of a diverse set of actors, but their rights and interests are not equally codified and protected in the legal sense. Regulators should

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<sup>90</sup> However, my concerns expressed in the footnote above are still valid here.

<sup>91</sup> And the success of gender parity initiatives shows that problems with representation should be attributed to a lack of will on the part of decision makers rather than, e.g., a lack of suitable diverse candidates. Similarly, the lack of diversity in training data sets, despite widespread availability of diverse data shows that the issues targeted through this recommendations are unlikely to be solved by self-tracking companies in the absence of regulatory interventions.

create tools for legally recognising users' input in co-constituting the self-tracking environment and the associated data, as well as codify the rights of individuals and communities operating within that environment. Arguably, data cooperatives and data trusts could advocate on behalf of users and be involved in the shaping of self-tracking tools. However, it would be worthwhile to mandate user representation and consultation at the design stage, thus ensuring that self-tracking companies are legally required to take users' interests and perspectives into account when developing tools for self-quantification.

#### *8. Limit the pressure put on individuals to engage in self-tracking*

It would be prudent to scrutinise situations in which users are mandated or pressured to use a self-tracking tool, sometimes even by public institutions. If self-tracking practices are to be motivated by an ideal of growth, users should have time and opportunity to reflect on whether and how self-tracking technologies should be incorporated into their life. When tracking is tied to other factors (e.g., access to insurance and public services, or evaluation of productivity), users might feel pressured to use self-tracking devices even when it is not in their interests or without taking the time to consider the influence of a given app or a device on their habits. Consequently, labour protection agencies, national health services and other bodies should provide clear guidelines concerning the appropriate use of self-tracking in institutional contexts and outline protections available to patients, workers and others who may be pressured to track themselves.

#### *9. Codify best practices for data sharing*

As informal practices of direct data sharing that occur among self-trackers are not regulated through data protection legislation such as GDPR (and in any case, it would be impossible to enforce applicable rules), it would be worthwhile to codify a set of best practices for sharing self-tracking data with other users. However, it might be more appropriate to conduct this task in a bottom-up manner, rather than through top-down regulatory measures. Organisations such as the QS movement, and relevant civil society organisations should work with users to prepare a code of conduct or a set of guidelines on how to participate in informal data exchanges in a way that would preserve the interests of and ensure respect for all parties.

### **3. Recommendations aimed at technology companies**

#### *1. Incorporate more standards, metrics and ways to track*

It would be commendable for developers to strive to diversify the standards and metrics they incorporate in their products, as well as modes of tracking. This would greatly improve the representation of different needs and perspectives and would contribute to the reflectivity and flexibility of habits produced through self-tracking. While technical limitations can certainly be an obstacle to this goal, much more can be done even at the current state of technology. As I argued in chapter 5, sizeable user groups are neglected in the design of self-tracking and self-quantification narrowly reflects the views of already dominant social groups. User participation in the design process could be an important tool for achieving epistemic equilibrium in the design of self-tracking technologies, and should lead to improvements in terms of engagement and recognition. Overall, reflection upon the goals and methods of self-tracking should extend far beyond its current scope and depth.

Two tools are particularly worth highlighting due to how they diversify self-tracking practices through algorithmic and material design decisions. Whoop is a tracking device designed to be worn not only on a user's wrist. It is possible to fit the device within a sports bra and other pieces of clothing and a proprietary algorithm adapts the results based on the location of the tracker on the user's body. In turn, the Oura Ring resembles traditional jewellery, which might make the device more appealing and comfortable or less intrusive for some users. Similar design interventions into the algorithms and the physical form of self-tracking devices could promote diversity of self-tracking practices and thus enable the production of a greater range of habits.

