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A large, stylized sunburst or fan-like graphic in a lighter shade of purple, positioned on the left side of the cover. It consists of a central vertical stem with multiple curved, radiating segments that resemble petals or rays.

PARADOXES OF THERAPEUTIC SELF- TRACKING ASSEMBLAGES IN EVERYDAY LIFE

Harley Bergroth



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The originality of this publication has been checked in accordance with the University of Turku quality assurance system using the Turnitin OriginalityCheck service.

ISBN 978-951-29-8202-8 (PDF)
ISSN 0082-6987 (Print)
ISSN 2343-3191 (Online)
Painosalama Oy, Turku, Finland 2020

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HARLEY BERGROTH: Paradoxes of Therapeutic Self-tracking

Assemblages in Everyday Life

Doctoral Dissertation, 158 pp.

Doctoral Programme of Social and Behavioural Sciences

October 2020

ABSTRACT

One of the most significant consumer trends of the 21st century has been proactive digital self-tracking. Proactive self-tracking refers to the everyday utilisation of a wide variety of hardware devices and mobile applications through which people gather data on their activity, sleep, bodily functions and behavioural patterns. Based on interviews, media materials and observations in self-tracking related environments, this doctoral dissertation examines how the practices of self-tracking and human-technology co-operation in everyday self-tracking assemblages shape peoples' lifeworlds and their sense of themselves.

This ethnographically oriented dissertation draws from the interdisciplinary field of science and technology studies, combining influences mainly from sociology, anthropology and continental philosophy in order to empirically investigate the multifaceted experiences of living with and through self-tracking devices and the data they produce. Specifically, it makes use of assemblage theory and various critiques of human-technology bifurcation in order to focus on the complex relations and associations between human beings and their technological supplements. While everyday imaginaries, marketing discourses and even research accounts too often construct technological devices as 'tools' that human beings use for their own purposes, these theoretical resources enable a viewpoint that treats technology as more-than-a-tool, which, I argue, is essential for revealing the multiple paradoxicalities and contradictions that characterise practices of everyday self-tracking. The detailed pinpointing of such paradoxes is essential for understanding how self-tracking technologies organise and effectively change the world by reconfiguring, e.g. the practical understanding and experience of the self. The dissertation also contributes to theoretical understandings of 'therapeutic culture' by considering how digital health technologies intertwine with and diverge from common therapeutic discourses of self-awareness and self-knowledge. Thus, it proposes further research on the reconfiguration of therapeutic culture in emerging digital new media assemblages.

This dissertation consists of a summary and four empirical articles. Three of the articles have been published in peer-reviewed scientific journals and one is in an internationally published edited volume. The first article (I) investigates everyday self-tracking assemblages as systems of moral knowledge production.

Through these assemblages, people seek self-control and health awareness by delegating control to algorithmic digital companions. These companions may provide people with positive effects, but they also underline existing modes of body politics and constantly produce 'problematic' or problematised bodies. The second article (II) shows how proactive self-tracking produces experiences of both self-knowledge and perpetual uncertainty. The article then develops our theoretical understanding of the temporalisation of the self in such practices. The third article (III) argues that proactive self-tracking is often closely intertwined with the idea of attaining holistic viewpoints to oneself, yet in practice it promotes fragmented vistas into one's life as bodies and selves are continuously divided into ever-more nuanced and detailed functionalities and longitudinal trajectories. The fourth article (IV) relates self-tracking more closely to other 'alternative' and/or critical health practices and develops an understanding of self-tracking as a sociotechnical manifestation of 'everyday fringe medicine', i.e. a regime of everyday self-care in which scientific and 'alternative' modes of knowledge production become negotiated and are sometimes mixed and matched.

All of the articles highlight the contradictions and paradoxicalities inherent in self-tracking practices. The summary of this dissertation synthesises the findings from separate articles and thus deepens our understanding of the inherent multiplicity and complexity of technology, especially in relation to self-tracking. The paradoxes (including but not limited to persistent dynamics between knowledge/uncertainty, holistic individualisation/fragmentary individualisation, becoming 'oneself'/'the other' and knowing about health in terms of 'official'/'alternative' knowledge) explain and show how self-tracking technologies shape everyday realities of therapeutic action and self-understanding, and produce new complexities instead of simply alleviating problems.

To summarise, this dissertation argues that the application of process ontology and the notion of paradoxes are analytically and methodologically inspiring and forceful approaches for looking past the surface of human-technology interaction and beyond common sense use-relations with technology. They help us acknowledge material agencies, and they help us observe how self-tracking assemblages actually 'work' in everyday life, even if people often tend to think of themselves as being ultimately in charge of what happens with technology. Paradoxes also show how technology actively produces needs and desires instead of simply fulfilling them. Thus, in order to think ethically about self-tracking and related developments in society, these technologies must be treated as more-than-tools. This dissertation creates a fertile basis for future research on self-tracking technology within different groups of people in order to see how these and other relevant paradoxes and contradictions play out in different cultural, material and personal contexts.

KEYWORDS: self-tracking, self, technology, materiality, paradoxes

TURUN YLIOPISTO

Yhteiskuntatieteellinen tiedekunta

Sosiaalitieteiden laitos

Sosiologia

HARLEY BERGROTH: Paradoxes of Therapeutic Self-tracking

Assemblages in Everyday Life

Väitöskirja, 158 s.

Sosiaali- ja käyttäytymistieteiden tohtoriohjelma

Lokakuu 2020

TIIVISTELMÄ

Yksi 2000-luvun suurista kuluttajatreendeistä on ollut proaktiivinen digitaalinen itsenmittaaminen. Proaktiivisella itsenmittaamisella viitataan erilaisten laitteiden ja mobiilisovellusten arkiseen käyttöön, jonka avulla ihmiset keräävät dataa elämästään ja kehonsa toiminnoista, esimerkiksi aktiivisuudesta, unesta, sykkeistä ja käyttäytymisen kaavoista. Tässä väitöskirjassa tarkastelen henkilöhaastatteluihin, mediamateriaaleihin sekä itsenmittaukseen liittyviin havainnointiaineistoihin perustuen sitä, miten itsenmittaamisen käytännöt ja niissä tapahtuva ihmis-teknologia-yhteistyö muovaavat ihmisten elämismailmaa sekä ymmärrystä ja kokemusta itsestään.

Etnografisesti orientoitunut väitöskirja kytkeytyy etenkin monitieteiseen tieteen- ja teknologiantutkimuksen kenttään. Väitöskirja ammentaa vaikutteita esimerkiksi sosiologiasta, antropologiasta ja mannermaisen filosofian perinteestä paneutuessaan itsenmittaamislaitteiden ja niiden tuottaman datan kanssa elämiseen liittyviin kokemuksiin. Hyödynnän etenkin assemblage-teoriaa ja ihmis-teknologia-bifurkaation kritiikkiä paikantaakseni ja avatakseni arkiseen itsenmittaamiseen liittyvää kompleksisuutta. Siinä missä arkiset ajattelutavat, markkinointidiskurssit ja jopa tutkimukset usein rakentavat itsenmittauslaitteet ”välineinä”, joita ihmiset käyttävät omien päämääriensä toteuttamiseen, bifurkaatiokritiikki avaa näkökulmia, joista käsin teknologiaa tarkastellaan ”enemmän-kuin-välineenä”. Näin arkisista itsenmittaamiskäytännöistä löytyy monia ristiriitaisuuksia ja paradoksaalisuuksia, joiden käsittelyn väitän olevan tärkeää mikäli halutaan ymmärtää syvällisesti itsenmittausteknologian yksilöllisiä ja yhteiskunnallisia vaikutuksia, ja itsenmittauskäytännöissä tapahtuvaa ihmisen ja teknologian yhteismuotoutumista. Väitöskirja kontribuoi myös ”terapeuttisen kulttuurin” keskusteluihin avatessaan sitä, miten digitalisoituvat ja datavetoiset terveysteknologiat kytkeytyvät terapeuttisiin puhe- ja toimintatapoihin käytännössä. Näin avataan keskustelua terapeuttisen kulttuurin paikantuneisuudesta, ja sen muotoutumisesta digitalisoituvissa (media)verkostoissa.

Väitöskirja koostuu kolmesta vertaisarvioidusta journaaliartikkelista, sekä yhdestä toimitetussa teoksessa julkaistusta luvusta. Ensimmäinen artikkeli (I) tarkastelee arkisia itsenmittauskokoontapanoja (assemblages) moraalisen tiedontuotannon järjestelminä, joissa itsekontrollia ja terveystietoisuutta tavoitellaan

delegoimalla kontrollia osittain digitaalisille, teknologisille kumppaneille. Näissä kokoonpanoissa teknologiat voivat tuottaa ihmisille positiivisia kokemuksia, alleviivaten samalla ruumiinpoliittisia arvottamisen käytäntöjä ja tuottaen ruumiin ”problemaattisuutta” käytännössä. Toinen artikkeli (II) valottaa, kuinka proaktiivinen itsenmittaaminen tuottaa käytännössä sekä tietoa että epätietoisuutta ja kiinnostusta itseä kohtaan. Artikkelit liittää itsenmittaamiseen liittyvän tiedon ja epätiedon välisen dynamiikan teoreettiseen keskusteluun minuuden temporalisaatiosta. Kolmas artikkeli (III) havainnoi itsenmittaamisen kiinnittyvän usein holistisen itsetietoisuuden diskursseihin ja argumentoi mittaamisen käytännössä kääntävän kokonaisvaltaisen itsetietoisuuden logiikan pääläelleen jakaessaan kehot ja elämät yhä yksityiskohtaisemmiksi parametreiksi ja datajatkumoiksi. Neljäs artikkeli (IV) suhteuttaa itsenmittaamisen muihin ”vaihtoehtoisen” itsehoivan käytäntöihin ja käsitteellistää arkista itsehoivaa ”arjen rajalääketieteenä”, joka avaa tilaa yhdistää erilaisia tietojärjestelmiä, ja sekä vahvistaa että toisinaan haastaa tai neuvotella ”virallisen” tiedon merkitystä.

Väitöskirjan yhteenveto tuottaa artikkeleihin perustuen laajemman argumentin itsenmittaamisen monitahoisesta paradoksaalisuudesta, mikä syventää aiemmassa tutkimuksessa tuotettua ymmärrystä teknologian monitahoisesta luonteesta. Kaikki artikkelit tuovat esiin arkiseen itsenmittaamiseen liittyviä spesifejä paradokseja ja ristiriitaisuuksia, joiden pohjalta yhteenveto rakentuu. Paradokseihin kuuluu esimerkiksi jatkuva tiedon ja epätiedon, holistisen individualisaation ja fragmentaarisen dividaalisuuden, minuuden ja ”toiseuden” sekä ”virallisen” ja ”vaihtoehtoisen” terveystietoisuuden välinen dynamiikka. Paradoksit osoittavat, kuinka mittaamiskäytännöt muovaavat ymmärrystä itsestä ja maailmasta, ja tuovat elämiin uudenlaista kompleksisuutta, vaikka ”välineinä” mittarien usein kuvitellaan helpottavan elämää.

Väitöskirja esittää, että prosessionologian soveltaminen ja ristiriitaisuuksien esiintuominen ovat analyttisesti ja metodologisesti hyödyllisiä välineitä, kun pyritään katsomaan syvälle ihmis-teknologia-vuorovaikutuksen pinnan alle, ja yli arkijärkisen tavan ajatella teknologiaa välineellisyyden ja käyttösuhteiden kautta. Nämä teoreettiset ja käsitteelliset resurssit auttavat suhtautumaan ei-inhimilliseen toimijuuteen vakavasti ja tarkastelemaan sitä, miten arkiset itsenmittauskokoonpanot käytännössä toimivat ja muuttavat maailmaa sekä itseymmärrystä. Paradoksit myös osoittavat kuinka teknologiat tuottavat tarpeita eivätkä vain palvele niitä. Itsenmittaamisen ja siihen liittyvien kehityskulkujen eettinen käsittely vaatiikin teknologian ymmärtämistä enemmän-kuin-välineenä. Väitöskirja luo hedelmällisen pohjan tarkastella sitä, millaisia muotoja siinä mainitut ja mahdolliset muut paradoksit ja ristiriidat saavat erilaisissa kulttuurisissa, materiaalisissa ja henkilökohtaisissa konteksteissa

ASIASANAT: Itsenmittaaminen, itse, teknologia, materiaalisuus, paradoksit

Acknowledgements

”What is work? Undoubtedly, it is a struggle against noise”
(Serres, 2007: 86)

Serres’ words pertain to much of the work involved in self-tracking and they surely pertain to the work of crafting this thesis. A chaos of ideas, materials and voices has now been converted into arguably somewhat orderly piece of sociological insight. It was a crafting process – often a struggle – that evoked many emotions. I do hope that some of the ideas presented here vibrate and resonate somewhere, make parasitic interventions here and there, and most of all help other people to generate other ideas that may lead to more humane futures, if even just a bit. Additionally, this work now reminds me on so many levels that noise (whether through the form of doubt, disorder or decay) *always* returns, sometimes in surprising ways, but now, more than before, I try to see the upsides in that, for to quote the poet Paul Claudel, ’disorder is the delight of the imagination’.

I wish to thank some people without whom this work and the process of making it would make a lot less sense and carry a lot less meaning than it does now. First of all, I wish to thank all those people in non-academic settings, who have taken the time to discuss self-tracking technologies with me during the last few years; who have shared their thoughts and hopes as well as fears and other emotions with me, and thus participated in, and made possible, the construction of the results in this work.

I wish to thank my supervisors. Thank you Suvi Salmenniemi, I honestly cannot imagine a more supportive and humane supervisor, teacher and colleague. Your extensive knowledge and your resolute encouragement for finding one’s own forms of critical thinking have really moved mountains during these years of collaboration. And Jukka Vuorinen, thank you for being the best possible companion in philosophical rambling. Whenever I thought I have gone too far with an idea, you would push me even further. Working with you is always an intellectual adventure of the most rewarding kind.

Thank you Mianna Meskus and Jaana Parviainen for reviewing this work. I really appreciate your insightful and fair comments.

I also wish to thank some dear colleagues who I have had the pleasure to get to know, and work with, during my years in academia and who have, in one way or another, all had an immensely positive impact on me. Thank you TrackThera research team Inna Perheentupa, Johanna Nurmi and Tatiana Tiaynen-Qadir for all the good times and fruitful meetings. Thank you Pia Vuolanto for the inspiring discussions on health expertise and for the co-authorship. Thank you Laura Kempainen, Teemu Kempainen and Veera Koskinen for thinking about the meanings and importance of crossing borders with me. Thank you Ilpo Helén for writing with me and challenging me in your honest fashion. Thank you Kia Andell and Marja-Liisa Honkasalo for leading me into unexpected and educating territories via our co-work on uncanny experiences. Thank you Olli Pyyhtinen and Jeannette Pols for your instruction and perceptive remarks at different stages of this work. Thank you Emma Lamberg, Henri Koskinen, Joni Jaakola and all members of our PhD seminar in Turku for all your help, and the comments and criticisms along the way. Thank you Minna Saariketo, Katja Pohjola, Carita Lockmer for co-living the emotionally taxing postgraduate everyday. Your company can lighten up the darkest of days. Thank you people of the Finnish Society for Science and Technology Studies for drawing me into the world of Finnish STS.

I wish to thank my parents and my brother for always supporting my curiosity, and my friends for all the fun and games.

Finally, I want to thank my wife Elina, for always being there. One day we and all our knowledge may be gone, disintegrated, and there may be no one left to remember that we ever existed but come whatever may, having had the chance to share a significant part of this existence with you is what really makes it feel like a gift.

October 2020
Harley Bergroth

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List of Original Publications

This dissertation is based on the following original publications, which are referred to in the text by their Roman numerals:

- I Bergroth, Harley. Terapeuttinen tiedontuotanto ja aktivoitumisen järjestelmät itsenmittajien arjessa. *Kulttuurintutkimus*, 2017; 34(1), p. 28–40.
- II Bergroth, Harley. ‘You can’t really control life’: dis/assembling self-knowledge with self-tracking technologies. *Distinktion: Journal of Social Theory*, 2019; 20(2), p. 190–206.
- III Bergroth, Harley & Helén, Ilpo. The Datafication of Therapeutic Life Management: Assembling the Self in Control Society. In Salmenniemi, S., Nurmi, J., Perheentupa, I. & Bergroth, H. (eds.) *Assembling Therapeutics: Cultures, Politics and Materiality*, 2019; London and New York: Routledge. p. 107–123.
- IV Vuolanto, Pia; Bergroth, Harley; Nurmi, Johanna & Salmenniemi, Suvi. Reconfiguring health knowledges? – contemporary modes of self-care as ‘everyday fringe medicine’. *Public Understanding of Science*, 2020; 29(5), p. 508–523.

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1 Introduction

Things vibrate. From the simplest of organisms to complex life forms, from the simplest of tools to the most advanced technological gadgets, all things vibrate. Beyond every static surface, there is constant vibration: if there were no vibration, there would be no life, only an eternity of still non-movement. However, by highlighting vibration not only do I refer to the physical-material understanding of 'existence' as atom-level vibration, but also to the symbolic understanding that *all things organise and affect the world around them*. Things – be they organisms, ideas, discourses, simple objects or complex technologies – emanate effects into their surroundings and come into being only through their relations to the environment. If things contain an 'essence', as famously argued by the sociologist and philosopher Bruno Latour (1999: 197), 'essence is existence and existence is action'. In this sense, vibration becomes resonance, as things exist only by resonating with their surroundings, i.e. by acting on, and shaping, the world. In a very general sense, this study is about vibrations in human-technology co-operation. More specifically, it focuses on a now popular and widespread everyday therapeutic life-management practice called self-tracking. I will explore ***how the human-technology co-work in self-tracking practices shape people's everyday life, their lifeworld and their sense of oneself***. By highlighting various self-related paradoxicalities that arise in everyday self-tracking practices, I will participate in the ongoing discussion about how humans and their technologies affect and reconfigure each other, and what this specifically means in the context of everyday self-tracking in a time permeated by therapeutic calls for taking charge of one's life and wellbeing.

In the Western world, millions of people now possess and employ self-tracking gadgets and related digital health applications (Schüll, 2016a; Lupton, 2016a) through which they can gather data on their lives and bodily functions and then consider using this data to improve their lives in some fashion. During my research, I have been one of these people. I initially bought a self-tracking device in 2015, a fitness tracking wristband (FitBit Charge HR) that helped me gather numerical data on my daily step counts, heart rate, sleep quality and calorie

consumption, among other things. I wore the device consistently for 8 months, seemingly learning new things about my body's functionalities and the patterns of my behaviour as the related mobile application in my phone gradually filled up with figures, graphs, averages and other mediums of insight. Furthermore, I learned not only about myself, but also about my surroundings, as my everyday urban living environment became 'quantified'. It became framed by the amount of steps it takes to walk certain routes, through which my relation to the environment changed; e.g. when walking to work, some route choices became more 'beneficial' than others (see also Prasopoulou, 2017; Pink & Fors, 2017). In everyday life, the actual hardware on my wrist gradually became easy to forget about. However, sometimes the wristband reminded me of its existence by providing gentle haptic vibrations to indicate, for example, that I had hit 10,000 daily steps – an achievement which in the current preventive medical discourse is often regarded as an indicator of sufficient activity for the maintenance of a healthy cardiovascular system¹.

At some point, I decided to stop wearing the device regularly, as in some sense I felt that there was nothing left for me to learn about myself through it at that time, an experience that researchers (Kristensen & Ruckenstein, 2018) have described as 'hitting a wall'. However, now, as I often find myself sitting down for extended periods of time working and trying to make sense of this chaotic mass of text that should someday become a thesis, it is obvious to me that there never really was a wall. In a sense I never really stopped wearing it – I never really 'gave up' the *technology* – even though the concrete wristband hardware has had a dead battery for a while and is currently buried under some junk somewhere at home. The activity of tracking left a mark. I now have a different smart watch device that I occasionally use, but even when I don't use a concrete device at all, which is quite often, I do think about my being differently than I did before getting entangled with technologies of self-tracking in my everyday life. In some ways, I am changed and, in a sense, I am self-tracking although I am not wearing a self-tracking device, for I often find myself reflecting on the very processes of my personal everyday being

¹ The proliferation of wearables has instantiated an understanding of the health benefits of taking 10,000 steps a day as a kind of common knowledge. However, recent research has rendered the scientific basis of such a recommendation questionable. It has been suggested that the often-heard recommendation actually stems from the trade name of a Japanese pedometer sold in the 1960's. The trade name of the device was Manpo-Kei, which translates to "10,000 steps meter". This trade name may have been chosen because the Japanese character for the number 10,000 resembles a man walking or running. However, according to research, actual health benefits can also be associated with notably lower levels of daily step activity (Lee et al., 2019).

that these devices taught me to monitor and manage in certain ways. Often, these days, *I still live the sticky connection* as I think about the daily step count and then find myself thinking that I really haven't been very active.