#### *2. Treat users as partners co-determining what should be tracked, how and why*

To ensure that users' existing habits are adequately recognised and part of the self-tracking habit formation, developers should extend user choice and influence at the outset of tracking. Users should be given more say about what metrics are being tracked, how they are used and what they signify. For example, rather than being presented with some single predetermined goal, users could fill out a short questionnaire and be offered with a range of options. These could clearly explain what a given objective aims to accomplish, who it is suitable for and what are its limitations. Moreover, users should be given a chance to reject the suggested options and determine their own goals.

In recent years, some makers of self-tracking technologies provided users with more

choice about the means and purposes of tracking. Apple's Fitness app allows users to pick their desired level of activity and be evaluated on this basis. In turn, Fitbit users are now able to determine how prepared they are to exercise on any given day and change the thresholds and recommendations depending on their "Daily Readiness Score" (however, this feature is unfortunately locked behind Fitbit's premium subscription). Similar design decisions should be adopted by other manufacturers and more methods of expanding user choice should be introduced as this would present users with more opportunity to reflect upon and control the habits produced through self-tracking.

### *3. Provide more transparency for those who may want it*

In the absence of legally-enforced transparency discussed in the previous section, developers should give users an opportunity to ask for explanations about every element of their self-tracking practice. Rather than hiding relevant information, they should prepare accessible descriptions (e.g., infographics) detailing what data is collected, what happens with it and how it factors into recommendations. Moreover, users should be informed about the provenience of the standards that serve for their evaluation and they should be provided some basic information on the functioning of the algorithms. Some technically savvy users might wish to require more detailed knowledge about a particular technology's privacy practices, data collection methods and other elements. They should be able to access this information without substantial efforts. However, ordinary users should not be overwhelmed with such specifics as this could lead to information overload – for many, limited but curated insight into the functioning of the device might be optimal.

### *4. Demystify data*

Developers should devote more attention to how they communicate about self-tracking technologies, the data they collect and the advantages they promise. The framing of data as objective and more accurate than human senses is misleading and can negatively impact the users' wellbeing and their habits. Self-tracking technologies should emphasise the context in which their data is created and highlight the hermeneutic work necessary to understand and incorporate this data into one's life. Moreover, users should be informed that their data can tell only a part of the story and should be actively guided towards alternative interpretations of the tracked activity. Developers could achieve that by disclosing the limitations of particular metrics and providing users with (external)

resources that could complement the understanding provided by the app or the device.

#### *5. Provide suggestions rather than conclusions*

In addition to demystifying data, developers should dilute the recommendations provided by self-tracking technologies. Rather than supplying verdicts and clear-cut conclusions, self-tracking apps and devices should provide users with suggestions for action/change. These should be formulated in ways that clearly delineate the reasoning behind them and indicate their constraints. They should encourage users to reflect upon their activity and consider a range of alternative courses of action, rather than thoughtlessly follow a series of steps. Moreover, developers should abstain from nudging and other techniques for behaviour management, especially those relying on exploitative dark patterns. For example, recommendations delivered in the form of notifications may convey a sense of urgency and thus prompt the users to make a decision about them in the moment.<sup>92</sup> Instead, suggestions formed on the basis of data could be presented in a separate menu that users have to navigate to and open out of their own initiative. In this way, users could themselves determine the best moment for reflecting upon the tracked activity and take their time to assess their options.

#### *6. Refrain from using impersonal and reductionistic social interactions*

Self-tracking can reduce the interactions between users to impersonal comparisons of metrics and competition on the leaderboards, neither of which fosters community, care and cooperation. It might be better to refrain from incorporating such limited and potentially harmful social features at all, especially as empirical research shows that users are likely to seek direct personal engagement with others as part of their self-tracking practices (Kristensen et al., 2021; Barta & Neff, 2016). Developers would do better to inform users about existing and independent communities of users (e.g., local QS meet-ups, or user moderated forums, see the recommendations directed at users) instead of creating communicative proxies that predominantly serve as an obstacle to genuine transaction.

#### *7. Grant users more control over the technological environment in which they*

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<sup>92</sup> And as Oura Ring demonstrates, it is possible to deliver an appealing self-tracking tool without any push notifications.

### *transact and cooperate*

Self-tracking is an important influence in people's lives and shapes the way they transact and cooperate with others. For these reasons, users should be able to co-determine how and why they engage with others through their apps and devices. In the absence of mandated user representation and consultation discussed in the previous section, developers should introduce means for users to participate in and control the design of the social features of self-tracking (e.g., user focus groups, user feedback), as well as create or promote spaces for interaction independent of excessive developer influence (e.g., user moderated forums). On the other hand, a total lack of developer influence would be problematic in the context of bad actors who might abuse the shared data, use the platform to harass other users, etc. Moderation of the interactions mediated by self-tracking could be a useful tool for developers to address such risks without limiting the users' control over their engagement with others.

#### *8. Leave it to the users to decide if and how data is shared*

Data sharing can be a positive way for fostering interpersonal relations through the medium of self-tracking, but this does not mean that all data sharing is beneficial to users. Rather than attempting to foster interactions between users by developing specific, predetermined data sharing functionalities (often furthering the developers' interests), the developers should leave it to the users to determine how and if data should be shared within their different relationships. Very often, in-built data sharing interfaces are woefully inadequate in the context of user needs (e.g., medical patients are unable to access or export the entirety of data collected by the device) and effectively lock them in a specific ecosystem. The developers should recognise and enable diverse bottom-up, user-driven initiatives that require data sharing.

#### *9. Build revenue streams not relying on data extraction*

In the absence of regulatory efforts curbing data extraction, developers should still try to find ways to expand their business without exploiting their users. As I already noted, subscription-based models, such as the one introduced by Clue, are one desirable way forward, but non-personalised advertising could also be considered by the developers.

## **4. Recommendations aimed at individual users**

### *1. Be critical*

As already noted in chapter 5, some users adopt a sceptical approach to their self-tracking apps and devices. By not taking metrics and recommendations at face value, they often develop a habit of reflecting upon the influence of self-tracking technologies and adapting them to fit their particular circumstances. Users should maintain a critical attitude to the promises of self-tracking and recognise that successful self-tracking practices require more than rote repetition. Users should remember that self-quantification exists at an intersection of many, often competing interests, and that not all of the decisions made by the developers prioritise user wellbeing.

### *2. Engage in hermeneutic work*

On that note, users should be willing to engage in hermeneutic work and consciously reflect upon their self-tracking practices and their incorporation in everyday life. Critical attitudes should not be adopted for the sake of scepticism, but with an eye for opportunities for the improvement of habits. Users should consider what goals they have in mind when they pick up a new app or device, and evaluate whether and how the tracking brings them closer to that goal. Self-tracking can only be relevant as a tool for moral deliberation when it is purposefully undertaken with moral deliberation in mind.<sup>93</sup> Users should make the effort to reassess “what kind of person one is to become and the kind of world that will be made” (Dewey 1957, p. 217) through the practice.

### *3. Treat self-tracking tools instrumentally*

Self-tracking technologies reflect a number of normative judgments and can be perceived as objective and infallible. Rather than conforming to these judgments and submitting to the authority of their apps and devices, users should remember that these tools are meant to serve them in producing desired effects. It is common for users to focus on the demands and injunctions displayed on the screen (“exercise more”, “update your privacy settings”) and fixate on the feelings of inadequacy instilled through self-tracking. However, users should remember that they have a right to ignore, turn off or even get rid of their tools when they do not have a positive impact on their lives (at least when the decision to begin tracking is fully their own). Moreover, rather than conforming

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<sup>93</sup> As I argue in chapter 5, non-deliberative self-tracking can still have a moral impact, but that would not necessarily be the impact desired and anticipated by the users.



to the vision promoted by self-tracking, users should seek ways to appropriate and transform their technologies in ways that suit their needs. A failure to follow some recommendation or fit within a certain metric should not be understood by default as a user's personal failing. Users should be more open to the idea that if self-tracking does not bring the expected results, it is their apps and devices that fail to live up to their needs and adapt to their life situations.