This position of an active non-user – or perhaps that of a passive user – is one example of the practical paradoxicality of self-tracking in everyday life. It invites us to rethink many of the common ways of thinking and talking about what ‘happens’ in self-tracking, i.e. in relation to ‘learning’ about oneself or ‘knowing’ oneself better through such practices. This study attempts to dive deep into such paradoxicalities by letting go of the idea of technology as a ‘tool’ that merely enables us to pursue human purposes such as self-knowledge. In a sense, tracker devices – as technologies and technological practices more generally – may be thought of through philosopher Jacques Derrida’s (1976) ideas on the ‘logic of supplement’, which offers an illuminating way of thinking about what it might mean to say that technology is a paradox. In common language, the term supplement refers to an object that is ‘added on to something’, and we may intuitively think of a tracker device as a supplement in the sense that it is simply added on to one’s life and body as an extra-bodily device, like a technological appendage, to empower or ‘enrich’ us in our pursuit of a better life. When thinking of enrichment in this sense, Derrida’s logic of supplement sees supplementation as completion without there really being a lack. However, the supplement also completes something as if filling a void, simultaneously signifying incompleteness. When applied to technology, the supplement is not just a useful ‘thing’ or device but also an event or ‘instance’ that is a ‘mark of an emptiness’ (Ibid.: 145); it not only aids or enriches but also promotes change and correction by marking incompleteness. Supplementation is, thus, always *both* addition to *and* substitution for something that is in some sense already ‘natural’ or complete – such as writing is to speech or masturbation is to sex.

This means that self-tracking technologies can, for example, be argued to *both* enrich our ability to know ourselves *and* change or correct the conditions surrounding how we know about ourselves. For example, for better or worse, since well before the advent of contemporary self-tracking technologies or older, analog self-measurement technologies, human beings have had embodied and discursive ways of producing knowledge about their activity and wellbeing in general, and these ways sometimes sit uneasily with the quantified, number-driven logic of self-tracking. We might then say that self-tracking technologies do not merely *enable* knowledge production (as the marketing would like us to believe), but also *change* its conditions and possibilities. A supplement, such as in our case a self-tracking device for a self-interested, health-conscious subject, both adds to and substitutes for (or replaces) one’s self-observation capabilities. In this sense, the logic of

supplement also questions the absence/presence dichotomy (in terms of *using* or *not using* self-tracking technologies) that so often haunts our accounts and imaginaries of self-tracking in practice. As will be argued later, we may relate to self-tracking technologies, and think through them, regardless of whether or not actual devices are tethered to our bodies. In any case, in this thesis, this framework of supplementarity invites the researcher to think through paradoxes; technology only enhances anything by and through changing it. For example, self-tracking may be seen as a practice of ‘ordering’ life – as a quest for enhanced order in terms of wellbeing – but as a transformative practice ordering is always also a process of dis-ordering existing orders.

Building on interview accounts, media materials and observations in self-tracking-related practices, this dissertation will shed light on the paradoxes and contradictions of self-tracking in everyday life. As a simple example of supplementarity and practical complexity in self-tracking, anyone who has personal experience with tracking aspects of their body in quantified form with common tracker devices such as fitness tracker wristbands and sleep trackers can probably relate to the experience of wondering whether to put their faith in the data and numbers or in their ‘gut feeling’. While rhetorically we often claim to favour one side of this dichotomy over the other, in practice self-tracking often becomes a matter of fitting together different modes of knowing about oneself and juggling multiple modes of knowing about oneself, even (or especially) when the quantitative and qualitative data seem tensioned or incompatible. While this problem in some sense surely also applies to older, analog technologies of self-measurement, the proliferation of digital, algorithmic self-tracking poses interesting questions in relation to the intensification of such paradoxes in everyday life. Some of the other paradoxes investigated in this thesis include questions of how we strive for ongoing control of that which is inherently uncontrollable, how we attempt to confirm and ‘actualise’ our bodily states or personal feelings in the present while lingering in the future (and perhaps in the past), how we simultaneously produce experiences of self-knowledge and uncertainty in self-tracking practice, and finally, how through the activity of self-tracking we can both attach to and detach from ‘official’ biomedical modes of knowing about health and wellbeing.

It could be said that as a social phenomenon self-tracking is a distinctive ‘culture’, a contemporary craze, a consumer trend, a lifestyle fad or even a digitalised mode of class-based distinction. All of these aspects can offer valuable insights into the phenomenon and are to some extent discussed in the pages of this study. However, overall, the main objective of this study as a whole is to ‘keep a steady eye in looking back at the machine’ (an expression borrowed from

discussions on teletechnology in Clough, 2000: 69), which in my case means that my focus is not on the ‘cultures’ (consumer culture, health culture, a culture of metricisation or a culture of therapeutic self-management, for example) that self-tracking machinery mediates, but on the technics, the machine. My focus is on how our self-tracking technologies *vibrate*, how they feed back into our mindsets of everyday therapeutic and wellbeing-oriented action. This study is about examining how the hardware and software of self-tracking *prescribes* (Latour, 1992) modes of being in the world and being with oneself. It is about examining how these technologies tap into the technological subconsciousness or technology-related non-conscious cognisation of human beings, directing how we act and think about ourselves (Hayles, 2006; see also Thrift, 2004), and doing so in ways that surpass our everyday consciousness over what we *think* we do with technologies. I want to look at how the human-technology arrangements of self-tracking ‘work’ in everyday life by inducing or promoting changes in modes of being and thinking. I will refer to this tendency of self-tracking technology to prescribe modes of action and certain mindsets as the ‘*techno-logic*’ of self-tracking.

This work thus owes much to the deconstructionist tradition, material semiotics and actor-network theoretical premises (see chapter 2) of trying to think beyond untenable binaries in terms of human-technology relationships. Despite its occasionally critical tone, my intention is not to claim that self-tracking technologies are inherently or unequivocally a negative phenomenon. Rather, my aim is to demystify self-tracking. In deconstructionist terms, technology is always *pharmakon*, i.e. both medicine and poison, and in order to grasp the profound effects technology has on the world it is necessary to map technological contradictions and ambiguities instead of simply endorsing or rebelling against any specific technological application.² Self-tracking technologies surely ‘work’ in different ways with different people in different situations and circumstances. Even more importantly, what I eventually think of as the central argument of this dissertation is condensed into the title of this PhD thesis – as an everyday means of self-care, therapeutic, proactive self-tracking often presents itself as a paradoxical activity. Self-tracking speaks to us in many tongues and lures us into many often contradictory directions.

² Modern technology – from industrial production to spacefaring and from communication to health care – has ‘always’ been indispensably intertwined with the dramaturgy of hope and the ethos of salvation. Yet, the dialectic of hope necessitates that hopeful visions of technological progress are accompanied by visions of technological dystopia. We then feel compelled to take a stand in relation to the question of whether technology is a boon or a bane, a blessing or a curse.

The multiple and sometimes contradictory character of technology in society is, of course, not my own invention. Rather, in this work, it has become a starting point, one that owes much to a plethora of previous research influenced, for example, by the idea of the ‘social construction of technology’ (e.g. Bijker et al., 1987). This tradition has aptly shown us how people relate to technologies in various ways, how technologies are tinkered with and how the ‘same’ technologies are effectively made into different things in different social contexts (although such academic works can sometimes be accused of replacing technological determinism with anthropocentric determinism). The more original side of this work relates to the detailed attempt to recognise and flesh out specific paradoxicalities of contemporary digital health technologies. I call the contradictions evident in everyday self-tracking practices ‘paradoxes’ because they are, in my view, contradictions that are highlighted by human action in self-tracking practices and in principle ever-present, even unresolvable, in the techno-logic of contemporary digital self-tracking. To repeat what was already said above, the intensified struggles for everyday ‘order’ – e.g. through ever more automated technologies of ‘knowing oneself’ and acting ‘right’ – always intensify the unexpected production of dis-order, which incites more action.

As anthropologist Dawn Nafus (2016, xii) once put it, self-tracking technologies represent a ‘significant new chapter in the ongoing story of what it is that numbers do for us, and do to us’ (and what numbers do *not* do, we might add). In opposition to our everyday imaginaries, which commonly propose self-tracking technologies as simple instruments of self-related knowledge production that enable self-control through numbers³, such technologies can in many ways make everyday life *more* rather than *less* complex. After all, even as early as almost a hundred years ago, the sociologist Robert K. Merton (1936) stated in a more down-to-earth fashion that complex systems in complex lifeworlds may deliver on some of their promises and purposes but also always bring about unintended consequences. It is, I think, by diving into the contradictions, paradoxes and unintended consequences of self-tracking that we can still gain new insights into how these technologies – in their various manifestations as specific devices – not

³ The idea of the importance of self-tracking and numbers in everyday life management has in recent decades been most clearly promoted by the Quantified Self movement. Born in the Bay Area of California in the first decade of the 2000s, it is a relatively loosely organised, global movement that brings together people who are interested in tracking, quantifying and self-managing various aspects of their lives. These people often share their findings with others. The spirit and telos of the movement is captured in the slogan ‘self-knowledge through numbers’ (see <https://quantifiedself.com>) (Lupton, 2016a).

only add to our social reality and sense of self, but also effectively reconfigure worlds.

1.1 What is proactive self-tracking and why should we care?

The term ‘self-tracking’ commonly denotes a wide range of life management technologies and activities with different wearable or near-body mobile technologies and biosensor devices through which people gather data about their lives and bodies (Lupton, 2016; Nafus, 2016; Ruckenstein & Schüll, 2018). The term ‘proactive’ employed here indicates that in this study my attention is focused on self-tracking that is conducted in everyday contexts as a voluntary and preventive means of health-monitoring and ‘risk management’, detached from clinical regimes and treatment programs through which people would monitor diagnosed illnesses.⁴

Contemporary proactive self-tracking technologies include, but are by no means limited to, smart watches and activity tracking fitness wristbands, exercise-related heart rate monitors, sleep tracking devices, and a plethora of digital health applications with which one can track one’s everyday activities and bodily processes, from general time-use patterns to menstrual cycles to daily water consumption to mood changes. Self-tracking has been practised in some form for centuries via the ‘logging’ of analog measurements produced with tools such as measurement poles and weight scales (Selke, 2016; Crawford et al. 2015). Arguably, however, the possibilities for modern everyday self-tracking have exploded with the development of new tools such as accelerometers and pressure, light or electricity-based biosensors through which information about movement and bodily rhythms and processes can be gathered automatically, often without paying continued attention to counting one’s steps, measuring one’s own pulse or consciously reflecting on personal stress levels and quality of sleep. For example, activity tracking wristbands (e.g. Polar Loop, FitBit) employ the accelerometer to measure daily step counts, while some sleep tracking technologies (e.g. Beddit)

⁴ The line between proactive and clinical self-tracking is of course sometimes somewhat blurry, especially in relation to so-called ‘lifestyle diseases’ such as type 2 diabetes and atherosclerosis. For example, three of my interviewees linked their current self-tracking activities to contacts with medical personnel who had informed them of elevated risks of such diseases, or even to past medical emergencies such as strokes. However, all interviewees stated that the employment of self-tracking gadgets in their everyday life was of their own initiative and was in no way encouraged or promoted by medical personnel.

employ a pressure-based sensor to measure heart rates and breathing rhythms during the time spent in bed. Some technologies for preventive stress management and ‘emotional intelligence’ (e.g. MoodMetric) measure electrodermal activity in order to analyse stress levels via the functioning of the body’s nervous systems.

Self-tracking is now a billion-dollar business worldwide and a central part of many health and wellness-related retail contexts as well as health-related events across Euro-American societies (Schüll 2016a; Sharon, 2017). This is also the case in Finland, which is where my empirical work has taken place. My participatory observation in recent years has involved events such the Upgraded Life Festival (in 2014 and 2015), which was organised within the premises of two distinguished universities in the Helsinki area, as well as Biohacker Summit (in 2015), which was organised in a prominent event venue in Helsinki and has since expanded abroad. Such events have provided platforms for Finnish start-up companies related to digital health and self-tracking (such as FirstBeat, Oura, Beddit, MoodMetric and others) to present and popularise their products in conference-style environments. Typically, these events bring together speakers from both scientific and entrepreneurial backgrounds who give presentations with themes ranging from nutritional coaching to transhumanist technoscience utopias. And in Finland, the digital health start-up scene has been booming indeed. For example, the national Finnish Funding Agency for Innovation (called Business Finland since 2018) has in recent years boasted a ‘Bits of Health’ program that has aimed to turn Finland into a ‘significant digital health hub where internationally successful companies are born’.⁵ Such goals have been realised, as evidenced by significant success stories, such as the purchase of Finnish sleep-tracking device manufacturer Beddit by international technology giant Apple in the spring of 2017.

Finnish sociologist Mika Pantzar (2012) has noted that while some Finnish technology companies – especially Polar Electro – have designed and developed modern self-tracking equipment such as wireless heart rate monitors since as early as the 1980s, near-body monitoring devices have traditionally occupied quite specific domains of professional life, such as clinical health care and professional sports. During the last few decades, the rise of individualistic and ‘therapeutic’ discourses on health and wellbeing in Finland and other Euro-American societies (Rose, 1990; McGee, 2005; Madsen, 2015; Salmenniemi et al. 2019) has propagated markets for algorithm-based self-monitoring devices that enable people to passively gather and visualise real-time information about themselves in an

⁵ See <https://www.businessfinland.fi/en/for-finnish-customers/services/programs/ended-programs/bits-of-health/> [last accessed 30/09/2020]

unprecedented way, all while going about their often busy and stressful lives. These therapeutic discourses, after all, typically promote reflective self-inspection and the attainment of self-knowledge. Thus, they also typically highlight self-responsibility and one's own ability to be in charge of one's life and wellbeing. In the fields of health care and digital health, such ideas surface through and mix with discourses of 'personalised' and patient-driven medicine (Swan, 2012; Topol, 2015; see also Sharon, 2017; Lupton 2016a; articles III and IV). These discourses encourage data-driven and individualised solutions for wellbeing and support preventive self-monitoring, which fits well with the increasing pressure for more efficiency that national health care systems face through the rhetoric of austerity (in Finland, see Wrede, 2008).

The users, the developers and the promoters of self-tracking technologies are all usually very aware of the limited objectivity – i.e. the technical limitations, inaccuracies and glitches – of current self-tracking technologies and specific gadgets. Yet, the phenomenon of self-tracking is in many ways surrounded by hyperbolic imaginaries on its *enabling* and *empowering* effects; how self-tracking data gadgets empower individuals to work on themselves, to better look after themselves and to lead healthier, happier and more productive lives. The empowering aspects of self-tracking may relate to a variety of arguments. For example, it may be pointed out that people's access to healthcare is limited, and thus self-tracking technologies bring (health) care closer to the individual. It may also be argued that self-tracking provides cost and time efficient care, helping individuals and service providers save time and money. Finally, it may be said that self-tracking helps people stay in better shape, both physically and mentally. For these reasons, among others, self-tracking technologies may of course be rightly seen as capable of producing empowering experiences for many people in many situations.

However, as will be shown throughout this study, when we consider how technologies 'vibrate' by conditioning our modes of knowing (about) the world and ourselves, such hyperbolic claims which 'black box' (Latour, 1999) self-tracking technologies in the sense of rendering them relatively free of complexities may also be quite detached from the everyday realities of *living with* self-tracking technologies and the data they produce. For example, self-tracking is definitely not an empowering regime of everyday self-care for everyone in every situation (article I). Even more importantly, based on our intuitive tendency to think of technology as a passive 'tool' for human purposes, we rarely consider how technology may be productive of new problems and even productive of the very conditions it is trying to alleviate or address in everyday life. For example, it may be argued that *in practice* self-tracking actively *produces* regimes of continuous

self-interest, (self-)control, anticipation and desire (cf. Introna, 2016; Adams et al. 2009; articles II and III), which in part explains why people often ‘stick with’ the mindset of tracking. While a specific technological gadget may produce experiences of knowing oneself better, the techno-logic of self-tracking – such as prescribing longitudinally extended acts of continuous monitoring – simultaneously produces a sustaining will to knowledge. After all, with the focus on the ‘self’, what we are actually tracking and constantly made aware of through self-tracking interfaces is not a coherent person in a single point in time, but an ever-developing *process*.

Moreover, self-tracking technologies – especially near-body gadgets that ‘automatically’ monitor the body and its processes – are now an integral part of social policy imaginaries from education to healthcare to housing to insurance across Euro-America (e.g. Lupton 2016a; Sharon, 2017; McFall, 2019). This means that while the technical gadgets themselves may shrink in size and become ubiquitous, ambient intelligence (Verbeek, 2009) in everyday use, we are currently looking at futures in which citizens’ lives become increasingly entangled with the big and small data they produce. These imagined developments and related possible futures also further blur the ‘voluntary’ character of self-tracking. As of today, most self-trackers still see their practice as a voluntary choice, but the more these technologies become entangled with people’s sense of social security, the more they also become ‘enforced’ (Lupton, 2016a: 10). Obviously the gathering and use of health data and related big data relates to an abundance of ethical issues that fall outside the scope of this thesis but have been fleshed out elsewhere in the field of digital humanities (for an overview, see e.g. Richterich, 2018; Sharon & Lucivero, 2019). However, it is also vital to probe deeper into the experiences of self-trackers – early-adopters as well as more ‘casual’ self-trackers – to learn more about how these technological data practices shape people’s modes of being, thinking and relating to themselves or others in everyday life. Thinking ethically about self-tracking calls for a deeper focus on thinking of technology as more-than-a-tool in everyday life, and this is one of the central aims of this thesis.

1.2 Mapping the literature on everyday self-tracking

Owing to the hype, everyday proactive self-tracking with wearable technology has been a hot topic across a wide range of fields in recent years. In the field of medical science, studies have often been interested in whether self-tracking devices can provide accurate health data (e.g. Case et al., 2015, for a review see Feehan et al., 2018) or help people improve their wellbeing in line with dominant conceptions of what counts as good health, such as by losing weight (Jakicic et al., 2016) or

becoming more active (DiFrancisco-Donoghue et al., 2018). In Human-Computer interaction studies, more interest has been directed towards mapping different patterns, habits of use and impacts of interaction with self-tracking technologies (Rooksby et al, 2014; Liu et al, 2015; Lazar et al., 2015, Kari et al., 2016). Studies in these fields show how the effects of self-tracking technology on individuals are not always in line with marketing claims promising health-related empowerment and improved wellbeing via data-based informatics. Such studies typically conceive of the ‘technology’ as ultimately a (passive) ‘tool’ subject to human use, interpretation and agency, and often aim to conceptualise human-technology interaction in terms that provide relevant insights and solutions for technology developers.

However, self-tracking – like any technological practice – is thoroughly a social phenomenon in that it both reflects and reconfigures the social and cultural context within which it is imagined, negotiated and conducted. Hence, there now also exists a diverse body of social scientific critical studies on self-tracking that probe the sociocultural and political conditions of the phenomenon, as well as the agential capacities of self-tracking technology. In what follows, I will review and evaluate this social scientific literature in order to ground my approach in existing scholarship on the topic. Specifically, I will tease out three thematic dimensions of analysing self-tracking, which nevertheless should not be understood as clear-cut categories of research, but as overlapping in a myriad of ways.

One influential line of thinking that has been drawn upon by many scholars relates to the **Foucauldian tradition** of governance and biopolitics. Many critical accounts have focused on how the human-technical ‘work’ conducted in everyday self-tracking relates to ideas of health- or wellbeing-related ‘assessment’ and ‘evaluation’ of bodies – whether this happens on the macro-level of big data mining or the micro-level of everyday self-evaluation. The framework of biopolitics, combined with a Foucauldian understanding of ‘technology’ as an organised form of knowledge (see Willcocks, 2006), suggests that self-tracking functions as an integral part of contemporary processes of enacting bodies and lives along the binaries of proper/improper or ideal/pathological in contemporary societies. Leisurely, proactive self-tracking then becomes a practice that is about (self-)discipline, (self-)control, and self-reflective normalisation (Lupton, 2012; 2013; Reigeluth, 2014; Ajana, 2017; Fotopoulou & O’Riordan, 2017; Sanders, 2017; article I). This is because self-tracking devices train and guide users to become and behave like good (health) citizens in relation to discourses on ‘proper’ being and in alignment with the requirements of the productive machinery (Foucault, 2010). This machinery summons an active workforce that is self-sufficient in the sense of taking

responsibility for its own capabilities for productive action, such as through constant health consciousness.

Of course, since the rise of digital infrastructures and networked data systems at the dawn of 21st century, processes of discipline and governance have also evolved and may now seem less tied to concrete institutions and expert instances (schools, hospitals, prisons) than is evident in Foucault's main body of work. However, his influence relates to discussions on contemporary, digital forms of capitalism in the sense that critical studies have often reflected upon self-tracking in relation to capitalist, neoliberal modes of conduct (Lupton, 2017: 63–64; Ajana, 2017; En & Pöll, 2016; Maturo et al. 2016) or, for example, as the management of labour force energies inside and outside concrete organisational contexts (Till, 2014; Moore & Robinson, 2015, article III in this thesis). This relates to the 'new spirit of capitalism' (Boltanski & Chiapello, 2005), which summons a flexible, active and self-regulative workforce that keeps track of its own adaptation to systemic productive demands through 'liberating gadgets' (Ibid: 437) that excite work on the self, e.g. by means of reconstructing potentially tedious self-development as a potentially rewarding game.

When analysed as such a technology of power, it can be argued that self-tracking affects the world and reconfigures self-relations, not only by empowering people, but by mediating, entrenching, (re)producing and putting into practice existing processes of evaluation and valuation, inclusion and exclusion. In this context, healthy and wellbeing bodies are 'proper' productive bodies. Self-tracking may then be thought to manifest as human-technology co-operative work on maintaining relations of power, relations which are already coded into the software functionalities of such technologies, e.g. as various haptic vibration functions, 'educational' colour codes indicating 'proper' modes of behaviour, or supportive on-screen messages executed by and through the biopedagogical language of algorithms (article I; Fotopoulou & O'Riordan, 2017). Algorithms, after all, are nothing more than sets of (in effect, a language of) executive commands through which computers and computation-based technologies solve the 'problems' they are faced with (Frabetti, 2015). In this way, following Foucault, we can think of self-tracking technology as an organised (or sociotechnical) form of discursive, normative language concerning health and wellbeing. While aptly taking issue with the normative (body) politics of self-tracking, this line of thinking can perhaps rightly be criticised for sometimes placing too much emphasis on structures or discourses in directing our use of technology.

Late in his career, Foucault (1988) seemingly steered away from an emphasis on discipline and turned towards an ethics of the self, which saw power as not only repressive, but also productive of possibilities, counter-power and resistance. This

has been one of the crucial influences in another strand of studies of self-tracking, which may be characterised as the **anthropological tradition**. This tradition focuses on understanding the ‘culture(s)’ of self-tracking from within, and the *everyday lived experiences* of self-tracking. Several ethnographical studies have called for a deeper look into everyday lives with these technologies and acknowledged that people are (at least to some degree) able to ‘work with’ self-tracking technologies to construct their own meaning for the practice and the data produced. People may use the devices differently than the designers intended. They may ‘sabotage’ or hack the functionalities of self-tracking devices, or simply control the ways in which (and what kind of) everyday data about them becomes registered and processed (see Nafus & Sherman, 2016; Sharon & Zandbergen, 2016; Lupton, 2016a; Ruckenstein & Schüll, 2018). People often express a ‘playful’ and experimental character with self-tracking technologies (Kristensen & Ruckenstein, 2018). For example, as evident in some of my interviews, a heart rate monitor may be designed to monitor resting heart rate or active heart rates during exercise, but it may also be employed in the personal investigation of how alcohol consumption affects one’s sleep. Indeed, it seems futile to attempt to reduce the effects of technology to the technology itself (or the discourse it explicitly offers and mediates), as if technology (or discourse) were a deterministic force dictating the behaviour of human beings outside the context of practice.

The anthropological tradition often highlights the idea that self-tracking may produce empowerment (Ruckenstein, 2014) and modes of ‘soft resistance’ (Nafus & Sherman, 2016) against capitalist demands. Hence, despite the focus on quantification and numbers in self-tracking practices and Quantified Self communities, the practice of self-tracking should *not* be understood as ‘data fetishist’ in the sense of people blindly acting by the numbers (Sharon & Zandbergen, 2016). Rather, it should be understood as a reflective practice in and through which the relevance and meaning of self-tracking technology and the data produced is evaluated in the context of unique situated circumstances and experiences (Pantzar & Ruckenstein, 2017). As such, what may be highlighted in this tradition, for example, are the potentials of self-tracking in promoting affective elevation and empowerment instead of repressive discipline.

Consequently, in this line of thinking, self-tracking practices are rendered a phenomenon permeated by complexity. It seems that self-tracking is not a case of either-or, not simply governance, but also some form of (perhaps covert) resistance (Nafus & Sherman 2014; Sharon & Zandbergen, 2016). It is not simply a quest for ‘objectivity’ (although metric data currently does hold significant cultural power as a medium of ‘truth’), but rather a quest for ‘situated objectivity’. People in their respective positions and situations always *interpret* datafied representations of

themselves, or ‘put data to use’, in various ways in relation to their own systems of knowledge (Pantzar & Ruckenstein, 2017, see also Fiore-Gartland & Neff, 2015). Furthermore, this line of thinking correctly highlights how self-tracking, especially within the related pioneering Quantified Self movement, may become productive of social relationships, solidarity and communicative communion. It may also liberate people from sometimes restrictive forms of institutionalised expertise, e.g. in relation to medical knowledge and medical conditions (Sharon & Zandbergen, 2016).

However, reflecting the age old debates between deterministic and social constructivist approaches to technology, it may be argued that in their effort to avoid reducing self-tracking to ‘discourse’ or systemic structures, this tradition often favours the human factor, affording the human beings and communities (most of) the agency in negotiating the use and effects of self-tracking technology. Furthermore, while human-oriented accounts aptly characterise what self-tracking may become in tech-savvy QS communities, it still bares well to keep in mind that although humans can and do play or ‘misbehave’ with technology – depending greatly on their know-how in tinkering with technical milieus of hardware and code – it may still be argued that technology conditions the ways in which we think and go about resisting its (perceived or actual) effects. For example, even within the more tech-savvy communities it seems implausible that people would ‘misbehave’ with an analog or digital measurement device (apart from declining to use it altogether) without making use of the affordance(s) of *measurement* in some fashion. Often, the acts of ‘resistance’ are conditioned by technology as well. A hasty analogy might concern reading a book that presents a social critique of the corrosive effect of smart technology after learning about the book from a tweet and ordering home delivery via a smartphone application. Resistance may then also be seen as being ‘brought to life’ by and through the very object of critique.

To be fair, both the Foucauldian and anthropological traditions commonly seek to engage with ideas emanating from the field of continental philosophy on knowledge, science and technology, and the broad field of science & technology studies (STS). Furthermore, as I have argued, they both offer illuminating vistas into what it may mean in practice to think that ‘technology conditions our experience of the world’. However, there now appears a third tradition, which I call the **socio-technical tradition**. By this I refer to studies that emphasise the ways in which human-technical assemblages ‘work’ in everyday life by conditioning experience and which (to at least some degree) aim to highlight technological and non-human agencies in practice. As a whole, this tradition involves an interdisciplinary emphasis that draws from philosophy, anthropology, sociology, human-computer interaction, human geography, psychology, and media studies,

along with a diversity of methods. The focus is less on practical interpretation of data by humans and more on datafied experience of the world. One of the earlier texts incorporating such views was presented by Bode & Kristensen (2015), who were critical of the concept of ‘data double’ (which focuses on how people interpret datafied representations of themselves) and suggested that self-tracking is rather a process of ‘doppelgängering’ in which representations become *actors* in self-enactment. As a cultural historical actant, the notion of the doppelgänger invokes the political aspect of the becoming of a person with and through the ‘evil’ or ‘deviant’ within.

In their work influenced by sensory ethnography, Sarah Pink and Vaike Fors (2017) have demonstrated that self-tracking tacitly invokes modes of being-in-the-world, as quantified measures on one’s activity can enact a new kind of understanding of one’s surrounding environment, e.g. by actualising in data the steepness of a hill. A similar idea is present in the work of information systems researcher Elpida Prasopoulou (2017), who writes about mundane activities and environments becoming quantified: ‘a trip to the supermarket is 500 steps. If I decide to make a longer walk on my way to the grocery shop to clear my head before dinner, I’ll record 2000 steps.’ As our lifeworlds become datafied, they also concretely change. In her more recent work, critical sociologist Deborah Lupton (2016b) considered self-tracking and data in terms of human-technology companionship and the metaphor of ‘eating data’ (see also Mol, 2008). This metaphor implies that just as with ingesting nutritional ingredients, parts of data become processed and absorbed into the body when ‘ingested’, and in the end it becomes impossible to separate foodstuff from oneself.

In some instances, anthropologically-oriented writers have brought up the centrality of (the experience of) time and temporality in self-tracking, which invites further ties to STS. In empirical studies focusing on human-data relationships, anthropologists Natascha Dow Schüll (2016b) and Jamie Sherman (2016) have brought up the idea that self-tracking is a practice of assembling together temporally scattered data points. Schüll (2016b) refers to this process by mentioning notions of the production of ‘time-series self’ in self-tracking practices. Sherman (2016) posits that this relational character enables people to establish and experience objectivity because, although the tracking technology itself may not be found to be objectively accurate, measurements can still be seen as accurate *in relation to similar measurements of the same people in different points in time*. Sherman’s (ibid.) work also highlights self-tracking as an aesthetic practice, drawing connections to technologies of film and photography. Day & Lury (2016) suggest that self-tracking may be conceived of as an ongoing process of self-composition by drawing an analogy to acts of ‘stitching’. This gives rise to the interpretation that tracking practices present an active making of ‘tracks’ which, in

principle, always lead people on. These studies have directed me to reflect upon how one's digitalising and digitally visualised relation to the self may invoke new modes of being and temporality in everyday experience and self-orientation.

This line of work resonates with geographer Nigel Thrift's (2004) notions of the 'technological unconscious' and literary critic Katherine Hayles' (2006; 2017) ideas on how we do not just (consciously) *think with* technology but (subtly) *cognise with* technology, meaning that technologies change not only our thoughts, but also the very contextual conditions of our thinking (in this case, in relation to ourselves). For example, media scholars Lomborg et al. (2018) focus on (socio)psychological notions of flow and repetition as a central means of understanding how the experience of self-tracking propagates engagement with the technologies of self-tracking. They contend that users are not 'hooked' to self-tracking by the technologies themselves since, for example, users may disengage if the technologies push or nudge their message of optimisation too hard. Rather, the user's use of technology prescribes experiences of temporal flow as users sustain their negotiations with the data or with other people (such as personal trainers, coaches or friends) who contribute to interpreting the data with and through the use of technology.

In general, STS-influenced research invites us to think about how technologies condition our ways of being in the world and knowing about the world and ourselves. Self-tracking technologies do this not only by 'nudging' (e.g. Schüll, 2016a) us with haptic alerts for idleness or by encouraging e-mails, but by vibrating in our (sub)consciousness. They do this by tying our sense of self into the flow of time, by hooking or luring us into the repetitive patterns and distinctive 'choreographies' of human-data feedback loops (Parviainen, 2016) and repetitive flows of quantified information. They do this by promoting an experimental mindset and, as Foucault might say, a 'will to knowledge', rather than by offering any definitive, stable knowledge. While being sympathetic to such views, I do think, however, that the related processual ontologies are not often followed as far as they could be, despite the now common vocabularies of assemblages, mediations and human-data (or human-technology) interactions in self-tracking research.

For example, most studies on the topic of self-tracking still seem to build on the premise that the human is the 'user' and the device is the one that is 'used', be it talk about governance, lived experience or human-technical data mediations. In other words, while these studies aptly illuminate the ways in which data practices shape and condition our behaviour in relating to ourselves, in terms of human-technology relationship they tend to focus on how the human and the non-human

interact instead of focusing on how the ‘human’ and that which is thought of as ‘non-human’ *emerge* or *intra-act* (Barad, 2007) through each other⁶. This implicitly means that the human ‘user’ is essentialised as an autonomous agent who acts in certain ways under the influence of technology (or wields one’s agential capacities over technology) instead of being merely one of the actors that *emerge* and *transform* in technological practice. I argue that this is not enough for us to truly grasp the profound effects of technological practice in general, or the now popular phenomenon of digital self-tracking in particular. Technology not only affects the way we act (including acts of knowing/thinking), it also changes the very conditions of acting.

While drawing notable theoretical and methodological influence from all of the important types of research mentioned above, this thesis also seeks to create something new from them and further develop the field. Following Lucas Introna (2013), I argue that despite our fine-tuned theoretical concepts of sociomateriality and our will to surpass limiting dualisms (such as those between ‘the social’ and ‘the material’ or the ‘human’ and the ‘technical’) we still tend to draw boundaries between these apparently different sides of reality. This may often prevent us from grasping the complexity of technological practices. Such human-technology bifurcation is in part constructed by our attachment to linguistic expression, for *in the practice of language we still tend to separate humans and their ‘tools’* in terms of agency, e.g. by speaking about ‘users’ and human-technology *interactions* (this line of criticism is elaborated further in chapter 2).

This is a problem because by drawing these boundaries, we involuntarily risk prioritising the agential properties of one side over the other. Thus, we also risk missing some aspects of what the ‘actuality’ or the ‘phenomenon’ of self-tracking assemblages at work is (cf. *ibid.*) or what the ‘self’ is that emerges in these assemblages. This thesis addresses this lacuna by teasing out some of the paradoxicalities of self-tracking in practice, and argues for a call to let go of the underlying presupposition of the human as the ultimate ‘author’ of ‘reality’. This is

⁶ The concept of intra-action stems from Barad’s (2007) ‘agential realist’ reading of quantum physical phenomena. Unlike ‘interaction’, which takes place between two or more pre-established entities that then interact with each other, the concept of ‘intra-action’ refers to the process of things (humans, technologies, ideas) *becoming* through each other. To put it another way, any ‘stuff’ or ‘object’ only ever emerges through relations, and not the other way around; *relata* do not exist independent of the relation. The concept of intra-action has sometimes been brought up in relation to self-tracking (see e.g. En & Pöll, 2016; Gardner & Jenkins, 2016), laying the groundwork for further investigation into the emergences and reconfigurations taking place in everyday self-tracking assemblages.

why I am not happy with contending that in self-tracking we make the self divided in time, for example. Rather, I speak of the self *becoming* dividual or a temporal object, for once the self becomes anew by and through technology, it cannot exactly un-become into what it was before.

By shifting the focus from cultures to technology, I contribute to the understanding of mundane everyday regimes of self-tracking. While there now exists empirical social scientific research on everyday life with self-tracking technologies, an ethnographically and ‘technographically’ (see chapter 3) oriented focus on everyday experiences beyond the tech-savvy Quantified Self communities is still relatively rare in research. This study builds on the idea that technology is always acquiring multiple meanings and purposes, and yet attempts to relate this idea with an understanding of how technologies of self-tracking frame our ways of knowing about ourselves. Through its novel emphasis on the paradox-ridden techno-logic of everyday therapeutic self-tracking, it contributes to our understanding of the everyday activities and actualities of self-tracking. In addition to focusing on (and fleshing out) various paradoxes in everyday self-tracking practices in a novel fashion, the main contributions of this work to existing scholarly literatures are the following:

First, this study advances theorisation on self-tracking by arguing for and applying process ontological premises (elaborated further in subchapter 2.2). It seeks to make sense of what ‘happens’ in self-tracking in everyday lives, including *beyond* the often-discussed dynamics of governance/resistance. This means a shift away from looking at self-tracking practices through human-directed use-relations and towards seeing these practices through relations of becoming (Introna, 2013; Barad, 2006; DeLanda, 2006; Stiegler 1998). In terms of the research question focusing on the formation and emergence of the self in these practices, this shift enables a focus not so much on what is ‘made’ of the self through representation, interpretation, desire, etc., but on what ‘becomes’ of the self through the co-work of humans and technologies in everyday self-tracking practices. In the context of this dissertation, this contribution entails novel theoretical discussions of the repercussions of proactive self-tracking in everyday lives, such as the emergence of the self as a ‘temporal object’ through the phenomenon of self-related temporalisation (article II).

Second, the study contributes to literature on *therapeutic cultures* (see chapter 2) by discussing what becomes of therapeutic discourses in the context of digital everyday self-tracking. In existing literature, self-tracking is sometimes connected to a cultural framework of therapeutic culture (Maturo et al. 2016; Lupton, 2016a), but it is usually not empirically investigated how self-tracking actually becomes therapeutic to people in practice and how self-tracking as a data-driven practice

shapes what becomes of therapeutic culture. In this sense, this dissertation promotes discussions of how assemblage theorising can deepen our understanding of the sociotechnical (re)configuration of therapeutic discourses in the context of datafication. While wellbeing-oriented therapeutic culture, as described in chapter 2, no doubt influences and propagates the use and commercial success of self-tracking technologies, such culture should not be understood as a static framework that functions independently of the technologies and applications through which it is mediated (Salmenniemi et al., 2019: 7–8). This entails discussions of how self-tracking excites therapeutic action by dividing selves and by what may be called ‘fragmentary holism’ (article III), for example, or about how self-tracking as an everyday activity participates in the sometimes subtle, sometimes notable reconfiguration of public understanding of (medical) science and expertise (article IV).

2 Therapeutic agencements of self-tracking

In this section, I will present the main theoretical foundations that have guided this research. I will begin by discussing self-tracking as related to contemporary 'therapeutic culture' from a relationalist point of view. I will then further elaborate on the philosophical foundations of thinking about the active, constructive role of technology in human experience of the world and oneself.

2.1 Tracking the self in therapeutic culture

'Therapeutic culture' typically refers to a cultural framework in and through which health and wellbeing are made sense of through psychological and psychologised modes of knowing about the self and working on the self. This is evident in the rise of life coaching services and pop-psychological self-help literature, for example, as well as in many public policy practices through which the contexts of working life and education have become saturated by proactive life management discourses and the promotion of emotional skills (Illouz, 2008; Madsen, 2014; Nehring et al. 2016). One of the most notable observers and critics of therapeutic culture in recent decades has been sociologist Nikolas Rose (see 1990; 1999), who analyses the post-war development of psy disciplines – especially psychology – and their intertwining with advanced liberal art of government. Rose applies Foucauldian analytics of power and shows that psy disciplines are central in how modern 'selves' have become understood and experienced as something that can, and should, be 'made up', worked upon and constantly reinvented to the point that it now seems to be a 'natural' state of matters that humans strive for continuous self-awareness and self-realisation. In Rose's view, this enacts new kinds of governable subjects and enables, in effect, neoliberal rule at a distance as individuals learn to maintain self-management according to, for example, the guidelines of experts or authority.

Of course, criticism of therapy culture did not start with Rose. Inspired by Philip Rieff's (1966) and Christopher Lasch's (1979) critical writings on the

'triumph of the therapeutic' and the rise of self-centred 'culture of narcissism' in contemporary (American) capitalism, cultural critics have long bashed therapeutic culture. They have seen it as a kind of opium for the masses in productivity and profit-oriented societies in which people are increasingly encouraged to work on themselves in order to cope with issues stemming from structural inequality, consumerism, productivity demands, and related ills such as experienced meaninglessness and burnouts, for example (e.g. Lasch 1979, Madsen, 2015). Such cultural criticism has typically centred on the individualising tendencies of therapeutic culture, and seen it as a paramount threat to solidarity, social engagement and the common good.

Critical studies have argued from various angles that while the proliferation of therapeutic culture may of course sometimes help individuals, it is also deeply problematic as it tends to render structural issues into personal pathologies and matters of self-development, and act as a form of governance or discipline. In the 21st Century, Israeli sociologist Eva Illouz has attempted to draw from, and move beyond, the American cultural criticism and governmentality studies in relation to therapy cultures. For example, in *Saving the Modern Soul* (2008) she attempts to look more deeply into how therapeutic narratives adapt and work in the everyday contexts of work and family life, instead of presupposing such a culture as solely disciplinary. One of the ideas in her book is that the significance of emotional self-control has taken root in both the work and family spheres as part of the therapy-infused rationalisation of modern capitalism. In the process, it reconfigures contemporary gender dynamics, for the self should now be constructed by reconciling 'masculine' assertiveness and 'feminine' emotional intelligence (Ibid., 240). While it does in some ways reproduce totalising notions of 'the therapeutic era', Illouz's work has since inspired nuanced investigations into how therapeutic culture is engaged with and works with other notable cultural and possibly subversive frameworks (see e.g. Aubry & Travis, 2015; Salmenniemi, 2017; Nehring & Kerrigan 2019; Perheentupa, 2019).

In any case, at the core of most scholarly attempts to understand therapeutic culture is the idea that the 'self' and particular notions of selfhood have gained a novel significance in modern life and modern capitalism. As mentioned earlier, self-tracking has sometimes been connected with the rise of therapeutic discourses of individualised wellbeing and selfhood (Maturo et al., 2016; Lupton, 2016a: 38–39; Article I). The connection between self-tracking and therapeutic culture makes sense not only theoretically, but also empirically. Popular self-tracking imaginaries – meaning, for example, the marketing imaginaries through which self-tracking is envisaged to help people – and common therapeutic discourses often explicitly highlight quests to become 'a better version of oneself' and find one's own

authentic, personalised recipe for health, wellbeing and happiness through continuous self-monitoring, self-reflection and self-awareness. In self-tracking, people are encouraged to take control of their lives – or some complex aspects of their lives – and become fitter, healthier and happier. This should be done via the monitoring and optimisation of their habits and bodily functions. As noted by Schüll (2016a) in her observations of digital health-related events in the US, consumers are eagerly led to believe that our data reveals something about who we *really* are.