#### *4. Seek out alternative recommendations and technologies*

Similarly, users should remember that particular self-tracking technologies and recommendations supplied by them do not provide the "correct" way of interpreting data (and they do not necessarily provide accurate data). Users could benefit from trying out different self-tracking tools or even alternative ways of making sense of the numbers supplied by their device. Self-tracking data is only valuable for users when it has a positive impact on their habits and lives. Instead of looking for what is deemed correct or accurate by a particular tool, users should focus on the data and recommendations that are *useful*, which will vary in definition depending on a particular user's goals and life situation. A focus on usefulness should serve as a motivation to engage in reflection, which should always be treated as a foundation of any successful self-tracking practice.

#### *5. Discuss and track with others*

Community with other self-trackers with a similar outlook on the practice can be beneficial for many users, especially those who for various reasons engage in resistance against the dominant visions of the practice. Participation in a community of self-trackers ensures a baseline level of deliberation (as it is necessary to reflect on one's habits to describe them to others) and makes users' self-tracking practices more independent from specific self-tracking technologies by introducing external and potentially disrupting factors (such as criticism of particular tools that individual users' might not have been aware of otherwise). By discussing the motivations behind their self-tracking projects, users could better understand how their and others' goals and habits operate in association with self-tracking. Exposure to different kinds of self-tracking projects, as well as the problems arising within them, could help users imagine alternative self-tracking practices and anticipate difficulties that could arise within their own life (thus making their habits more flexible).

Moreover, as noted in chapter 6, various communities are often created alongside

self-tracking practices. While I am sceptical that self-tracking itself has a community-building dimension, users should recognise that they share interests, goals and concerns with other self-trackers. By participating in online and offline communities, users can turn a solitary, self-driven practice into one that accompanies and fosters friendship, care and cooperation. Whereas self-tracking, on its own, can impoverish the quality and variety of transactions with others, people engaging with the practice should maximise direct engagement with fellow self-trackers as it helps overcome this limitation and provides users with more influence over how the practice impacts their interpersonal relations.

At the same time, the community-oriented modes of tracking are particularly important in the context of data cooperatives I discuss in section 2. If my preferred method for managing data were to be introduced, the grassroots communities created by users would be vital for its success. Consequently, users should be encouraged to cooperate with others in their self-tracking practices as this would provide a foundation for more far ranging changes in the data governance regimes underlying self-tracking.

#### *6. Seek diverse ways of engaging with others*

On that note, users should not depend on the social functionalities embedded in their apps and devices as they are not necessarily designed to foster user interests or the feelings of solidarity, community and care (instead promoting the extraction of data and engagement with the self-tracking tools themselves). The formation of independent communities and alternative modes of communication with fellow self-trackers should be seen as an important part of many self-tracking projects, especially those aiming to further specific shared goals (e.g., advances in disease management). Ownership and control over the means of engaging with other, like-minded users would significantly contribute to the achievement and maintenance of the benefits of (pro-)social self-tracking practices.

#### *7. Be mindful of the context of data and the users on the other side of the device*

Even if not purposefully tracking alongside others, users should remember that their practices are entangled with other people in many ways – data sharing, leaderboards and recommendations based on aggregated data all tie individual users to the wider self-tracking community. It might be easy to forget that self-quantification involves engagement with others (even if indirect), but users should be mindful of the impact of

their interactions. They should treat data as a cooperatively produced resource, and (unknown) others as distinct individuals worthy of care, friendship and respect.

## Chapter 9. Conclusion

### 1. Summary

While the critical tone adopted in this dissertation reflects my scepticism regarding the current state of self-quantification, I still believe that the technologies and practices I discuss can have an overall positive ethical impact. Self-tracking can improve people's habits, foster communities, and produce other discernible benefits like self-knowledge or improved access to healthcare. However, my pragmatist analysis leads me to conclude that due to companies' unilateral control over self-tracking and their focus on profit extraction, self-quantification fails to live up to its potential, and is in dire need of regulatory oversight, design interventions and bottom-up reassessment of how it is used and which purposes it is meant to serve.