Should we wish to follow the idea of the (un)holy union between therapeutic culture and modern capitalism, self-tracking technologies may be seen as 'liberating gadgets' of the newly energised flexible capitalism (Boltanski & Chiapello, 2005: 437–8, see also Till, 2014) as described earlier. They are liberating gadgets because they make ongoing self-management a fun game through which potential or actual workforce is nudged into maintaining wellbeing and productivity by investing in themselves and by, e.g. voluntary exercise and self-regulation. However, this dissertation holds that self-tracking is not simply or solely capitalist oppression (although capitalism and productivity-oriented discourses are, no doubt, important actants in popular self-tracking assemblages). Instead, I argue that digital gadgets such as self-tracking devices work as 'supplementary', for they may offer empowerment by turning the self into an object of becoming and transformation, and in the process simultaneously reveal the self as persistently incomplete (a central aspect in articles II and III). In the latter sense, self-tracking fits firmly in the continuum of body projects and self-projects of (post)modern society. Self-tracking gadgets can undoubtedly help and aid people in their self-improvement goals (at least temporarily) by providing experiences of becoming healthier, fitter and better informed about oneself and various aspects of one's body, for example. However, self-tracking also prescribes and effectively *enacts* perpetual regimes of therapeutic action as much as it serves to help people achieve personal goals. As such, everyday self-tracking assemblages promote self-control in practice, but may also challenge and even undo personal therapeutic imaginaries of self-control.

Indeed, in the opening pages of his book *Optimizing the Self: Social Representations of Self-help*, psychologist Ole Jacob Madsen (2015, 1–2) draws attention to the fundamental paradox of self-help books specifically, but also to the 'therapeutic industry' more generally. He argues that the lure of a variety of therapeutic technologies often stems from them not being very effective in doing what individual human beings think that they are supposed to do, i.e. enact happier, healthier, more balanced and better-informed lives. More to the point, it may be argued that while self-help books may indeed help people, they do so by and

through enacting problems. For example, the quest for, and perceived success in, developing 'self-awareness' is dependent on the enactment of a related 'problem', which may then be resolved. The problem being that the person is to some degree *not aware* of him or herself, at least not in the right way.

In the context of digital self-tracking, here I wish to build a connection to the work of French philosopher Michel Serres, who in *The Parasite* (2007: 79; 86–90) writes about technological systems 'working because they do not work'. It is important to stress that this is definitely *not* to say that therapeutic technologies of self-development are, in general, useless. Sometimes self-help technologies or self-tracking technologies do have beneficial effects in people's personal quests for a better life. However, Serres' phrase does convey the idea that dysfunction is always part of any functioning system, and Serres elaborates on this through the concept of *noise*. For example, a system of communication such as one's personal system of self-tracking is programmed to transmit a signal, namely knowledge or understanding about one's wellbeing. However, in Serres' thought, noise is the 'third man', always present in the system of communication, always haunting the channel and hindering the transmission, for noise (static, incoherence, or in the case of self-tracking perhaps randomness, delay, doubt, insufficiency or misunderstanding) is always part of the 'work' of the system. If the signal were perfect, i.e. free of noise, the whole system would disappear or become meaningless, for every signal would be transmitted in perfect clarity, as if through instant telepathy and objectivity. If a signal of self-tracking was perfect, one would possess absolute knowledge on one's wellbeing and would seek no further information on one's life and body – there would be 'no spaces of transformation'.

One of the contributions of this study is then to consider more specifically what it would mean if digital therapeutic technologies of self-tracking 'work because they do not work'. As will be elaborated in the articles of this thesis, one way to make sense of this question is to suggest that such technologies actively enact the kind of everyday 'problems' that they are thought to solve via therapeutic intervention. It may be argued that most, if not all, therapeutic technologies enact the self as a process or a project that should be worked upon in some way, but self-tracking technologies contain unique characteristics in this regard. This is due to their data-driven design, through which selves are rendered un/problematic via various visual and haptic cues (article I) or in which selves emerge as perpetually incomplete via linear trajectories, graph designs and the divisive techno-logic of self-tracking (articles II and III). The articles in this thesis thus present some ways in which self-tracking technologies *both* work *and* do not work.

So, while self-tracking can then be perceived of as part and parcel of 'therapeutic culture', I would prefer to characterise self-tracking technologies as

part of people's everyday therapeutic *agencements*. This will be elaborated further in the following subchapter. The notion of 'therapeutic culture' implies a more or less static and homogenic framework within which specific technologies can be situated, but which itself almost seems set in stone. It has been suggested elsewhere that with any form of therapeutic technologies, researchers should consider the notion of therapeutic assemblages/*agencements* instead of 'therapeutic cultures'. This would allow for better consideration of the role of technologies in shaping what becomes of 'culture' in various situated practices (Salmenniemi et al. 2019), such as in the context of digital self-tracking. In the context of this thesis, such a focus on assemblages reveals paradoxes in the ways in which self-tracking technologies, despite their 'therapeutic' aura, may become (experienced as) counterproductive in practice. This is partly because while self-tracking imaginaries incorporate influences from more traditional therapeutic discourses such as holistic health and self-help parlance, in practice the digital milieu of self-tracking constitute distinctive and sometimes contradictory therapeutic regimes of action in everyday life (see article III).

2.2 Therapeutic *agencements*

My focus on the relationality of self-tracking as a therapeutic technology stems from a tradition of assemblage theory that is typically linked to the work of French philosophers Gilles Deleuze and Felix Guattari, who developed the idea in their seminal work *A Thousand Plateaus* (1987; see also DeLanda, 2006). Assemblage theory highlights the processuality of social reality, referring to the idea that 'reality' is not determined solely by nature, nurture nor any underlying 'social structure' (such as 'culture'). Rather, reality comes into being and into effect through webs of heterogeneous relations; reality is a collection or an arrangement of components that join together *in action*. Practically, this means that things (material entities, ideologies, bodies, selves, etc.) are not essentially comprehensible apart from the relations that constitute them. To put it another way, things do not merely 'exist' out there in the world, but they 'emerge' through relations and become 'actual' through *action* and *practice*. For example, a thing such as a city 'emerges' (or is, in fact, constantly produced and reproduced) *in action* as ideas of urbanisation, networks of people, services and buildings as well as flows of traffic – both within and exterior to the thing itself – come together and make a city 'happen'. It is the same thing with any entity and the same with therapeutic culture – culture is a collection of processes and events happening, of things coming together and acting together.

Importantly, an assemblage also shapes all entities that are part of the assemblage. For example, in and through the entity of a ‘city’ people become urban city dwellers with their distinctive urban patterns of thought and action. Human culture thus acquires specific urban flavours and car design may change to meet the demands of tight city parking. The capacity of assemblages to shape their constitutive components implies agency that is not reducible to any single entity such as a human being. In fact, the concept of assemblage is a translation of the French term *agencement*, which is a wordplay that accommodates both the idea of an arrangement (un agencement) and agency (agencer). Political scientist Koray Caliskan and sociologist Michel Callon (2010: 9) argue that ‘[...] agencies and arrangements are not separate. *Agencements* denote socio-technical arrangements when they are considered from the point [of] view of their capacity to act.’ In my investigation of self-tracking practices, I attempt to employ the concept of assemblage while remaining sensitive to the meaning inscribed in agencement. I try to employ the concept as not only an arrangement of different components, such as human bodies, self-tracking technologies, ideological influences, political discourses, etc., but also as meshworks of agency in which all components of the assemblage actively configure and reconfigure each other, however subtle these reconfigurations may be.

Assemblage theory may be criticised for proposing that the researcher take into account every possible actant that ‘works’ within the assemblage in order to adequately describe said assemblage. Even in a hypothetical world in which we have no word count limits for our research papers, this would of course be impossible. However, all research faces the same problem; we always have to limit our scope, whether we speak of factors, variables, causes, effects or actants. Assemblage can then be understood more as a theoretically-methodologically guiding sensibility than a methodical imperative of describing actant-bundles as a whole (I am fairly certain that it cannot be done!). In this study, assemblage is a theoretical-methodological sensibility in the sense of producing sensitivity for symmetrical relations in terms of agency, meaning that the aim is to avoid placing any actant (such as the human being, or the technical device, or an overarching ‘culture’) as the ‘director’ of technological practice.

Assemblage also works as a theoretical concept that deconstructs the binary between specificity/generality in research – through the idea of assemblage, the specific always resonates with the general and vice versa. In terms of specificity, different self-tracking devices certainly produce different modes of knowing about one’s body. The researcher can then look specifically at activity tracking wristbands, for example, and say that they shape one’s self-image by including measurements on movement and heart rate, while excluding other aspects of the

living organism through which the self could be assessed and understood (Lupton, 2016a; Prasopoulou, 2017). We could then say, for example, that popular activity tracking wristbands ‘enact’ or individuate selves by and through algorithmically produced and morally charged conceptions of activity (Article I). However, while this is true, a fixation on specificity may also divert researchers from mapping the broader processes through which the techno-logic of self-tracking – or the working of the technological assemblage of self-tracking – shapes lifeworlds.

The idea of a ‘technological assemblage’ is useful here as well because it is often hard to pinpoint everyday self-tracking to a specific set of equipment or measurements. This is underlined by the observation that, in practice, self-trackers often act with multiple devices (as well as with their personal observations ‘off the record’) that enable and produce biomarkers through which one can evaluate one’s self-development. Furthermore, as evident in my interviews as well as others’ work (e.g. Sherman, 2016; Sharon & Zandbergen, 2016), self-trackers are usually quite aware of the limitations of any *specific* device they happen to be using (‘that activity tracker could definitely measure steps more accurately!’) while still having faith in the general reliability and value of self-tracking measurements. Be that as it may, even if a person is simply ‘dabbling with’ a specific measurement technology (as might be argued with some of my interviewees) such as an activity tracking fitness wristband – which in any case would usually now contain multiple features such as step count tracking, calorie consumption tracking, sleep tracking, resting heart rate tracking, etc. with varying degrees of reliability – the practice of self-tracking produces and invokes *relations* to other technologies of probing and investigating the self by measurement. Having begun measuring the self with any device, many interviewees talked about a gradual increased interest in measuring different things with different devices, more accurately and in different situations.

The questioning of specificity also underlines the idea that no technology is imagined, developed, marketed and finally used in a vacuum. Rather, *all technology is always an exteriorisation of our existing ways of acting and thinking in the world*. As already argued, the practice of engaging with visual (and often numeric and quantifiable) data for evaluative purposes is nothing especially new. It has been around for centuries (see e.g. Crawford et al., 2015; Martin, 2007), for technologies for self-tracking also include analog wooden measurement poles, notebooks, mood charts and weight scales, among other things. However, at least two things can be argued to be ‘new’ in the contemporary, digitised movement of self-tracking. One is the commodification of self-monitoring within therapeutic industries (McGee, 2005, Madsen, 2015, Salmenniemi et al. 2019). The other is the intensity through which digital, algorithmic technologies ‘work with’ us and (are designed to) steer our behaviour and thoughts in and through the interfaces and

backstages of everyday life, for the evaluative gaze of these technologies reaches beneath our skin and often collects data about us even when we are occupied with mundane activities in our everyday lives. In this sense, the wider *techno-logic* of self-tracking is itself a historical assemblage/agencement that acquires various forms in and through the therapeutic industry of today.

2.3 Vibrant technology

Assemblage/agencement theorising may seem abstract and distinct from the everyday experience of human beings. After all, we tend to see technologies as tools that surely do not act in their own right. Yet, at the same time, this line of thinking appears to be a powerful analytical tool that enables us to re-focus our gaze on technological practice and stare back at the machine. Instead of focusing on what people *say* or *think* they do with technologies, we can become more sensitive to tracing the (unexpected) consequences taking place or ‘happening’ in our interactions *with* technology if we think of technological practice as a complex bundle of relations. Furthermore, such thinking enables a reading of technology as material politics and a mode of ‘doing’ the world. As the political theorist Jane Bennett puts it in the opening pages of *Vibrant Matter: A Political Ecology of Things* (2010: 3), it is important to acknowledge the agential powers of things in order to ‘acknowledge that which refuses to dissolve completely into the milieu of human knowledge’ and ‘give voice to a vitality intrinsic to materiality’. This is to say that as a kind of companion species (Lupton, 2016b), matter *does* things *with* and *through* us, and from a sociological perspective, the most interesting are those that we rarely notice or think about. Bennett herself also insists that we *can* notice such things as children, for example, when we are still more intuitively open to the idea that the material world can really come alive.

Imagine a human being reading something online on a smartphone. For the observer, it is kind of boring; there doesn’t seem to be much happening. And yet there are all kinds of vibrations at play. There are atomic level vibrations which we cannot see, electro-magnetic vibrations which we cannot feel (unless something is seriously wrong with the device), and vibrations of light which we don’t pay attention to. Furthermore, the intuitive focus is typically set on the seemingly active person who is doing something (reading) on a smartphone. It therefore goes unnoticed how the device ‘vibrates’ by performing all kinds of actions—by *suggesting* an activity (reading), by *establishing* or *enabling* a connection (to the internet, to a text), by *distracting* (from work-related thoughts, perhaps) and by *postponing* other actions (some people claim that people would have more sex in a world without smartphones). There are all kinds of things *happening* before, during

and after the actual act of reading, things that, in everyday contexts, commonly pass more or less right through our consciousness.

In the sense of agency, it is the human being (like our 'user' of the smartphone), whom we commonly afford with the power of agency in the sense that we see the human as the one who *does* and *uses* things. Bennett argues for an understanding that places the human as an actant node in assemblages of various kinds. In the case above, this involves much more than the human and the phone. It also involves actants such as the internet, the text that is being read, the author of the text, coders, algorithms, a phone charger, electrical grids, and all kinds of other objects that are as much 'forces' or 'intensities' as they are concrete 'entities'. The idea of actants falling into relations with other actants and affecting each other is a crucial element of Bennett's actor-network theoretical framework (see also Latour 1992; 2005), in which agency or 'use' or any 'act' is not reducible to any single entity, but only to a complex bundle of relations. This framework is also applied when anthropologists Jeannette Pols and Ingunn Moser (2009: 161) describe 'user' as a highly categorising and even intellectually lazy term. According to them, this is because the concept of 'user' awards agency to the human even though 'use' is always about action and about *becoming* something else in the sense that the object of use *shapes* and *directs* the subject as a user. It could perhaps be said that the act of successful 'use' *is performative of the unity of an agencement*. Successful 'use' in a certain situation could not be achieved if some of the other actants were missing. For example, a person does not so much 'use a smartphone' as make a call or read a text online.⁷ Or when we turn to self-tracking, one does not so much 'use' a self-tracking device as perform the action of tracking⁸ one's body and the self.

According to philosopher Bernard Stiegler (1998), the need to rethink technology is the result of a long running trajectory in Western thought, rooted in the classical, philosophical separation of 'tekhne' and 'episteme'; that of craft and knowledge. According to him, this separation, which was already evident in the way the ancient sophists were perceived to employ the craft (tekhne) of rhetorics to

⁷ Of course, assemblages also fall apart; the connection can break when something (e.g. the human being, a link station or a mobile phone battery) falls out of the functional assemblage. However, successful 'use' of technology is *enabled* by an assemblage of actants.

⁸ It once occurred to me while tracking a mythical beast in a fantasy world (on PlayStation 4) that, as a verb, the concept of 'tracking' is peculiar, as it implies an activity of following or tracing something, such as an animal, that has left traces but has since moved along. It implies an awareness of an entity or a being that nevertheless is usually not present via direct perception or experience, or is at least in the process of fleeing and dis-appearing. The tracked object is simultaneously there and not-really-there.

distort or manipulate ‘truth’, has resulted in an inability to conceptualise the technical or mechanic as originary of the human experience and knowledge of the world. This classical distinction thus separates the ideal world of knowledge from that of the world of practice and the human from the technical, ultimately insisting on the reduction of the technical domain as a domain of tools that serve human purposes (see also Simondon 1958: 1–5). For Stiegler, however, it makes no sense to think of the ‘human’ apart from the technical, as technology is merely a mode of being and doing.

Of course, in modern philosophy of technology, the call for overcoming such human-technology bifurcation may be traced at least as far back as Martin Heidegger’s writings on technology. In his essay *The Question Concerning Technology* (1977), Heidegger perceived technology as ‘enframing’ (translated from the German term *gestell*) the modern human being’s lifeworld. Heidegger famously argued that to treat technology as a neutral tool is to fundamentally blind oneself to the ‘essence of technology’ (an essence that is, according to him, ‘enframing’), and he attempted to offer an account of technology as a distinct ‘mode of existence’. Practically, this means, for example, that modern technologies of (industrial) production ‘enframe’ or condition our existence in the sense of ‘revealing’ nature as a reserve for productive action, such as mining, harvesting and energy production. However, Stiegler’s criticism of Heidegger focuses on Heidegger’s failure to really follow through with his ideas on the fundamental intertwining of the human and the technical, as Heidegger ultimately considers technological enframing through the production of ‘inauthentic’ or restrictive effects on human existence, which is why Heidegger is often claimed to revert to (overly) deterministic conceptions of technology.

In relation to Heidegger’s call on how we should think about technology as not-neutral, it seems that the call is typically half-endorsed by scholars, yet often simultaneously overlooked. By this I mean that while it is now commonly acknowledged that technology is all but neutral (the design, appropriation and use of technology by individuals as well as by institutions and corporations always involves political, normative and value-laden purposes, and thus technology is, in a sense, politics in practice), technology is still too often conceptualised as a ‘tool’ for human beings to achieve their human purposes. In terms of self-tracking, this means that we often focus on how humans use and negotiate (or decide not to use) these mediators of health-oriented culture. In terms of everyday life, this implies, for example, that the technology of self-tracking really only works on us as long as it is tethered to the body and produces data – in other words, as long as it is actively ‘used’. For example, many studies draw attention in one way or another to the fact that people quite often abandon, stop, or quit active self-tracking, perhaps

even after a very short period of time (e.g. Lazar et al., 2015; Clawson et al. 2015; Kristensen & Ruckenstein, 2018). While this is of course interesting and relevant, such remarks can also promote thinking through use-relations, and if we do not observe in detail *how* self-observation practices are (dis)engaged from or related with post-abandonment, the techno-logic of self-tracking is rendered more or less irrelevant. Even studies that look into ‘life after self-tracking’ and categorise ways of talking about and relating to self-tracking technology after abandonment (Epstein et al. 2016) tend to speak in terms of ‘stopping’ and ‘returning to’ the activity. This itself can be read as a contradiction of sorts.

As I see any specific technological biosensing device of self-tracking, such as a fitness tracking wristband or heart rate monitor, as also being related to a wider techno-logic of self-tracking and self-quantification, one of the crucial arguments of this study is *that a relation between a person and a self-tracking device does not break via a separation of these actants*. In fact, a separation event may also be an indication of the transformation of actants involved in self-tracking assemblages. For example, as described in the very beginning of this introduction, there often comes a time when we feel we no longer need a specific self-tracking device in order to know ourselves in terms of the insights of that specific device (Kristensen & Ruckenstein, 2018). However, it could also be argued that the person who ‘abandons’ the device is not the same person who activated it, but rather a new person with a different type of being and self-related mindset. The relation between a tracker (human) and a tracker (technological gadget) is still there, *visible in its absence*, for a new mode of existence is ‘revealed’ through the working of a self-tracking assemblage. Practically, as also described in the beginning of this introduction, this new mode may manifest in new forms of self-monitoring and self-evaluation in everyday life, regardless of whether a self-tracking device is worn. Furthermore, since assemblages are temporally unspecific (Marcus & Saka, 2006), a relation between self-tracking technology and the human being also *precedes* actual use, for people relate to such technologies through, for example, marketing ads or user experiences of family members and friends.⁹

Here we may briefly return to the abovementioned Derridan concept of the supplement in relation to human-technology relationships and how technological

⁹ The process of attaching meaning to technology, and in a sense personalising it, prior to actually using it and tinkering with it has been discussed, for example, through the notion of ‘pre-domestication’ of technology (e.g. Saariketo, 2018). What I would add to this perspective is the acknowledgement that human meaning-making itself is to some degree framed by technological agencies, e.g. via the affordances offered by the functionality of (longitudinal) measurement.

practice may be revealing. Just as agencement is a wordplay that accommodates the aspects of both (static) arrangement and (flowing) agency, the notion of supplement is an exercise in playing with the French language and the meanings of supplementary (*supplémentaire*), the substitute (*suppléant*) and substitutive supplementation (*suppléance*). Furthermore, there is the verb *suppléer*, referring to addition but also to the (paradoxical) action of ‘supplying a necessary surplus’ (Royle, 2003: 50). Adhering to this complexity, as described in the introduction, we may think that the supplement enriches, or completes, without a lack; i.e. it adds to something that is already complete, but it also substitutes, and while perhaps serving a need, it also becomes excess, and in the process ‘reveals’ the supplemented completeness as incomplete.¹⁰ While this perhaps applies in some sense to much of our relations with technology in general – at least when any technology is deemed applicable or in any sense ‘useful’ – in terms of self-tracking specifically, the *production of incompleteness in terms of the self seems like a notable part of the actual user experience*. This will be further examined and elaborated in the articles of this thesis.