Over the course of this dissertation, I tackled three interrelated research objectives, aiming at identifying the ethical issues surrounding self-tracking, analysing selected issues in more detail from the standpoint of a pragmatist ethical theory, and prescribing recommendations for the future regulation, design and development, and use of tools for self-quantification.

The preparatory chapter 2 presented an in-depth description of self-tracking technologies and typical practices associated with them. By focusing on the main features of self-quantification, both in its casual and Quantified Self varieties, I was able to pinpoint the most philosophically relevant characteristics of self-tracking and discuss the divergent tendencies found within the technology and the associated practices. The contents of chapter 2 served as a conceptual foundation for further analysis and enabled me to make more informed methodological choices when preparing the literature review and developing my ethical theory.

In chapter 3, I achieved the first research objective by conducting a state-of-the-art literature review that draws together works from various disciplines and discusses the ethical issues that have been so far associated with self-quantification. Designed to be maximally comprehensive, this literature review mapped all of the arguments I was able to identify in the retrieved works and assigned them to 13 different categories. Three of them dealt with the perceived benefits of self-tracking and discuss user empowerment and well-being, positive impact on individual and public health, and positive impact on interpersonal relations. The other ten categories catalogued the concerns voiced by the

authors regarding social norms, privacy, ownership and control of data, user autonomy, harm done on the basis of data, datafication, interpersonal relations, deficiencies of design, perception of health, and regulation. On the basis of the literature review, I argued that self-tracking needs to be analysed through a systematic application of an ethical theory with a particular focus on the issues of habit formation, interpersonal relations and justice.

In chapter 4, I laid the foundations for the fulfilment of the second research objective by developing a normative approach for the analysis of self-tracking based on John Dewey's pragmatist ethics. Although I initially considered the merits of Shannon Vallor's virtue ethics, I ultimately argued that Dewey's philosophy is much better suited for the analysis of self-tracking and that it is especially well-adapted for the purposes of this dissertation since it places particular emphasis on the three problem areas I decided to address following the literature review. Over the second half of this chapter, I outlined Dewey's ethical work by focusing on his understanding of habit, democracy, and technology, as well as the ethical relevance of epistemology. I argued that a pragmatist approach for technology assessment should focus on the habits produced by a technology, the transactions with others it enables, and the distribution of burdens and benefits associated with that technology. This allowed me to perform my analysis by evaluating self-tracking in reference to Dewey's ethical ideals of continuing, inclusive growing and democracy.

Chapters 5, 6 and 7 presented an in-depth analysis of selected ethical issues surrounding self-tracking from the perspective of the pragmatist ethical approach developed in chapter 4. As the findings of the literature review led me to conclude that novel philosophical work needs to analyse the impact of self-tracking on habit formation, interpersonal relations, and justice, each of these three chapters was devoted to one of these three problem areas. Taken together, chapters 5, 6 and 7 allowed me to accomplish the second research objective.

In chapter 5, I studied the habits produced by self-tracking and argued that in order to promote continuing, inclusive growing, technologically-mediated habits need to be intelligent, that is, reflective and flexible. Over the course of the chapter, I argued that the design of self-tracking is not accompanied by an adequate amount of reflection, as developers routinely fail to consider the needs and circumstances of users and rely instead on generalisable categories that ultimately correspond to the life experience of a very narrow group of users. Moreover, the opacity of algorithms and the arbitrary nature of

standards endorsed through self-tracking limits the ability of users to reflect on the habits produced through self-tracking. These features lead to the formation of rigid habits that cannot withstand changes in the circumstances, and they do not promote independence in users that would help them adapt their behaviour without the input of self-tracking. Overall, I argued that even if self-tracking technologies produce beneficial habits, they do so in a guided way, thus negatively affecting users' agency and depriving them of opportunities to consciously choose the direction of their own behaviour, and ultimately life.

In chapter 6, I discussed the impact of self-tracking on interpersonal relations through the lens of Dewey's concept of transaction. I argued that the datafied interactions enabled by self-tracking are characterised by a degree of distance and reduce users' ability to shape how they are perceived by others (since these others primarily encounter datafied representations over which users have no control), while also promoting a narcissistic or competitive view of interpersonal relations. Moreover, due to its emphasis on the sharing of data, self-tracking replaces genuine interpersonal relations with mere exchanges of information, which, as I argued, is an insufficient basis for the formation of community or expressions of solidarity. Finally, I demonstrated that groups using self-tracking to further their shared interests may find themselves lacking control over the infrastructure mediating their interactions, and deprived of opportunities to influence decisions over how self-tracking technologies are governed.

In chapter 7, I catalogued the benefits and burdens produced through self-quantification and argued that the unilateral control over data assumed by giant technology companies is undemocratic and incompatible with continuing, inclusive growing. I demonstrated that the for-profit, despotic governance of self-tracking is exploitative, creates knowledge asymmetries and allows the technology companies to consolidate their power and expand into new sectors, such as healthcare. Moreover, I argued that the financial, temporal and cognitive costs of self-tracking exacerbate inequalities between users.

In chapter 8, I addressed the third research objective by formulating ethical recommendations for regulators, makers, and users of self-tracking technologies. I argued that regulators should primarily focus on changing the data governance model underlying self-tracking. I demonstrated that cooperative governance of data would be both practical and desirable from the ethical perspective adopted in this dissertation, especially when coupled with other regulatory interventions, such as bans on data

extraction (especially in crucial sectors such as healthcare), regulation of dark patterns, transparency mandates, and others. I also discussed design interventions and development decisions that can be made by self-tracking companies to ensure a more ethical functioning of the technology, such as an increased range of standards and metrics, involvement of users in the design process, demystification of data and provision of contextually relevant information. Finally, I suggested that users should seek alternative recommendations and technologies, track and discuss their data with others, and treat their tools in an instrumental manner.

## **2. Limitations and suggestions for further research**

Naturally, the analysis presented in this dissertation is not without its limitations stemming from the scope of the study, adopted theory, the unpredictable nature of technological developments, and many other factors. For this reason, I believe that it would be worthwhile to discuss some limitations of my research and present avenues for further work that would fill the gaps found in this dissertation, as well as expand upon the ideas I presented.

I aimed at providing a comprehensive analysis of the ethics of self-tracking *in general*, but the broad lens adopted in this dissertation meant that I did not discuss individual use cases in more detail. Although I studied individual fitness tracking, sharing and discussion of data (e.g., in the QS movement), tracking in workplaces, as well as self-monitoring of symptoms, exclusive focus on any of the specialised use cases would likely shed light on unique ethical issues that necessitate further analysis. For example, despite mentioning fertility tracking apps several times in this dissertation, I did not devote much attention to rampant gender stereotyping present in these apps, as well as many other gender-related issues that are the most prominent in self-tracking tools focusing on fertility (although I provide a more detailed analysis in Waelen & Wieczorek, 2022). At the same time, the broader perspective I adopted allowed me to discuss some issues that would likely not have caught my attention if I focused exclusively on individual use cases. For example, the political-economic dimension of self-tracking, or the general impact on habit formation, are arguably much better examined from a higher vantage point.

My selection of sources can also be criticised as this dissertation refers exclusively to texts written in English. While this narrow focus most likely led me to overlook a range of interesting arguments and analyses devoted to self-tracking, I simply do not

possess the linguistic skills to read all the potentially relevant work. Other ethical analyses written on the basis of sources written in German, French, Spanish and many other languages could present different conclusions or would have been able to shed more light on problems not discussed in detail in this dissertation. At the same time, a large part of the scholarly debate around self-quantification has been international in character, and consequently has been conducted in English, even if the authors come from non-anglophone countries.