Stiegler (1998; 2011) finds in Heidegger’s, Derrida’s and phenomenologist Edmund Husserl’s analyses the basis for his own work on the originary technicity of the human being, and develops it further, especially in arguing how technics is central and indispensable for temporality, i.e. the human experience of time. For Stiegler, what is crucial in this process is the concept of *exteriorisation*, which refers to how culture is exteriorised in the technical, how the technical is the human and culture ‘outside of itself’. If we accept that a human being is a cultural being, we must also accept the *originary technicity* of being human. This implies the technical as originary of the habitual and affective consciousness of human beings, for it is through technics, which conditions our knowledge and praxis, that we live also that which has been. As such, for Stiegler, the invention of technics is the ‘invention’ of the human itself, because technics is cultural epigenetics; it transmits lessons of experience and practice that biology, acts of education, or genes alone cannot transmit (see also Roberts, 2006). Thus, technical evolution and

¹⁰ Also, if we think of how a specific self-tracking technology produces a digital representation of the self – a ‘data double’ (see e.g. Ruckenstein, 2014, Lupton 2014) – we may also think of how the representation (or a digital ‘copy’) is not just a representation, but an actor by its own right. The copy adds and replaces – a ‘copy’ is needed to truly establish an ‘original’, and the original self then also becomes a supplement to the digitalised self. This is a sort of schizophrenic stance which in practice can lead to persistent confusion over whether one should trust in the numbers or ‘listen to one’s body’.

development is always also re-invention of the human; the human is never separate from 'tools' that inscribe and prescribe culture.

It could be argued here that self-tracking technologies are possible only *through* a history of self-measurement and (e.g. quantification-based) self-assessment. A history of doing and knowing about the body in standardised terms is exteriorised in such technologies. New kinds of self-tracking devices also actualise gradual progress (or a shift in time) such as the move from one type of measurement to another, from relative inspecificity towards relative specificity or from analog to digital. In engaging with self-tracking, we *live by doing* through a history of self-measurement and self-assessment, just as in cooking with an electric stove we live by doing through a history of food culture.

While for Stiegler all technology is about exteriorisation and transmission of culture and collective memory, his later work is mainly concerned with technologies that are specifically designed to transmit memory. Stiegler concerns himself with photography and film – in general with technologies of recording and of the (moving) image – and develops a philosophical, multifaceted account of how contemporary technologies of cinema intertwine with human consciousness, contributing to what he calls the industrialisation of memory or industrial conditioning of memory. By this he means that imagination is industrialised via *mnemotechnics*, via an industrially produced recapturing of the past (recording in different forms) that opens up vistas for the 'objectivisation' and measurement of experience on which the modern digital economy rests. It is here that his work becomes useful for me in terms of thinking about the links between technology and temporality, not just on the collective level, but also on the individual level, in everyday life and in relation to therapeutic self-development. As shown in article II, Stiegler's work offers viable vistas into a crucial element of the techno-logic of self-tracking: its tendency to prescribe temporally extended, 'tracking' mindsets. This follows from how selves are 'revealed' and re-configured as 'temporal objects' or objects of (in principle) continuous, anticipatory observation and pursuit. In this sense, in self-tracking practices one's being is actively enacted or individuated as being-in-duration, as an object of continuous interest rather than an object of in any sense 'complete' knowledge. This feeds back to the idea of technologies 'working' as therapeutic technologies precisely 'because they do not work'. Once again, this does not mean that self-tracking technologies cannot help people. What it does mean, in my view, is that they do not usually alleviate complexity or a 'will to knowledge' without producing complexity and even uncertainty in individual lifeworlds.

In other words, I draw from Stiegler's work in elaborating how a self-related recording practice such as self-tracking intertwines with habitual and affective

lifeworlds in everyday life. As the practice of self-tracking is about recording and revisiting datafied images of oneself, it evokes an imaginary of the self as trajectories of standardised measures. For example, the accelerometer technology that is built into fitness tracking wristbands standardises ‘movement’ or ‘activity’ into recurrent step counts or values of intensity. It is through these quantified and visualised markers and trajectories that self-tracking devices retain personal histories and reveal possible futures for one to interpret. In this way, as elaborated further in article II, self-tracking also enacts new temporalities in one’s life – in a way, self-tracking is about producing an image of the self, an image that always ‘flows into’ the future and the past.

Together with assemblage theory, these ideas of originary technicity help to focus on the co-constitutioning of the human and the technical in self-tracking practice. Furthermore, the idea of technology as crucial to one’s experience of time and as objectivisation or standardisation of imagination (in terms of the self) relates to another theoretical discussion, one that has paved the way in this study for thinking of self-tracking – and the persistent incompleteness of the self-tracking subject – as inherently *political* techno-logic. I am referring to Gilles Deleuze’s discussion of dividualisation, which is employed in article III. The engagement with Deleuze’s (1995a; 1995b) theories of dividualisation builds on his tendency to try to think about power and politics in terms of a shift beyond Foucauldian ‘discipline’ in the (political) milieu of a digitalising world.

Deleuze conceives of a ‘control society’, which is his response to a Foucauldian idea of discipline. Foucault did not live to see the large-scale rise of digital networks, but writing at the beginning of the 1990s, Deleuze engaged with the idea of how evolving, ultimately all-pervasive digital systems and assemblages transform society. His idea was that if lives in ‘societies of discipline’ had been characterised by beginnings and completions, epitomised in movement between disciplinary institutions, such as from families to schools and schools to work, digital networks propagate a shift towards a ‘control society’ in which a person ‘never finishes anything’. Lives become metastable objects of perpetual (bio)education, always open for alteration and always in process. The crucial factors or actants in this shift are the digital networks and systems that enable the monitoring and standardisation of lives through the algorithm-based collection and mining of huge masses of ever more nuanced big data. This development cuts through the public and the personal.

In summary, the theoretical resources laid out in this chapter have given rise to the research problematic of how human-technology co-work shapes people’s sense and understanding of the world and themselves in practice. The discussion of self-tracking as a part of therapeutic agencements – and the fact that this research was

conducted as part of a research project on therapeutic cultures – contributed to the centrality of the ‘self’ and self-knowledge in my research from the beginning. This is also a crucial reason why some other relevant concerns (e.g. big data-related information security) is not a significant part of this work. As will be elaborated in the next chapter, assemblage theorising and ideas of the originary technicity of human beings have served as both theoretical and methodological influences in my choice to focus on material agencies and the idea of ‘co-work’. Through this focus, we can understand and analyse technological practice as a mode of becoming, as a mode of world-making (in this case, especially in relation to oneself and one’s wellbeing), rather than as a simple use-relation.

3 Research materials and notes on methodology

This research – as any research – is itself an assemblage of sorts. In this section, I will first describe my research materials. I will then discuss how the theoretical background presented above has led me to assemble together research questions, situated experiences and empirical research materials in order to say something relevant or meaningful about how people’s self-tracking assemblages work in self-related knowledge production in their everyday lives. The approach to self-tracking employed in this study can be described as ethnographically sensitised or ethnographically oriented. This means that in addition to interviewing people, I have immersed myself in the practice of self-tracking since the beginning of this research. For example, I have followed the phenomenon in online communities and social media, and used data-producing self-tracking devices on and off in my personal life. This also means that the process of data analysis in this research cannot be unconditionally separated from the process of data gathering and data production, as various research materials intertwine in producing understanding of the ‘field’ and the techno-logic of self-tracking (cf. Huttunen, 2010).

Following the media scholar Taina Bucher, this research can perhaps be called a ‘technography’ (see Bucher, 2012). Put simply, technography may be understood as extensive ethnography of *technological practice* in everyday life. Bucher (2012: 69) writes that technography is ‘a way of describing and observing technology in order to examine the interplay between a diverse set of actors (both human and non-human)’. Indeed, although this study draws upon interviews and observation with human beings, it has really been more about observing technology-in-action and technological practices than observing people or their personal beliefs. Bucher (ibid.), investigating mainly social media, notes that ‘technographic inquiry starts by asking what the software itself is suggestive of’. I would argue that we can also incorporate hardware and technology more generally as a starting point – or, rather, a lens – for technographic inquiry. If ethnography traditionally seeks to understand ‘culture(s)’ from within, technography then specifically focuses on how technology shapes and is shaped by (and is constitutive of) culture(s) and action in everyday

life (Bucher, 2012; Jansen & Vellema, 2011). For example, while a more traditional ethnography of self-tracking may investigate movements such as the Quantified Self in their happenings and meet-ups¹¹ (e.g. Nafus & Sherman, 2014; Sherman, 2016), a technography may zoom out from specific movements in order to focus on technologies (and their techno-logics) that extend far beyond early-adopter communities. This, of course, does not restrict technographical accounts from interacting with people or events that have connections to social movements such as the Quantified Self. A technographical point of view may also be constitutive of a sort of resistant reading, one through which the researcher may locate the contradictions and paradoxes that follow from people narrating the use of technology from their human user position, while being also subject to the technologic of self-tracking.

In general, as a qualitative, ethnographically-oriented study, this work can of course be seen as subject to severe limitations in the sense that the knowledge produced here is not of a generalisable nature, e.g. due to a relatively small sample of research materials. Although, as already discussed, through assemblage thinking it can very well be questioned whether the general/specific dichotomy is meaningful at all in deciding the usefulness or validity of research, especially in qualitative and interpretative social science. In my view, more pressing limitations or challenges in this work then relate to the researcher's access to 'material agencies' and 'everyday lives' through relatively conventional qualitative methods. It may be asked how one can access the constitutive 'doings' and 'enactments' of selves in practice by talking with people and observing spaces and practices, or how one can know what technologies 'do' by interviewing human beings. Furthermore, if the mundane 'everyday' is understood as that habitual, routine-infested mode of being-in-the-world that is not really thought about while we are living it and goes more or less unnoticed (see e.g. Cooper, 2014: 6), there is the question of how the researcher could access and explicate other people's (or even their own) 'everyday lives'. While these questions remain open to debate, the following descriptions of research materials and methodological approaches present some ideas and strategies through which I have answered to these challenges in this work. Overall, I think said challenges can be meaningfully

¹¹ Meet-ups are informal events in which active self-trackers within the Quantified Self community – QSers – meet and share self-tracking related personal experiences, stories, illness narratives and tips with each other. Such events have been organised during the latter half of 2010s with varying degrees of regularity in hundreds of larger cities across the world, most notably in Europe and North America.

addressed here, although not completely overcome, by combining various types of research materials in exploratory and open ways.

3.1 Research materials

In this section, I will present the research materials of this thesis. I will first present the interview materials, after which I will elaborate on my autoethnographical observations as well as other observation materials and contextualising media materials. I will then present some thoughts on research ethics in the context of this study.

3.1.1 Interview data

The main body of research material in this study consists of semi-structured interviews with Finnish and/or Finland-based self-trackers. I have included interviews with 19 interviewees from 18 separate interview events, as one interview situation included a married couple. All interviews for this study were collected between 2015 and 2016. Of all the interview events, 17 were conducted either in face-to-face meetings, via Skype video calls or via Facetime video calls. All of these interviews were recorded, although some interviewees on Skype preferred that I only record audio and not video. In one instance, interview questions were sent by e-mail to the interviewee, to which she replied via e-mail, as we ultimately failed to schedule a time for a meeting. The recorded interviews lasted between 35 and 90 minutes. Of all interviewees, seven were men and 12 were women. Two of the interviewees were immigrants with whom the interview was conducted in English. The interviewees ranged in age from their early 20s to their early 50s¹². All interviewees were either working or studying at the time of the interview. In general, it can perhaps be said that self-tracking seems to appeal mostly to the relatively well-off portion of the population, and the most enthusiastic self-trackers in my research were definitely those who were studying to become (or already were) qualified as highly specialised professionals in fields such as healthcare, technical work or academia. There were also a few interviewees with a vocational education who were currently employed in more traditional working class jobs, such as waitresses or salespeople. The interviewees lived in

¹² On a curious side note, the oldest of my interviewees stated that based on the data he consistently acquires from his self-tracking devices, he tends to think that should the population register centre contact him to inform him of a mistake in their paperwork and inquire about his true age, he would have to take off 10 to 15 years.

different parts of Finland at the time of the interviews, although most resided in urban areas in southern Finland, and one Finnish interviewee was working in the UK. It could perhaps be said that highly educated participants possessed more resources to critically evaluate the functions and possibilities of self-tracking devices in their lives. However, I would say that a common denominator in almost all the interviews was how happy people were to attempt to critically reflect on their self-tracking, for by its very 'essence' (an unfounded term, I know) it seems to be a practice that actively 'disappears' into the canvas of everyday life, at least when self-tracking devices are functioning properly.

The interviews were loosely structured around the themes of personal background and motivations for self-tracking, experiences during self-tracking, and thoughts about the current and/or future development of self-tracking technology, although the actual questions differed in different interviews depending on the direction of discussion. I also discussed the more general field of 'biohacking' in more detail with some interviewees, as they were interested and/or engaged with it to some degree. However, all interviewees told me about how they were originally drawn into the practice of self-tracking and how they perceived self-tracking technologies as serving (or not serving) a purpose in their life.

I originally found the first interviewees through the Quantified Self & Biohacking Finland Facebook community, in which I posted an invitation to anyone who might be interested in sharing their experiences with self-tracking. This Facebook community is a loose and multi-faceted group which brings together people who are interested in self-care and self-development via a plethora of strategies, ranging from nutritional choices to technological body augmentation, and from mindfulness practices to data-driven self-tracking. Such a group can be perceived as a fruitful platform for investigating self-tracking as part of a social movement of sorts and it originally served as a practical platform through which to access the field. However, as targeting 'early-adopters' of self-tracking technology has not specifically been my aim in this study, I have also consulted some personal acquaintances to gain access to 'casual' self-trackers. These are people who I do not know personally and who are not (as far as I know) related to movements or global discursive formations such as the Quantified Self. I also used a snowballing method to gain access to more interviewees. Overall, to my knowledge, six of my interviewees have had a concrete connection with the Quantified Self & Biohacking Finland community (in the sense of having been a member of the group on Facebook, having participated in conversations within the group, and/or having attended some of their exhibition events). However, none of them have participated in local Quantified Self meetups on a regular basis, at least not to my

knowledge, so in this sense they are not (nor do they usually think of themselves as being) deeply invested in an early-adopter 'culture' of self-tracking.

A common denominator in all interviewees was their interest in the self-monitoring and everyday management of their wellbeing via datafied information. However, many (12) interviewees did not 'know' about these activities in terms of 'Quantified Self' discourses, but rather employed whatever technologies of the self available to them in everyday health-related retail contexts. This heterogeneity of interviewees in terms of age, social position or Facebook community connections has been an advantage in pinpointing the ways in which human 'users' of self-tracking technology act and work with the deeper techno-logics of such technologies regardless of whether they identify with a distinct 'self-tracking culture' (Lupton, 2014) or social movement of self-quantification.

In addition to interview data on self-tracking, one of the articles (IV) in this thesis makes use of interviews conducted by fellow researchers among different therapeutic practices – namely body-mind-spirit therapies and vaccine hesitancy. These additional sets of interviews are employed as representative of different health practices that are related to the practice of self-tracking in regard to the now widespread contestation and appropriation of health-related expert knowledges in Western societies. A further description of these additional interview materials can be found in article IV.

3.1.2 Observing the digital, physical and textual spaces of self-tracking

A crucial part of any ethnographically oriented research is observation and participation in spaces and among practices that relate to the object of study. In addition to the interviews, I have conducted autoethnography by wearing a FitBit Charge HR activity tracking wristband consistently for 8 months in 2015–2016. After that, the device has stayed in my life by being on and off (mostly off) my body. The FitBit Charge HR is a self-tracking device that was released to consumer markets in 2015 and features many of the common tracking functionalities found in popular tracking devices today. Through tracking the body's movement, it offers, for example, step count tracking, sleep tracking (providing information on estimated duration of sleep and whether the sleep has been deep or restless) and information on general activity on an hourly basis. In addition, through a light-based sensor technology, the device also measures heart rates during exercise in a specific exercise mode and resting heart rate at all times. Furthermore, automatically gathered data can be supplemented, such as by manually entering data about calorie consumption, for example. I have personally never added data to the software manually (except for markers such as age, height and estimated

weight), but I have relied on data that is gathered automatically. Vistas on the interface of the related mobile application in my personal use are presented in figure 1 below.

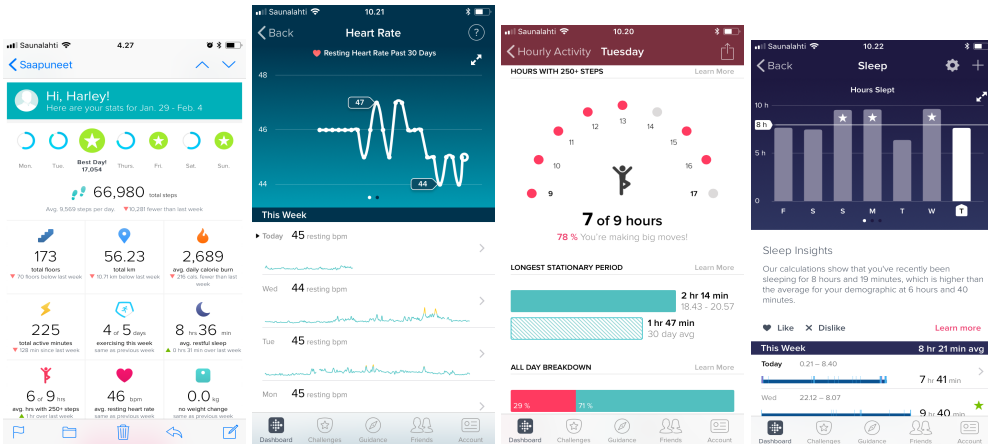


Figure 1. Screenshots from an older (2016) version of the FitBit software.

While autoethnographical observation may be considered a relevant – or even crucial – part of almost any kind of fieldwork ethnography on any specific culture or practice, it is especially relevant in technographical research on self-tracking for at least two reasons:

First, by definition, self-tracking is often a very personal practice (as indicated by the concept of 'self'). Different self-tracking technologies offer various possibilities or affordances for self-making by connecting with others and sharing personal measurements online. However, it quickly became evident in the interviews that while people sometimes do make use of these affordances – they sometimes talk about being interested in other people's data, comparing themselves to others or even competing with others – self-tracking is still mostly narrated as meaningful through personal self-actualisation in terms of one's own actual or potential health, wellbeing, fitness and activity. For my research participants, the algorithmic landscape of self-tracking was not typically a crowded stadium full of competitors, but rather an arena for competing against oneself. My personal experiences of tracking myself have then helped me relate to research participants' accounts and understand how much of the vibrant power of self-tracking technologies often lies in the ways they re-adjust our sense of self through numeric and visual cues. More theoretically speaking, they re-adjust our sense of self through dividualisation and temporalisation of the self, rather than through a fundamental rearrangement of sociality and sense of community in everyday life.

Second, self-tracking is a popular practice in part because it takes 'work' away from self-monitoring, meaning that trackers become ubiquitous technology that operates automatically on algorithmic commands while human beings are busy with their everyday lives. In this sense, it is hard for a researcher to observe everyday self-tracking 'as it happens', as most of the actual human-device interaction happens as woven into the mundane activities of everyday life and takes place on the move. Of course, the acts of working with the data and personally analysing one's data are practices that can sometimes be more readily observed, although based on my interviews, such personal analysis is often a long-term process of self-reflection. Thus, a crucial way to experience self-tracking 'as it happens' or to investigate such technological practice in all its ubiquity is to engage in self-tracking and relate one's self-tracking experiences to what other people say about self-tracking.

Furthermore, during the past few years, I have attended several self-tracking-related events and exhibitions, such as Upgraded Life Festival 2014 and 2015 and Biohacker Summit 2015 in Helsinki, in order to familiarise myself with the hype and promotional ecosystem behind self-tracking in Finland. These events have boasted presentations as well as interactive exhibition spaces for technology developers. In the course of research, and in relation to getting to know many of the technologies of self-tracking that I have encountered in the exhibitions or in the interview narratives of research participants, I have also collected screenshots of self-tracking-related textual-visual materials such as public websites, guide videos, blog posts, online discussions, marketing ads and user manuals for specific devices.