Although a pragmatist ethical theory allowed me to discuss issues not covered by mainstream approaches in technology ethics or discuss them in a unique manner (e.g., through the focus on the notions of intelligent habit and transaction), Dewey's philosophy also has its blind spots. For example, principled approaches are arguably much more useful for regulators, as a discussion of well-defined and comprehensive lists of principles allows principled assessments to be easily translated into regulatory recommendations. Since my adopted theory focuses more on decision-making and deliberative procedures rather than on the endorsement of specific values, many of its recommendations may seem general or vague. After all, even if a Deweyan framework provides arguments about the structure of desirable habits or political institutions, it does not determine the exact goals that should be served by these structures, proposing instead that these should be selected in a bottom-up, deliberative manner.

Similarly, this indeterminate nature of Dewey's ethics can be problematic in the context of highly specific issues introduced by self-tracking. Arguably, the aforementioned gender-related impacts might be better addressed by a feminist philosophical theory, whereas the problems connected to health would be better assessed through a public health or bioethical lens. However, in line with the pragmatist commitments endorsed in this dissertation, I do not see the answers I provided as exhaustive and ultimate. My Deweyan approach is valuable primarily in the context of ethical pluralism and should be seen as complementary rather than an alternative to other philosophical methods. If it can address some issues not covered by other ethical theories, it does so at the cost of ignoring or underdiscussing the problems those theories hold as central. In this sense, the fallibilism endorsed by pragmatism should entail not only a readiness to constantly revise one's claims, but also a readiness to do so from competing perspectives.

Others might also take issue with my characterisation of Dewey's ethics. As I demonstrated, there is evidence in Dewey's work, as well as support from his



commentators, to describe habits and character as the central concerns of Dewey's ethics, but some may argue that this would place Dewey too closely to virtue ethics. In fact, considering his commitment to ethical pluralism, Dewey could also be characterised as a consequentialist – evaluating habits and action through the light of the satisfaction of needs and the attainment of goals – or a deontologist – focusing, among others, on principles such as continuing and inclusive growing and democracy that I highlighted in my dissertation. According to Dewey himself, the truth lies somewhere in the middle, and even though I would situate it closer to the side of virtue ethics, other readings are possible, and they would certainly influence the conclusions of alternative Deweyan analyses of self-tracking.<sup>94</sup>

Finally, just like many works on the ethics of new and emerging technologies, this dissertation will soon become obsolete. In fact, it may already be obsolete by the time it finds itself in the hands of its readers. I would welcome this possibility if it means that many of the concerns I raised will have already been addressed by regulatory interventions and responsible development of self-tracking. The recently adopted Digital Services Act and the Digital Markets Act are certain to bring considerable changes to how digital technologies function within and outside of the European Union, and at this stage it is impossible to assess how they will shape self-tracking in the years to come. The landscape of self-tracking has undergone many changes since I first started working on this dissertation and the speed and scope of future developments are difficult to predict. Hopefully, with time the issues identified in this dissertation will be forgotten rather than grow in significance. Nevertheless, my findings should be updated alongside future research and developments in self-tracking as they reflect only the current, fallibilistic understanding of the technology and its ethical impact.

In this sense, the work undertaken in this dissertation is far from over as more research (as well as political, economic, cultural, etc. change) is needed to address the ethical issues associated with self-tracking. Consequently, I propose that future study of the ethics of self-quantification should go in the following directions:

1. There is a need for regulatory work and legal research that would contextualise the data governance recommendations I presented in chapter 8. I must admit that many of

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<sup>94</sup> Of course, this, too, has its limitations, as even the most uncharitable reading of Dewey would not succeed in portraying him as an authoritarian or a reactionary conservative.

my suggestions can be read as too ambitious, impractical or unrealistic, depending on the outlook of the reader. Regulation of emerging technologies is a challenging task, as politicians and legal experts have to contend with the rapidly changing nature of the object of the regulation, as well as the entrenched power of technology companies unwilling to give up on their profits and influence. Consequently, legal and public policy scholars should discuss the viability of alternative data governance models in the current regulatory and political landscape, and propose concrete solutions that would recognise the interests of a wide range of parties.