My engagement with the abovementioned materials has helped me familiarise myself with (marketing) imaginaries and common discourses surrounding self-tracking technology. After all, a part of looking back at the machine consists of looking at representations of the machine for representations are also actants. For example, I have – in the dual role of aspiring amateur self-tracker and researcher – become acquainted with the websites of many popular Finnish and international self-tracking device manufacturers, including but not limited to Polar, FitBit, Oura, Withings, HeartMath and FirstBeat. These sites present self-tracking technologies to potential consumers. Websites change over time, of course, but such sites have served, and still serve, to produce an understanding of the normative and/or 'holistic' character of self-tracking promotion (addressed in article III). This is evident not only in the typical language of self-development, self-understanding, self-control, (inner) balance and/or overall 'improvement' as a physical being, but also sometimes in the related visual imagery of happiness, fitness and joyful harmony. Ideas of holistic or empowering self-knowledge and control of course reflect the tendency to think of technology in solutionist terms, constructing

technologies as (simple) solutions to (complex) problems. Naturally, these sites often also state the specific functionalities of the devices they present, so in this sense the holistic ideal is also rendered questionable in the marketing materials. However, the benefits of tracking specific metrics and parameters of the body are typically rhetorically connected to overall improvement and being in charge of complex phenomena such as one's health, recovery, fitness or wellbeing, in the hope that the potential consumer, too, buys into the idea of making big impacts through small, fragmentary data. The materials also typically highlight how the user can, in a sense, forget the burden of self-monitoring and self-related knowledge production, and let the technology push them towards making the 'right' decisions in terms of aspects such as activity or recovery.

Textual-visual materials also include articles on websites, blog sites, and print media in which self-trackers have elaborated on their experiences and routines with, and thoughts on, self-tracking devices. In such materials, solutionist viewpoints and success stories are likewise often present, but user experiences in some ways often also reflect the same paradoxes that surface in the interview materials, a good example being the tension between growing self-knowledge and growing self-interest (elaborated in more detail in article II). Furthermore, having been a member of the Facebook group Quantified Self & Biohacking Finland since the beginning of this research, I have closely followed the group's discussions about various self-tracking devices and the practice of self-tracking in general. These discussions have been critical, deep and highly perceptive, as they have involved a lot of people with extensive experience with a variety of self-tracking devices and strategies. However, I would say that discussions are typically characterised by the general (solutionist) conception that, in principle, self-tracking technologies and contemporary technologies of self-measurement are enabling and empowering 'tools' of self-awareness and knowledge production, provided that the human 'users' just use them appropriately and maintain realistic expectations.

As a whole, such textual-visual materials have served as complementary and contextualising materials or additional 'site documents' that have helped me to understand imaginary creation and self-tracking related imaginaries in which the influence of therapeutic culture and personalisation of health, as well as technological solutionism, often becomes evident. In this regard, some materials have been presented as part of the analyses in the articles of this thesis. More generally, these materials have also supported the development of arguments on the paradoxical techno-logic of self-tracking, as they have resonated with and revealed a more general setting for the experiences articulated in the interview materials. The complementary materials, along with my own autoethnographic experiences and observations have also no doubt (in some ways) directed the

ways in which I, as a researcher, have talked about the subject matter with my interviewees. During the interviews, I sometimes brought up my own experiences with self-tracking or related online discussions, which has then provoked a response from the interviewees, or I have related my own experiences when they were similar to experiences first articulated by the interviewees. In this way, I now believe I have co-produced relatively rich interview material, with statements and discussions that I might have missed out on otherwise. I believe that instead of implanting paradoxes into the interviews, I have been able to co-produce (with the interviewees) articulations of everyday complexities of self-tracking in more detail.

3.1.3 Research ethics

This research has proceeded according to principles of ethical social scientific research. First of all, all interviewees have been asked for and clearly verbally expressed their consent that their interview may be recorded and quoted in this research, and to date none have expressed a wish to nullify this consent. I have stored all interview recordings safely, and no one except myself has had access to the original recordings during the research. The recordings (which contain identifying information such as names, voice audio, and in many cases video images) will be destroyed after the research, as promised to the interviewees. All the interview transcriptions based on these recordings have been carefully pseudonymised. The interviewees have been granted pseudonyms and I have removed or changed all mentions of real names, workplaces, specific degrees, places of residence and other such information that may identify the person.

In terms of online observations in communities such as the Quantified Self and Biohacking Finland Facebook group and observations in Biohacking exhibitions, I have mainly observed as a so-called lurker, not making myself explicitly known, apart from occasions on which I have posted interview invitations to the Facebook group. First of all, Facebook groups and exhibitions can be considered public or semi-public spaces, although in this specific Facebook group one had to be accepted as a member by an administrator (this was in 2015) and no reason for joining was required. Second, a frequent lurker declaring their presence might change the way in which discussions are initiated and commented upon. However, I have not presented any direct quotes from the discussions and have described them on a very general level when applicable, because, according to my understanding, in principle everything that is written online can potentially be traced to the person who wrote it.

3.2 On making sense of a mess

Social reality and the things that we typically attempt to capture and describe in social scientific research (attitudes, behaviours, causalities, correlations, experiences, modes of being, etc.) are 'complex, diffuse and messy', which is why it can be argued that attempts to say something precise and factual about them through specific methods makes that messiness even messier. In a sense, in terms of the messy 'social', clarity is paradoxically a distortion (Law, 2004: 2).

On my behalf, this is not meant to stand as a statement against any specific methodological tradition nor as an attempt to reproduce any deep-rooted divides in social scientific research, such as the quantitative/qualitative divide. Some methods are relatively well equipped to describe and theorise the relations and correlations between phenomena (such as relations between technology use and class position, for example), while other methods are better equipped to describe and theorise experiences (the experiences related to the use of technology in specific contexts, for example). However, social scientific research always captures only some small part of a complex 'social reality'. This is why I think that it is crucial for researchers of the social world to always keep an open mind towards the idea expressed by Law (2004: 5), which states that methodology does not always *have to* follow a strict set of *rules*. Research can also *embrace* the messiness of the world and express *in practice* the attitude that Law (*ibid.*, 6) describes as playing with the famous idea of 'thinking six impossible things before breakfast'. Perhaps in this way my research has been – in the spirit of interpretative ethnography – averse to disciplinary and methodological borders or predefined limitations to what is 'properly scientific'. I think of it as social science, but also as improvisatory storytelling, which is important in envisioning new questions and viewpoints, although to some it might (and does) seem 'somehow literary or something' (see Cervonka & Malkki 2007, 10).

Despite the framework described above, this study, with its methods of thematically oriented textual analyses and (auto)ethnographically oriented observational practices, presents quite 'conventional' qualitative work. However, in going about my analyses, I have tried to embrace the idea of messiness; I feel that there are still many interesting things about self-tracking left to say through this line of thinking. I think of myself as mostly indebted to assemblage theorising. As already noted, the assemblage/agencement is not just a theoretical framework, but also very much a methodological framework through which all the articles in this thesis try, in a sense, to present and bring forth the messiness of our technological practices rather than attempt to fit such practices into neat models.

Law's argument for embracing messiness stems from assemblage thinking and, more generally, from a line of philosophy of science typical to a field of social science now referred to as science and technology studies (STS). In its contemporary form, the field of STS usually incorporates a wide range of influences from (post)modern continental philosophy, social constructionism, as well as feminist studies and the arts, among others. STS attempts to critically analyse the processes and conditions of knowledge production and 'reality' in a society permeated by scientific and technological modes of action and knowledge. STS encourages empirical investigations that lay a sensitive eye on the processes through which technoscientific contexts and practices condition our ways of seeing the world, being in the world and knowing about the world. Furthermore, it acknowledges how science, too, is a socio-material practice, subject to the context in which it takes place. There are at least four things prevalent in this tradition that have been especially methodologically influential in the ways that I have gone about conducting this study:

First, a crucial theoretical-methodological point of departure is that the researcher always brings oneself into the research assemblage (see also Fox & Alldred, 2015; Kolehmainen, 2019). There is no way around it so it might as well explicitly be made part of the research, which is why I think the autoethnographical observation and my own embodied orientation towards the subject matter is crucial to spell out in the context of this research. Of course, drawing from a variety of backgrounds such as Marxist materialism, Foucauldian power analytics and phenomenology, feminists and anthropologists (see e.g. Csordas 1990; Ahmed 2000; Bordo, 2003; Probyn, 2005) in particular have long highlighted the significance of embodiment in the construction of 'reality' and our social environment. And of course, modern feminist philosophy of science (Haraway, 1988) teaches us that all research is always situated in the personal lifeworlds of the researcher, which is why attempts to construct research as 'objective' by ignoring personal situatedness are, in a sense, ultimately doomed to fail.

In the context of this study, autoethnographic reflection has been constitutive of that which Sarah Pink and Vaikke Fors (2017, 380) have employed in their self-tracking related research and termed 'empathetic knowing', meaning that it is through our own embodiment that we can relate to the embodied experiences of practices such as self-tracking. For example, when an interviewee speaks to me about 'joy' or 'terror' in the practice of self-tracking, it is only through my own embodied experiences of joyful empowerment or distress in general – but preferably in the context of self-tracking in particular – that I can relate to and utilise these experiences in the construction of my results.

Second, and in relation to the previous point, it might be argued that there is no static, objective reality out there waiting to be found. Instead, reality is enacted in practices, and this includes acts of speaking and thinking. Science, too, is a sociomaterial practice and 'craftwork' that is situated, historical and contextual; hence, its facts are also in a sense *produced* and actively constructed rather than just found (Latour & Woolgar 1979; Latour, 1999; Law 2004). Scientific research results are always an assemblage, since research and its results are arranged in certain ways and they resonate (or should I say vibrate) in certain ways with the world around them. For example, as noted above, should the results of this study be presented as a categorisation of the ways in which human 'users' use (or do not use) their self-tracking devices, that would contribute to the still lively reality of human-technology bifurcation (Introna, 2013). This relates closely to the idea of performativity, which calls for a focus on practices in which 'reality' is formed and performed, and thus effectively *made*.

Methodologically, this second point relates to the call to embrace the *abductive* logic in sociological knowledge production and theory construction, to draw our theories and imaginaries from things observed 'in the field' with an open mind, all the while trying to avoid being locked into rigid categories and preconceptions (Timmermans & Tavory, 2012). Breaking from inductive (generalising) and deductive (logically rigid) reasoning, abduction concerns itself with probabilistic and explanatory reasoning – even initial improvised 'guesswork' (Cerwonka & Malkki, 2007) – and ultimately looks to create new ways and modes of thinking about everyday life through cycles of interpretation and re-interpretation. Thus, abductive research, as an art of 'making sense', of course closely intertwines with the long tradition of hermeneutics with its emphasis on interpretation and meaning making.

Third, ideas of the messiness of social reality, and the idea of *the ongoing production of reality* in acts of doing, speaking and thinking, need not imply that it is useless or undesirable to use existing, well-established qualitative methods (such as thematic content analysis) in order to say something coherent or relevant about the world, or about whatever technological practice the researcher is interested in. Instead, the idea of messiness may be *productive of a certain way of reading and thematising research material*, one that explicitly focuses on that messiness, for example, through the idea of *contradictions*.

Indeed, it is important and useful to describe 'laws of nature' in the natural sciences or 'social facts' in the social sciences. However, it is not a new idea that the relevance of sociology can also be found in the ways in which it can propagate new questions, new, unconventional ways of thinking and new ways of imagining the world via the application of abductive reasoning and by trying to build sense

into that which seems contradictory or paradoxical. In hindsight, the articles in this thesis have not been about finding facts about self-tracking at all, but about finding multiplicities and potentialities in relation to self-tracking practices. The articles have not been about finding the ‘essence’ of self-tracking, but more about deconstructing any such presumed essence through which contradictions and paradoxicalities are pushed aside. In finding contradictions, dissonances, ruptures, multiplicities and paradoxes in the world, we also uncover questions and gaps in our understanding, things that still need work. In order to do relevant research, we do not necessarily need to agree with the philosopher Kierkegaard, who allegedly argued that a thinker without a paradox is like a lover without passion. However, in qualitative analysis, building sense into that which seems paradoxical is a fruitful way of ‘reaching beyond’ the text and (as is the case here) of ‘staring back at the machine’ in order to say something new about the complexity of our everyday lives in digitalising environments.

Fourth, the idea of assemblages/agencements draws attention to the materiality of self-tracking, which means that analysis is also guided by an overall sensibility towards new materialist ideas of the active agential capabilities of matter (Bennett 2009; Latour 1992). This means that one crucial method of ‘looking behind the text’ – interview accounts, marketing materials, or other textual materials – has been to consider how technology conditions the experiences or imaginaries present in these materials.

Following Bruno Latour’s (1992) ideas, technologies and material objects actively function in society, constituting what he called the ‘missing masses’ of social reality. Drawing an analogy to modern theoretical physics, Latour posits that just as dark matter or dark energy are *both* there *and* not-there in the universe – meaning that we do not directly perceive or sense such matter, though it still appears to add to the total mass of the universe, affecting how the universe and spacetime forms and ‘works’ – technology is paradoxically both there and not-there in our everyday life. We tend to think of technology as a more or less passive ‘tool’, yet technologies weigh on us, push us and *suggest* certain modes of thought and action. In order to grasp the multifaceted and often unexpected or unintended effects that technology induces in ‘social reality’, it is then necessary to acknowledge technology as an active force, as a concrete, vibrant mass of its own.

3.3 Analyses of content and narrative

To some extent, the analyses of the interviews and textual-visual materials in this study have followed the permissive and flexible principles of (thematic) content analysis. Traditionally, content analysis is understood as a systematic way of

cutting, typifying, coding and categorising the contents of textual or audiovisual data in order to draw meaning from it by and through constructing an understanding of the thematic ‘structure’ of the object of analysis (see e.g. Corbin & Strauss, 2014: 159–160; Tuomi & Sarajärvi, 2018: 103–114). In practice, qualitative analysis usually involves some form of categorisation or thematization. In this work, the interviews and other material have been thematised in order to tease out different therapeutic imaginaries and functionalities, i.e. how self-tracking technologies are presented as improving or serving a purpose in one’s life, and the kinds of self-understandings people or technology developers articulate in these materials.

In terms of the interview data, thinking in terms of content analytical categorisation was of course already coded into the planning and execution of the interviews, as they were structured around certain themes such as personal motivations for self-tracking, personal experiences during self-tracking, and personal future imaginaries regarding such activities. It now seems that my analytical perceptions in the beginning of this research were focused on more or less ‘evident’ attitudes and descriptions, on what people say about self-tracking and about themselves, and perhaps to some extent what I personally think of self-tracking. This is, of course, an important part of self-tracking; people, including the researcher, have thoughts, motivations, desires, aspirations and fears in relation to the activity.

At first, the focus of the categorisation of interview accounts was in the different kinds of ‘selves’ that were actualised in and through self-tracking technologies. For example, as self-tracking has often been characterised as the production of datafied representations of the self (Ruckenstein, 2014; Sharon & Zandbergen, 2016), I was interested in thematising how such representations were articulated in the interviews. I found that selves were often made sense of through binaries such as objective/subjective, numerical/embodied, healthy/unhealthy or active/inactive, any side of which may then become emphasised in people’s statements about themselves, depending on their situated position and experiences. For example, an active young person with an athletic background may find activity trackers highly rewarding and empowering, while someone suffering from health issues may struggle with feelings of inadequacy or even shame when engaging with self-tracking technologies. This fits well with the common critique that self-tracking entrenches contemporary body politics and generally seems to appeal to people who are active and healthy to begin with (Ruckenstein, 2014; Sanders, 2017; Article I).

However, as I engaged more deeply with STS and actor-network theoretical literature, it started to seem that I was perhaps too concerned with what people say

or think about self-tracking without paying adequate attention to how they speak about what 'happens' or what they 'do' when engaging in these practices. It then started to become more obvious that self-tracking seems to entrench fundamental paradoxicalities in everyday being. For example, there was talk in the interviews about gaining more or less objective knowledge – or 'situatedly objective' knowledge – which nevertheless never really seemed to 'stick', was experienced as short-term or uncertain, or which did not merely fill gaps in self-knowledge, but also *added new kinds of gaps*. In relation to the 'selves' being made in self-tracking, there was much talk about self-tracking being motivated by a wish to actualise self-related states of being or self-related projects (being active, becoming fitter, etc.), yet in the end, actualisation often seemed to give way to potentialisation, which fuelled more tracking and more 'paying attention'. Consequently, rather than 'actualising' the self (e.g. as healthy or unhealthy, or active/inactive) in any *sustaining* sense, people's everyday self-tracking assemblages often seemed to work as continuous arenas of health or activity-related individuation in which clear binaries are blurred due to the presence of a multiplicity of potential selves. So I started to analyse the interviews in a new way, focusing on such contradictions, and it started to look like there was often in some ways contradictory stories running parallel in the accounts of my interviewees—accounts of what self-tracking is in theory and what it is in practice. A crucial focus in this research then became that of practice. For me, this has meant focusing on what people 'do', or more precisely, *what kind of 'realities of doing' in terms of the self are constructed* in people's narratives of their self-tracking practices. Thus, the overall research question has come to deal with the idea of the continuous re-configuration and shaping of the self and one's lifeworld in these practices.

We may contend that the social world is done in practice (Latour, 2005; Mol 2002), but one might question how someone can employ interviews to describe what people or other objects *do* (the 'actuality' of self-tracking) instead of describing what people say or what they *think* is happening (the imaginary of self-tracking). Perhaps there is no simple answer to this, but for me, one way of working with this problem in the interview data has related to a shift in the analysis, a shift that has led to a hybridisation of thematic analysis of content and analysis of narrative. Many of the interviews run in the form of a (more or less) chronological narrative or story from one's background to the present day and on towards the future. Within the interviews, people articulate big and small stories of action and consequence, thus presenting storied ways of knowing about their lives with self-tracking technologies (see e.g. Riessman, 2005) The paradoxicalities then become visible when the content does not always neatly match the narrative. For example, content may point to the technology as a 'tool' that is 'used' by the

human being in order to gain self-knowledge and actualise a 'better' self. However, the narrative – e.g. the recapping of one's time spent using or thinking about using various self-tracking technologies – may reveal how technologies of self-tracking 'linger'¹³ in one's life, how they concretely *change* things as they vibrate in personal lifeworlds, suggest certain actions and produce, for example, growing self-interest rather than reassuring self-knowledge. Content may point to increasing self-knowledge during the course of self-tracking, as people often readily highlight the ability of self-tracking devices to provide more or less 'real' knowledge, given enough time or enough measurements. At the same time, the narrative of repetitive, ritualistic or habituated tracking, of the expansion of one's self-tracking equipment arsenal or of a general will to knowledge in terms of the self points in another direction. It is in this way that I have later come to read and thematise the materials by *looking for* contradictions rather than trying to avoid or suppress them, since in a messy reality (interview discussions are indeed messy and inconsistent) they are often there anyway.

This is also where the more (auto)ethnographically oriented materials have been quite helpful, as I have personally 'worked with' the interfaces of self-tracking technologies. I have become familiar with the functionalities of some of the most popular near-body self-tracking hardware and with the on-screen companion applications and interfaces of such hardware. This – together theoretical discussions in philosophy and sociology of technology – has also helped to look beyond 'user speech', and focus on the ways in which the technical affordances at play in self-tracking participate in constructing or directing people's lifeworlds, and thus the narratives of self-tracking as well. As highlighted through the concept of *gamification* (Lupton, 2016a: 62–63; Maturo & Setiffi, 2016), self-tracking practice may be understood as an everyday 'game' of health and wellbeing, for self-tracking related software often appropriate and promote game-like elements, e.g. point counts in different forms, goal attainment, guidance, challenges, rewards, trophies, and competition (against oneself if not others). It is then important to keep in mind, as scholars in game studies often tend to remind us, that the researcher cannot really comprehend or interpret a 'game' by looking at someone else play it (Kirkpatrick, 2013: 160–161). Rather, any 'game' takes shape in what happens in and through one's own embodied choreographies of gaming and processes of immersion, attachment and detachment.

¹³ In the context of assisted reproductive technologies and IVF treatments, it has been suggested that the concept of 'lingering technological entanglements' offers a viable way of exploring how technologies stick to lifeworlds and shape self-identifications long after specific periods of 'use' (Helosvuori, 2020).

4 Paradoxes of self-tracking in everyday self-tracking assemblages

In this section, I will present a summary of each article included in this study. All of these articles aim to bring forth the techno-logic at work in everyday self-tracking from different angles. All of them then illuminate different aspects of how the everyday presentation and imaginary of self-tracking is complicated in practice, of how the 'promise' of self-tracking technology is one thing while the (unexpected) 'actuality' of self-tracking can be something else.

4.1 Self-tracking systems as assemblages of moral knowledge production and struggle against the 'othered' self (article I)

The first of the four articles in this thesis examines self-tracking as an everyday regime of 'mundane governance' (Woolgar & Neyland, 2013). This refers to the notion that Foucauldian ideas of governance and biopolitics should be intertwined with an understanding of the meaning of everyday materiality in mediating such strategies of power. The paradoxicality discussed in this article involves two things. First, that of the **the breakdown of the binary between activity and passivity in self-tracking practice** as moral knowledge production in terms of the self becomes distributed in people's everyday self-tracking assemblages. Self-control is sought by giving (some) self-control away (see also Gomart & Hennion, 1999) to algorithmic actants that wield notable power in directing how we feel about ourselves as we affectively engage with oneself-as-data. Second, there appears the paradox of the **'othered' self being, in practice, both struggled against and constantly reproduced in self-tracking** through the material and algorithmic functionalities of common self-tracking devices such as idle alerts, visual cues and the continuous accumulation of steps in daily cycles.

The argument here is based on interviews and observational data, and draws from interviewees' descriptions of self-tracking devices as companions (cf.

Lupton, 2016b) through which they enact the self along the axis of ideal/pathological. In practice, the functionalities of the devices – which gather and algorithmically evaluate data on bodily acts such as movement and sleep – often serve to establish morally invested knowledge on oneself. The moral power of these devices is evident in the way interviewees talk about self-tracking in terms of affectively oriented language: how self-tracking is productive of ‘urges’, how ‘bad’ results ‘bug’ them or taste bitter, and how ‘good’ results elevate their moods and feel rewarding. For several interviewees, one of the central aims of self-tracking activities seemed to be the construction of the self as ‘active’. They meant this in both the concrete sense of being active in daily exercise/movement as well as in the symbolic sense of taking care of oneself in a discursive climate that resents idleness, inefficiency and, generally, bodies that are not worked upon. Of course, people also commonly explicitly mention that self-tracking is ‘not that serious’ for them and they do not let it stress them out, but this does not mean that the ideal/pathological-binary has no meaningful effects in their lives.

One common conception about self-tracking practices is that they are productive of *data doubles*, i.e. datafied representations of the self, with which people negotiate in making sense of themselves (Ruckenstein, 2014; Lupton, 2014). However, some have suggested a more active role for the data by characterising self-tracking as a process of *doppelgänger*ing, through which the self becomes not a static representation, but a process of including/excluding pathology (Bode & Kristensen, 2015). As self-tracking is narrated as a struggle against laziness, illness and other such signifiers, it is then possible to see self-tracking as a process in which the ideal and pathological selves are constantly present, for the person draws meaning for the data from ideals that should be strived for (e.g. being active and energetic, efficient recovery) and pathologies that should be excluded (e.g. ‘laziness’, sickness). Body political discourses, as actants in self-tracking assemblages, do of course participate in defining what the concepts of ‘ideal’ and ‘pathological’ actually signify.

Different devices have their own ways of defining the ideal and pathological. For instance, a common activity tracking wristband participates in enacting ‘proper’ bodies via step counts (along with other markers), the monitoring of which is enabled by the built-in accelerometer technology. A proper body in this case is a body that is active in terms of movement on a daily basis, and this imperative is underlined via a range of strategies, from explicit encouragements to haptic vibrations and colour codes in the mobile application. However, it is important to note that by encouraging constant monitoring of activity, these devices do not merely work to solve or relieve a problem of inactivity, but also work to produce

and reproduce this problem in everyday life. As such, self-tracking assemblages participate in the sociotechnical process of 'othering' in relation to oneself. In some ways they participate in the classificatory struggle over what kind of bodies are respectable, pointing to how classificatory everyday practices and body political thought patterns are evolving, materialising and retreating into ubiquitous code in our time.

The article suggests that self-tracking assemblages can be conceived of as systems of activation and a kind of biopedagogy (see Fotopoulou & O'Riordan, 2017) through which people are taught respectable modes of being through the monitoring of activity, sleep, heart rates, moods, etc. In self-tracking, people seek control over their wellbeing while actually giving some of that control away to digital self-tracking systems that actualise one's body as proper or problematic in new ways. It may then be argued that self-tracking is indeed often a positive practice, at least for those who are already active, fit and healthy, or for those who possess the bodily resources to take care of themselves, as their properness is more readily verified by the data. But even in their case, the pathological is always present as the 'other', as that which is excluded through maintenance of properness.

To summarise, the main arguments in this article are as follows:

1. Self-tracking systems are assemblages in which various actants such as human beings, technologies (e.g. fitness wristbands, accelerometers, etc.) and moral discourses on properness intertwine and co-operate.
2. The significance of materiality is crucial when analysing the ways in which biopolitics works in and through the digitalising everyday contexts of today. Self-tracking is a case in point, as self-tracking devices are commonly hyped as all-around beneficial tools for preventive self-care, yet are also thoroughly permeated by algorithmic body politics and knowledge about 'proper' (and 'improper') modes of being.
3. In the self-related knowledge production of self-tracking, the 'other' is always present as the pathological which is to be kept at bay. Self-tracking does not only solve self or body-related 'problematics,' but also produces them in practice, such as through the ever present dichotomy of activity/inactivity, for example.

4.2 Self-tracking as dis/assembly of self-knowledge in everyday life (article II)

The second article investigates everyday self-tracking assemblages as a technical practice of self-related knowledge production. In this article, the paradoxicality of self-tracking manifests through **the interplay of experiences of self-knowledge and those of perpetual uncertainty**. It argues that while self-tracking is often imagined and described as a practice of compiling and forming (health) knowledge about oneself, in practice self-tracking often enacts a sustaining will to knowledge and 'interested subjectivities' rather than self-awareness.

The argument is empirically drawn from 14 interviews with self-trackers who have employed their self-tracking devices, or collections of devices, for at least 6 months. While most interviewees very explicitly describe how self-tracking helps them 'actualise' their behaviour (a step count may indicate whether one has 'really' been active over a certain period of time) or sensations (a heart rate measurement may 'actualise' relaxation or the effectiveness of training, and sleep measurement may 'actualise' the quality of sleep), the ways in which they (sometimes implicitly) describe their practices with self-tracking technologies also reveal a self that, once measured, gradually slips from grasp. While an experience of self-knowledge may more readily be achieved in a relatively short time-frame or with a project (such as one day of activity tracking, or a two-month specific project of body mass tracking), through self-tracking the self simultaneously becomes an object of interest to which one *can* pay attention and observe in new ways since one's longitudinal observational capabilities are enhanced in new ways. So, it can be said that a self-tracking device is (or can be effective as) a 'means to an end' but that it is never 'only' a means to an end, because it always changes the human being who we tend to think of as the origin of those specific 'ends'.

Theoretically, through an engagement of Stiegler's (2011; 2012) ideas on cinematic time, the article contributes to existing literature on the topic by proposing a new approach to the evident temporalisation of the self in self-tracking practices. More specifically, the article discusses self-tracking practice as the production of the self as a 'temporal object'. In his philosophy, Stiegler builds upon Husserl's notion of the temporal object, a classic example of which is a melody. A melody is an object composed of smaller components – notes – and a melody becomes coherent as a multiplicity of notes set into relations with each other. Melody requires the appearance of new notes, but importantly, it also requires the disappearance of notes, which enables variation. However, notes do not completely disappear, but are rather 'suspended', as all notes have some kind of relation (ascension, descension, repetition, etc.) to other notes within the

melody. Importantly, this is not to be understood as saying that an object is *in time*, as all objects in human perception are in time, i.e. affected by the flow of time. A temporal object is an object that is not only in time, but *constitutes in duration*. This means that the object only becomes coherent as ‘unfolding’ or as ‘movement’. Of course, philosophically thinking, the ‘self’ may generally be thought of as always constituted in duration, at least when considered through the now-prevalent therapeutic ethos and therapeutic technologies via which selves are rendered objects of constant *development*. However, this is not so in our *everyday perception* of ourselves, as anchoring the self in time and place makes existence easier to handle. Yet, in practice, the digital technicalisation of therapeutic self-tracking practices seems to complicate the process of anchoring the self in time and place.

In the context of this article, I employ the notion of the temporal object to sociological empirical analysis of everyday life in order to describe how the relation to the self forms or transforms in self-tracking practice. Here, the way Stiegler engages with the idea of film as a temporal object is crucial: a film is a collection and an arrangement of images in series and, like melody, it becomes coherent by the process of ‘flowing away’ (Stiegler 2012: 446–447). Any temporal object ‘weaves itself in the thread of time[...] as that, which manifests itself in disappearing, as a flux vanishing as it is produced’ (Stiegler, 2011: 36–37, quoted in Roberts, 2006). The flow of a temporal object ‘coincides with the spectator’s consciousness’ so that the spectator *lives* the unfolding. In self-tracking practice, the self is the spectator and assessor of itself as something that is woven in time through temporally scattered measurements and then ‘vanishes’ into the ongoing trajectories, potentialities and averages, for the self that is produced in any specific measurement event also becomes a fragment of a wider databank. As such a time-series self, the self becomes lived as an entity that is not only anchored in the present, but resonates with the self as just-past and as yet-to-be; it is thus always ‘becoming’ and *in a persistent state of incompleteness*. This explains a crucial aspect of the ‘actuality’ of self-tracking in practice. It also explains why people may be lured into and keep up with their ritual-like self-tracking practices and why they may keep thinking in terms of the temporally extensive techno-logic of self-tracking even after they have quit active tracking with any specific device. We can also relate such temporalisation of the self to the idea that contemporary forms of self-tracking seem generative of repetitive choreographies of checking-back and hitting (algorithmically defined or self-developed) targets (Parviainen, 2016: 65).

This is not to say that self-tracking technology, or any technology, is *in itself* a negative or undesirable phenomenon. The interview accounts show that self-tracking may well provide many people with positive experiences of being masters

of their own health, especially in the current health climate that champions preventive health consciousness and self-control (Topol, 2015; Sharon, 2017; Lupton 2016a). However, it is important to bear in mind that the effects and repercussions of technologies and technological practice indeed always intertwine with the sociopolitical contexts in which they become functional. For example, it serves us well to acknowledge that in contexts in which we are actively encouraged to look after our health and take control of our wellbeing, such technologies of self-knowledge do not offer simple solutions or simply enable one to make the ‘right’ health choices, but often make life more complex and cause ongoing concern over personalised health monitoring. In summary, there are ultimately three main arguments in the article:

1. While biopolitical processes of ‘normalisation’ explain much of the appeal of self-tracking technologies (Lupton, 2013; Fotopoulou & O’Riordan, 2017; Ajana, 2017; Article I), self-tracking practices also involve a deeper technological logic (techno-logic) of temporalisation upon which processes of normalisation operate. This logic is conceptualised here via the production of the self as a ‘temporal object’.
2. While self-tracking technologies are typically (explicitly or implicitly) argued to enhance or support self-related knowledge production, *in practice* these technologies often seem to enact and reproduce the kind of self-interested subjectivities they promise to attenuate. Thus, self-tracking is equally re-productive of both self-knowledge and ‘ontological uncertainty’ (as it is termed here).
3. In terms of repetitive and ‘neurotic’ tracking, while it is often the ‘human user’ who is intuitively deemed an ‘obsessive’ or ‘neurotic’ person, a tight attachment to repetitive tracking is actually a very logical way of *working with* or *becoming* with the techno-logic of self-tracking.

4.3 Self-tracking as fragmentary holism in control society (article III)

The third article of this thesis, co-authored with sociologist Ilpo Helén, investigates self-tracking as a therapeutic practice and asks how self-tracking technologies are imagined as contributing to a good life. The paradox here becomes that of a **sustaining tension between a seemingly ‘holistic’ or ‘comprehensive’ understanding of the self and the fragmentary techno-logic of self-tracking systems.** The article connects with the idea of a techno-logic of temporalisation, but theorises the human-technical co-work from a different angle.

The article starts with the idea that self-tracking technologies serve and function as a sociotechnical instantiation of ‘therapeutic culture’. This term refers to a cultural framework of popular psychological life management discourses that are widely theorised, for example, in connection to self-help literature (Madsen, 2015; Salmenniemi, 2017) and, more generally, the commodification of emotion (Illouz 2008; Ahmed, 2010; Davies, 2015). Therapeutic culture is typically thought to summon self-sufficient subjectivities that are willing and able to work on themselves, self-manage their emotional-physical wellbeing and take responsibility for their health. As such, they are often thought to align with neoliberal conceptions of ideal citizenship and being. However, ‘therapeutic culture’ is itself always an assemblage, meaning that it is not the ‘same thing’ across different contexts. Assemblage theory opens up possibilities to investigate the forms and functionalities that therapeutic discourses acquire in and through the technical context through which such discourses are appropriated. No ‘culture’ or discourse merely instantiates in technological practice, but also transforms or takes shape in these practices. Thus, we may investigate what becomes of the therapeutic in terms of (or through the data-driven techno-logic of) proactive self-tracking. Empirically, the article draws from various self-tracking related marketing materials and public texts as well as 15 interviews with Finnish self-trackers. It focuses on the ways in which self-tracking is imagined as promoting a ‘good’ or ‘better’ life, both in marketing promotion and in everyday narratives.

The article first engages with technology developer’s materials to show how the therapeutic imaginaries of personally meaningful measurements leading to self-understanding and transformation are a crucial part of the ways in which self-tracking technologies are presented to consumers. This is in a sense logical, since the concept of *self*-tracking already attaches the activity of tracking to a ‘self’ that is typically understood to stand for a unique, whole and bounded individual. However, the ‘holistic’ logics of ever deeper self-understanding and self-transformation are in principle contradicted by the logic of self-tracking technologies, for measurement focuses on algorithmically pre-determined nuances and specific functionalities of the body, and this, in practice, divides the individuals into ever-smaller parameters. Furthermore, self-tracking technologies monitor biomarkers such as step counts or heart rate rhythms, and based on them, may attempt to say something about ‘who we really are’ in the form of moral evaluations (for example, a daily step count of 10,000 steps indicates sufficient or ‘good’ activity). However, even then people are encouraged to ‘keep track’ in order to gather data and produce these evaluations consistently (daily, weekly, monthly, etc.). The way in which technology developers encourage people to know and upgrade the self, and perhaps find out something about who they really are (cf.

Schüll, 2016a), but at the same time encourage a division of the self into data bits and longitudinal trajectories is conceptualised as ‘fragmentary holism’. In a manner reminiscent of what has been presented in the first two articles (I and II) of this study, this paradox or tension is a characteristic evident in interview narratives that focus on the use of self-tracking technologies. Most self-trackers say that self-tracking helps make certain aspects of the self – such as health or daily activity – ‘more real’, and thus contribute to a ‘bigger picture’ of oneself. However, the tensioned logic of fragmentary holism results in a ‘pervasive tension between becoming a self-informed subject and constantly pushing the boundaries of self-knowledge further’.

In terms of one’s relation to the self, self-tracking seems generative of ‘data derivatives’ that do not centre on ‘who we are, not even on what our data says about us, but what can be imagined and inferred about who we might be’ (see Amore, 2011: 28). This, of course, involves the political aspect of what counts as ideal/pathological, which is evident in how interviewees describe an information-deprived relation to themselves and posit self-tracking as a way to constantly psychologically motivate them to stay in good physical shape, good health, or to stay active and avoid ‘laziness’. In relation to this, self-control is considered in connection to politics of activation and politics of personalised medicine. We argue that through politics of activation (which is typically discussed in relation to activation of the unemployed, but which *becomes* something else in self-tracking assemblages), ‘the point of self-tracking is to educate people not on their daily step counts or heart rates during sleep *per se*, but mainly on caring for and managing personal ‘vitality’ by themselves in order to reduce the ‘deadweight’ in the productive system’ (see also Eversberg, 2015). Through politics of personalised medicine, which envisage the future of healthcare as ‘personalised, predictive, preventive, and participatory’ (Hood & Friend, 2011), self-tracking contributes to the data-driven future of healthcare and seemingly becomes a technique of ‘progress’. At the same time, it instantiates perpetual struggles and preventive relations of control instead of experiences of wholeness or healing in individual lives. Again, it could also be said that this relation of control to the self also precedes and follows the acts of tracking with any specific device, for it can be applied and ‘brought to life’ in different ways via a variety of self-monitoring devices.

The argument is theoretically tied to Deleuzian visions concerning the rise of societies of control. Facing the development of new digital systems in the final decades of 20th century, Deleuze argued that corrective and normalising interventions by public authorities and experts become replaced by new kinds of techniques that divide and fragment their objects (biopolitically thinking, our

bodies) into ever-smaller parameters and ‘action-units’. This, for Deleuze, is a very basic requirement in societies that rely on instant communication and continuous control instead of the time-specific and place-specific confinement of people (Deleuze, 1995a: 174). He saw the logic of control as pertaining to everything. Eventually, all people – as bodies, persons and communities – as well as the environment in which they live become divided and fragmented into clear-cut variables, and the cumulative data is ever more vigorously analysed in search of patterns, deviations and trends. What is crucial for us is the idea that the logic of dividualisation in terms of everyday self-tracking gives rise to fragmentary regimes of individualisation through which the self becomes a processual object of perpetual control.

The text, then, considers self-tracking explicitly as an everyday political assemblage. The main arguments can be summarised as follows:

1. While the language of therapy cultures typically encourages holistic self-investigation through reflexive dialogue (such as with a therapist, a spiritual guide, even self-help manuals and the like), the techno-logic of self-tracking effectively inverts the focus on the self as something whole, thus supporting continuous control of specific parameters instead of holistic self-understanding.
2. As a political technology of self-evaluation, self-tracking always ‘precedes’ therapeutic transformation rather than actualises it in the sense that it motivates continuous self-monitoring and thus enacts struggles against social ills – in our case, for example, against the long-running (and very lutherian) pathologies of illness and idleness.

4.4 Self-tracking as everyday fringe medicine (article IV)

The fourth article, co-authored with Pia Vuolanto, Johanna Nurmi and Suvi Salmenniemi, examines the relations to biomedicine and medical expertise in three different self-care practices, including self-tracking. The paradoxicality here stems from how it seems that **while self-trackers often promote (strong) adherence to and engagement with science and scientific modes of knowledge production, in some ways self-tracking imaginaries also prescribe or suggest a move away from dominant biomedical modes of expertise and knowing about health.** Self-tracking is often experienced as ‘evidence-based’ personal informatics, which is to say that while the activity may be perceived as a more or less situatedly objective source of self-related health knowledge, as such it also offers possibilities to move

away from population-based understandings of health on which official recommendations are often based.

The article stems from a collaboration within the project *Tracking the Therapeutic: Ethnographies of Wellbeing, Politics and Inequality* (funded by the Academy of Finland in 2015–2019), and relates to the notion that was brought up in the previous article (III). Namely that self-tracking imaginaries sometimes appropriate influences from a range of 'alternative' health practices. This article combines data from three different health-oriented 'groups' in Finland, namely body-mind-spirit therapy groups, vaccine-hesitant families and self-trackers. It develops the concept of 'everyday fringe medicine' (EFM) in order to bring these seemingly different groups together to relate them to the alleged crisis of expertise in contemporary societies (Collins 2014; Nichols 2017) and to argue that a variety of contemporary practices of everyday self-care may be understood as paradoxical practices that are, in a sense, *both* outside *and* inside hegemonic discourses of biomedicine, for they criticise, appropriate and/or 'work with' biomedical health knowledge and medical science. The article contributes to our knowledge of the formation of public understanding of science in the tumultuous terrain of contemporary health knowledge.

The article draws from long-term fieldwork among different EFM practitioners in order to argue that EFM in all its forms usually reflects a desire to engage with science instead of uncritically adopting it or simply abandoning or ignoring it. EFM practices are often characterised by varying degrees of critique towards the 'official' medical establishment and medical experts. Types of criticism brought up in the article are 1) criticism of medical knowledge production, 2) criticism of medical professional practices and 3) criticism of the knowledge base of medical experts and the meaning of 'evidence'. The first type of criticism argues that medical knowledge production should be free of all vested interests, such as the interests of pharmaceutical companies or local businesses. It sometimes constructs personal knowledge production as morally pure. The second type of criticism argues that medical practices are too professionalised or stuck in their own ways and thus often fail to respect people's own experiences, views and emotions. This constructs personal knowledge production as a path towards more 'holistic' health knowledge and wellbeing. The third type of criticism argues that population-level recommendations are blind to individual variation, which is why the gathering of 'personal evidence' is important in developing health-related knowledge.

In addition to these types of criticism towards the medical establishment, EFM practices typically cast a critical gaze inwards towards 'other' peers. This refers to how EFM practitioners evaluate other people in their reference group as unbelievable ('amateurs', 'conspiracy theorists', etc.) or credible. Credibility is perceived as

stemming from the individuals' capabilities and willingness to 'work with' scientific materials and adhere to scientific principles of knowledge production. For instance, the self may be constructed as credible by bringing up one's sceptical attitude or one's university degree (especially in so-called hard sciences), for these supposedly offers adequate analytical tools in knowledge production through one's observations and data. Thus, this inward critique may also be seen as underlining general trust towards science and scientific modes of knowing about the world.

Self-tracking relates to other EFM practices mainly through its focus on 'working with science' and/or through its personal, often 'research-like' attitude towards knowledge production about oneself (see also Heyen, 2020). Reflecting the cultural power of data as a more or less 'objective' source of knowledge, self-tracking as a data-driven practice is often seen (in public discussions and personal narratives) as a somewhat 'scientific' or at least uncontroversial mode of knowing something seemingly 'factual' about one's health and wellbeing. In my study's interview accounts of self-trackers, criticism of big pharma or industry ties in medical knowledge production were unsurprisingly virtually non-existent, while such critique was typical for vaccine-critical participants and body-mind-spirit practitioners. However, wider discourses around self-tracking in Finland have in recent years been linked to the field of science-inspired 'biohacking', within which such critique is not unheard of. The article draws attention to the appearance of traces of critical behaviour in self-tracking imaginaries. Self-tracking practices (from everyday consumer gadgets to private laboratory testing services) may be employed to support a form of self-care that mixes and matches official and 'alternative' influences. This self-care may be employed to validate one's own experiences, which may thus promote criticism of the professionalised expert system. Most of all, this self-care may be employed to experiment on oneself in order to produce personal-level health knowledge that may or may not challenge population-level recommendations. At the same time, science is held in high regard. In my interviews, there is frequently suspicion towards 'other' self-trackers who are seemingly doing it wrong by *not* adhering to principles of scientific scepticism. Generally, of the three self-care practices investigated in this study, self-tracking most explicitly expresses trust in medicine and faith in scientific rationality.