2. More specifically, future research should focus on data cooperatives. While working on the recommendations found in chapter 8, I was surprised by the relative lack of attention devoted to cooperative stewardship of data. Despite the viability and performance of worker cooperatives, as well as the interest in platform cooperatives in general, data cooperatives remain scarcely discussed in the literature and in the media. Initiatives like MIDATA can serve as examples of successful cooperative data governance schemes, but more research and public advocacy is needed for data cooperatives to become a real alternative. Philosophers would do well to discuss the conceptual issues associated with shared ownership and management of data, as well as the ethical issues brought on by such novel distribution of agency and responsibility. Legal scholars could contribute by outlining regulatory and legal instruments that would enable the functioning of data cooperatives at a large scale. Computer science could prepare technological solutions for cooperative data governance (not necessarily based on a variation of the PDS model). Social scientists could conduct empirical research on people's attitudes to and experiences with cooperation in digital environments, while economists could study the financial feasibility of the cooperative model of data governance.<sup>95</sup>

3. Moreover, I see great potential in the application of Dewey's ethics to the analysis of other technologies, especially those offering personalised content and services. Although, as I argued, self-tracking takes habit-formation as its explicit focus, all

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<sup>95</sup> Similarly, political-economic research would be of great importance in the context of anticapitalist critiques of technology. While I only suggested that capitalism can be blamed for many of the issues surrounding self-tracking, an in-depth philosophical and economic analysis would be required to identify how capitalism affects the issues of justice and to explore whether alternative economic regimes would not lead to similar problems.

technologies produce new habits and influence existing ones. The framework I developed in this dissertation could be fruitfully used to discuss the ethical dimension of technologies such as AI, personalised advertising, adaptive education systems, and many others. A Deweyan approach could be particularly effective in the context of technologically-assisted teaching and learning, as his highly influential philosophy of education would greatly complement the ethical considerations I outlined in chapter 4. It is also worth highlighting that despite some interest, pragmatism is not widely discussed in mainstream philosophy of technology and theoretical contributions made on the basis of Dewey's work could benefit more influential theories, such as virtue ethics of technology or postphenomenology. For example, even though Dewey's view of technology is compatible with postphenomenology (and mediation theories in general, as I noted in chapter 4, section 3.3), the political and interpersonal considerations found in pragmatism go beyond many discussions found in postphenomenological literature. Similarly, I argued throughout chapter 4 that Dewey's notion of habit can complement virtue ethics of technology by making it possible to study how technologies affect practices and dispositions that are not ostensibly moral and that do not necessarily fall under the MacIntyrean notion of a practice (e.g., physical activity). Future research in pragmatist philosophy of technology could lead to other significant contributions (especially if it follows from a different characterisation of Dewey's ethics, as I discussed above).

4. Finally, this dissertation by no means exhausted the ethical discussion on self-tracking. Research on specialised applications of quantified data collection would be particularly warranted. Unique tools might present new ethical quandaries and alternative methods are likely to lead to new conclusions regarding both self-tracking in general, as well as specific tools such as continuous glucose monitors, mental health tracking apps, and many others. Self-tracking technologies incorporating other emerging techniques, such as voice or facial recognition, could also lead to ethical issues not discussed in the literature so far and warrant more scholarly attention. Finally, I noted in chapter 3 that future work on self-tracking should incorporate anticipatory methods. The future of self-tracking is not yet determined, and it would be prudent to prepare regulators, designers and users to the problems that are likely to arise in the future.

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