It is important to note here that the authors of this article do not wish to take sides in relation to health behaviour. Our aim is not to evaluate the truth-value of critical claims and related behaviour patterns of any kind, but to understand these different self-care practices from the practitioners' own point of view while contributing to discussions on the public understanding of science. We argue that self-tracking – alongside other EFM practices – is not *essentially* for or against the

official medical establishment or scientific knowledge production, but is rather a sociotechnical regime of contemporary health assemblages within which we often encounter an eclectic mixing and matching of official and alternative influences. In this regard, it makes sense to analyse self-tracking further in relation to – and *not* in contrast to – other critical health practices (e.g. various alternative therapies and vaccine hesitancy) because they, too, are not simply for or opposed to the medical establishment, but reflect a wish to engage with scientific knowledge and in some ways *develop* scientific knowledge production. In this sense, self-tracking and other forms of EFM appear as contemporary forms of boundary work (Gieryn, 1999) through which the boundaries between valid knowledge and invalid knowledge – and the demarcations between science and pseudoscience – are tested and, possibly, in some ways, reconfigured.

EFM is a novel concept that in the authors' view can be applied to a wide range of health practices – from those incorporating epistemologies of 'complementary and alternative medicine' (CAM) to new and emerging technoscientific practices such as self-tracking, which is in some ways aligned with biomedical (data) rationalities while also being often actively 'non-medicalised' by users, technology developers and medical experts. One of the strengths of the EFM concept is that it abandons the medical starting point of other concepts (mainly CAM) and adopts a social scientific starting point in which no practice is pre-established as being 'outside' of 'proper' medical (or scientific) knowledge production.

In terms of self-tracking, the main arguments of the article may be summarised as follows:

1. As a situatedly objective method of self-care, self-tracking works as a sociotechnical regime of action within which influences from various official and 'alternative' (or 'other') health knowledges are being negotiated. These knowledges are also mixed and matched as people gather data and aim to use it to produce personal and personalised knowledge of their health and the self. It may then be argued that, in practice, self-tracking also reconfigures the self as an 'expert' instance, at least in relation to one's own health and (possibly) health knowledge more generally.
2. As such, self-tracking appears as a contemporary form of 'everyday fringe medicine' (EFM) and boundary work through which the boundaries between valid and invalid knowledges– or possibly even between morally pure and impure knowledges– are being tested and perhaps reconfigured.

5 Conclusions

This study has brought forth some of the various ways in which everyday self-tracking practices can be seen as paradoxical practices. It is now time to draw some conclusions. The paradoxicalities presented above have been a way for me to explore and conceptualise the ways in which self-tracking practices shape and transform lives and ‘selves’, and a way to look beyond the usual questions of whether these technologies can help people or whether they are ‘useful’ in helping people lead better lives. They surely can be useful, but paradoxicalities, as they are presented here, also help to understand how the employment and introduction of technology is always a shift in being; it is always a trade-off and never only a means to an end. In self-tracking, the acquisition of datafied information about one’s activity or sleep can commonly be seen simply as a ‘natural’ act (who wouldn’t like to know themselves a bit better?), but upon closer inspection the potentialisation and temporalisation of selves, and the division of bodies into ever more nuanced bits of data are also transformative processes through which new kinds of orientations towards oneself and the world are enacted.

Although I have drawn examples from the use of specific devices, such as fitness tracking wristbands and sleep tracking technologies, in some ways the paradoxes presented here pertain to self-tracking technologies more generally. Thus, more research is needed to investigate how the dynamics and tensions e.g. between activity/inactivity, knowledge/uncertainty, individualisation/dividualisation and credibility/incredibility form and transform with new and emerging self-tracking technologies in different contexts. Whereas in a way the starting point of this research has been the notion that contradictions exist in the use of technology – meaning that technologies often acquire multiple, sometimes contradictory roles and functionalities in people’s lives depending on the situations in and through which they are utilised – paradoxicality in its various forms can be perceived as the main result. By saying that everyday therapeutic self-tracking is a paradox, or a bundle of paradoxes, I wish to convey the idea that self-tracking practices often seem to involve a paradoxical techno-logic; that these devices ‘work’ through persistent contradictions, although the paradoxes presented here

may acquire different manifestations in different contexts. In self-related knowledge production, the noise always returns. As the tracked 'self' is ever changing, self-tracking *both* actualises *and* potentialises the self. It produces and un-produces knowledge, it both individuates and dividualises the body. I argue that sociology can make a contribution to our understanding of self-tracking practices, data-driven everyday milieus as well as technological practices more generally precisely by diving deep into such paradoxes and fleshing them out in a nuanced way, as I have attempted to do in this work. From the sociotechnical perspective, such paradoxes also underline how biopolitics – the political, productivity-driven administration and normative 'ordering' of bodies and lives – is shifting from institutions and expert instances into the background code of everyday health behaviour and personalised biochoreographies.

I have shown that self-tracking systems change the world through affecting processes of knowledge production and everyday experiences of the self and others. As is the case with most of our everyday technologies, we tend to think of self-tracking technologies as tools, but they are more-than-tools: they effectively change the conditions of experiencing and understanding the world, including ourselves. Further questions need to be asked about what we mean by 'knowledge' in the context of self-tracking and whether 'knowledge' (in terms of the self) is a good concept at all for describing what accumulates and happens in everyday self-tracking with related contemporary digital consumer services and technologies. The question is once again timely, as the world is struggling to understand and cope with the COVID-19 pandemic. In relation to the pandemic, the Finnish self-tracking technology *Oura* – a smart ring that gathers data on heart rates and body temperature, for example – has recently been involved in academic studies investigating whether such technologies can help detect illness before notable symptoms appear, thus stopping it from spreading (Karppinen/YLE, 5.4.2020). The reception of such projects in expert instances underlines the supplementarity of technology in knowledge production—from an engineering perspective, the ring can help us understand the disease better, while from a medical perspective, connections between subtle changes in body temperature or other biomarkers and COVID-19 illness seem uncertain at best and problematic at worst. Importantly, both perspectives appeal to us and are present in how self-tracking technology 'works' in society.

Self-tracking technologies entrench the production of moral self-knowledge and evaluations, render selves perpetually uncertain, divide selves into ever smaller action units, and subtly reconfigure people's relations to health knowledge and science. The ways in which they do this also bring up the question of what, in fact, is the relation between using technology and needing technology. Everyday

consumer gadgets for self-tracking may be commonly argued to serve certain needs that arise in Euro-American health-oriented cultures. Through discourses of healthcare-related austerity and preventive medicine, people experience the need to look after themselves according to health guidelines and due to scarcer healthcare resources, for example. However, when talking about self-tracking with people during my research in the last few years, I have never heard overall healthy people saying that they acquired a self-tracking technology such as a fitness tracking wristband or a sleep tracking device because they really, truly *needed* it. Rather, as is the case with many consumer technologies, there is first curiosity, and perhaps expectation, towards what can be done with the technology, and the actual *need* comes after, through practice. Need is a result as much as it is a precedent for the use of self-tracking devices. This work has laid out some ways in which self-tracking practices are productive of needs, affective attachments and desires in everyday life. When looking into the question of how technologies change the world, the production of needs and desires is, in general, a good place to start.¹⁴

Finally, academics and non-academics alike have often asked me whether I personally support or condemn the widespread commercialisation of self-tracking technologies. Unsurprisingly, I usually now respond by saying that the phenomenon is potentially both positive and negative, but in my view it's generally not making peoples' lives easier, at least not without making them also more complex. It's a paradox. However, at this point I remember one of my interviewees saying that while it is positive that through self-tracking one can experience possibilities to nurture and care for oneself, becoming too focused on oneself is probably not a very 'sustainable way of living'. Finally, I cannot deny that a similar undercurrent of nagging cultural criticism has followed me during this work, during times of escalating ecological crisis and unprecedented global inequality. Maybe that influence has shown through, at least in the first few years of my project, as several humanities researchers have politely tried to remind me on different occasions that maybe I should sometimes try to see the upsides and empowering potentials of self-tracking in personal lifeworlds. After all, Quantified Self -communities, for instance, do present examples of how self-tracking is not

¹⁴ For arguing this, I draw inspiration from the keynote speech of the prominent STS scholar Harro van Lente at *Nordic Science and Technology Studies Conference 2019*. He argued for treating the production of needs as one of the key programs for future studies of technology, as the production of needs for specific technological applications does not by any means stop with innovation, but continues after it. But in addition to the *social* production of needs, e.g. in and through the media, we also need to acknowledge materiality and the algorithm-based functionalities of contemporary machines in the production of needs and motivations.

only about self-centricity, of how people sometimes do extensive work with personal data and express solidarity by passing that information on to others according to the principles of open science, regardless of whether or not this information is in line with official sources of knowledge and biomedical expert discourses.

Since I am trained as a critical sociologist, positivity has not always been easy for me. Only half-jokingly, one could say that positivity is for anthropologists! However, in the later stages of this work, the idea of paradoxes and technological assemblages has helped me avoid excessively depressing visions of self-tracking dystopia. Thus, just to end on a slightly positive note, while self-tracking assemblages, technologies of measurement and systems of health-related datafication may in many ways function as assemblages of control, affecting and altering our sense of self in ways that add complexity to lifeworlds instead of alleviating it, self-tracking, and in general the datafication of bodies and selves, is now a part of our social milieu and we can expect these activities to play a part in how we overcome, or do not overcome, the pressing challenges of our times. What, for example, could be the role of personal and wide-scale health data and self-tracking in relation to our collective struggle against climate change, as such drastic change inevitably exacts its toll on human health in many regions of the world? How could health data and technologies of measurement work in combating or entrenching global and local inequalities? How may datafication developments eventually work to reconfigure or downgrade our economic-political systems? Such changes may be necessary in order to preserve most of our planetary natural habitat. These are important questions for future research, research in which the ability of self-tracking technologies to re-configure worlds and realities of living should be taken into account.

On the other hand, I am still thinking about the interviewee who described his sustained, almost 'neurotic' practices of self-tracking in his search for an illusion of self-control, although it seemed that the practice had also in fact made concrete for him the experience of how one cannot really control the inherently unpredictable flow of life. And while he found the lack of control deeply distressing, I am still thinking how this, in fact, can also be empowering, at least in therapy-infused sociopolitical contexts in which we are still encouraged, even required, to become the masters of our own wellbeing and life in general. But this, again, leaks back to the binary idea that technology is either a curse or a salvation. However, if the human is already technical, if technology is originary of our humanness, maybe technology only affords salvation on the one hand and dystopia on the other in contexts where human beings try to wield mastery over it, when they try to control nature and themselves through it. It seems as if technology and related fantasies of

ever-developing automation can, indeed, be interpreted as our mode of maintaining slavery after slavery (Simondon, 1958/1980: 1–5), technology being the automated machine, the instrumentalised tool that now works (and is put to work) for us as an expression of our will to mastery of the living environment. After all, against widespread technological solutionism, the philosopher Gilbert Simondon suggested that a degree of technical ‘perfection’ or progress is not automation, which basically reduces the machine to pure utility and reveals it in instrumental terms rather than in practical and communal terms. His work was, among other things, an invitation to think about our existence among technical objects not through use-relations but through relations of being-with (see also Lindberg, 2019) and becoming-with. This invitation is widely still pending today.

For me, this thesis has not only been about understanding self-tracking, but about understanding technology, and has thus been an exercise in better understanding what it is to be human. Somehow, in these times of unprecedented global challenges, there seems to be a growing consensus in societies that we, as human beings, need to change, deeply and fundamentally. However, there also seems to exist a widespread belief in technological salvation, for example in relation to the climate battle. During this project, I’ve come to think that a crucial part, a necessary part, of our potential transformation as individuals and as communities involves the reinvention of our ‘tools’ and our relationship towards technology. It seems to me that the way forward towards more sustainable futures is not an anti-technological attitude (if we are technical beings, what would that really even mean?), but a new mode of relating to technology and a new mode of embracing ecologies of things, as suggested by Jane Bennett (2010), for example. We must acknowledge – as I think these paradoxes to some degree imply – that we are not, and never will be, masters of technology, nor masters of nature. Consequently, we will never even be masters of ourselves. Perhaps this way of looking at our existence, in terms of assemblages of matter and non-matter, is tragic, but it is in any case a mode of thinking that may free us from thinking about technology through the utopia/dystopia binary and enable a more harmonious coexistence with other beings, living or non-living, and a more harmonious coexistence with ourselves.

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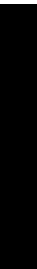
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Original Publications

Bergroth, Harley (2017)
Terapeuttinen tiedontuotanto ja aktivoitumisen järjestelmät
itsenmittaajien arjessa.
Kulttuurintutkimus 34(1): 28–40



Terapeuttinen tiedontuotanto ja aktivoitumisen järjestelmät itsenmittaajien arjessa



Harley Bergroth

Ihmisten kehoa ja elämää mittaavien hyvinvointitekniikoiden, kuten aktiivisuusrannekkeiden ja unenseurantatekniikoiden, arkipäiväinen käyttö on yleistynyt voimakkaasti viime vuosina. Tässä artikkelissa tutkin haastattelu- ja havainnointiaineiston avulla sitä, miten itsenmittaus tulee toiminnalliseksi kehoa ja minuutta koskevan tiedontuotannon tekniikkana. Artikkelin valottaa itsenmittaukseen liittyvää minuuden tekemisen problematiikkaa ja tekee näkyväksi, miten erilaiset sosiomateriaaliset toimijat kytkeytyvät yhteen tekemään poliittista työtä.

Viime vuosina erilaiset puettavat, kehon toimintoja ja rytmejä mittaavat laitteet ovat yleistyneet arkipäiväisessä käytössä (Ruckenstein 2012; 2014; Lupton 2014; 2016; Schüll 2016). Ideaalin käyttötarjoituksensa mukaan ihmiset voivat näiden laitteiden välityksellä kerätä numeraaliseen ja visuaaliseen muotoon muunnettua dataa elämästään sekä käyttää tätä dataa pohjana elämänhallinnalle. Viitataan laitteisiin, jotka on otettu käyttöön

enemmän proaktiivisena kuin reaktiivisena toimenpiteenä; niiden avulla ei yleensä ole tarkoitus todeta tai seurata sairautta vaan ylläpitää hyvinvointia. Tyypillinen itsenmittaustekniikka tämän artikkelin kontekstissa on aktiivisuusranneke, joka seuraa askelmääriä, unen rytmejä, kulutettuja kaloreita ja joissakin malleissa sykettä. Lisäksi haastateltavat ovat käyttäneet muita yksittäisiä kehon toimintojen visualisointiin

keskittyviä laitteita ja sovelluksia arkisen elämänsä ja kehonsa kartoittamiseen. Terapeuttisena teknologiana tai minuutta koskevaan tietoon ja muutokseen pyrkivänä tekemisen tapana (Foucault 1988; Salmenniemi 2017; Lupton 2016, 39) itsenmittaus ei käsittelyssani palaudu mihinkään tiettyyn laitteeseen vaan viittaa laajemmin kehon mittauksiin ja itsen monitorointiin perustuviin tapoihin tuottaa ja kokea minuutta. Artikkelin

avaa näkökulmia terapeuttisten teknologioiden sosiomateriaalisuuteen. Kysyn, kuinka itsenmittaus tulee toiminnalliseksi kehoa ja minuutta koskevassa terapeuttisessa tiedontuotannossa.

Sosiologisen itsenmittaustutkimuksen piirissä pioneerityötä on tehnyt etenkin Deborah Lupton (2013a; 2013b; 2014; 2016), joka on tarkastellut mobiiliterveysteknologioiden sekä niitä popularisoineen globaalina *Quantified Self*-liikkeen kytköksiä esimerkiksi uusliberalistiseen yksilöä omasta terveydestään vastuullistavaan kulttuuriseen kehukseen. Aiemmissa tutkimuksissa itsenmittausta ja siihen liittyvää tiedontuotantoa on usein lähestytty foucault'laisen (itsen) hallinnoinnin ja biovallan (Lupton 2013b; 2016; Reigeluth 2014; Fotopoulou & O'Riordan 2017) sekä kapitalistisen tuotantokoneiston ja sen tuottavan työvoiman sosioteknisen organisoinnin (Till 2014; Moore & Robinson 2015) näkökulmista. Antropologisesti orientoituneissa tutkimuksissa on toisaalta usein korostettu itsekontrollin ja hallinnoinnin ohella sitä, kuinka datan kerääminen ja tulkitseminen saattaa myös voimaannuttaa ihmisiä määrittelemään uudelleen yksilöstä teknologian avulla tuotetun datan merkitystä, arvoa tai potentiaalista käyttötarkoitusta (Ruckenstein 2012; 2014; Nafus & Sherman 2014; Sharon & Zandbergen 2016) ja kenties näin

haastamaan hallinnan tiedollisia mekanismeja.

Keskustelut siitä, miten ihmiset, ihmisryhmät tai ihmisinstituutiot tulkitsevat ja (väärin)käyttävät laitteita ja dataa vaikuttavat kuitenkin useimmiten palauttavan poliittisen toimijuuden lopulta ihmisiin. Tässä tutkimuksessa mittareiden toiminnallisuutta arjessa tarkastellaan sosiomateriaalisten aktanttien välisissä suhteissa rakentuvana prosessina (Latour 1990; 1992). Pyrkimyksenä on ottaa ei-inhimillinen toimijuus vakavasti tavalla, jota ei itsenmittaukseen liittyvässä tutkimuksessa ole riittävästi hyödynnetty.¹ Vaikka esimerkiksi sosiomateriaalisten kokoonpanojen (*assemblage*) käsitettä on toki käytetty käsitteellistämään ihmisten ja teknologian yhteenliittymiä mittauskäytännöissä (Lupton 2014, 4; 2016), arkipäivän kokemusten empiirisen tarkastelun kautta on mahdollista valottaa tarkemmin itsenmittaukseen liittyvää minuuksien tekemisen sosiotekniiikkaa. Woolgarin ja Neylandin (2013, 38–39) esittämää erontekoa seuraten tarkoitus ei ole niinkään esittää, että teknologiat ovat itsessään poliittisia vaan tutkia sitä, kuinka ihmisten, mitaritologioiden ja yhteiskuntapoliittisten diskurssien muodostamassa kokoonpanossa toimijaverkoston aktantit kytkeytyvät yhteen tekemään (ruumiin) poliittista työtä.

Tieteen- ja teknologiantutkimuksen keskustelujen mukaisesti oletan, ettei kehon ja minuuden todellisuus ole pysyvä tai vakaa vaan aina muotoutumisen ja täytöntöönpanon prosessissa (Mol 2002; Mol & Law 2004). Minuutta toki tehdään suhteessa ajassa ja paikassa eläviin, moninaisiin moraalisiin ja poliittisiin arvioiteihin hyvästä ja huonosta tai kunniallisesta ja vaarallisesta (Skeggs 2014; Douglas 2000; Peteri tässä numerossa). Itsenmittauskokoonpanot, jotka ehdottavat ja mahdollistavat intensiivistä tiedontuotantoa entistä useammista tiedostamattomankin kehollisen elämän osa-alueista, kuten arkisesta liikkeestä ja unesta, myös muovaavat aktiivisesti kunniallisen ja vaarallisen olemisen tapoja sekä käsityksiä siitä, miten mittauskäytännöissä dataksi hajoavaa potentiaalista minuutta voidaan – tai tulisi – tietää ja hallinnoida.

Potentiaalisen minuuden hallinnoinnin myötä artikkeli pohtii itsenmittausta suhteessa aktivoinnin yhteiskuntapoliitiikkaan, joka saa itsessäänkin aktanttina mittauskäytännöissä uusia muotoja. Kulttuuriantropologi Natascha Dow Schüll (2016, 13–14) on esittänyt, kuinka itsenmittauksessa tuotettava minä ei lopulta näyntyä vain aktiivisena, valitsevana minä vaan yhtä lailla passiivisena minänä, joka delegoi itsen johtajuutta laitteille. Näin hän esittää, ettei mittaus

kiinnityksiselitteisesti esimerkiksi uusliberaalin aktiivisen subjektin ihanteeseen. Toisaalta ajatus toimijaverkostosta voi auttaa kohdentamaan huomion siihen, kuinka ihmisen ja teknologian suhde ei ole vain delegointia, vaan myös neuvottelua ja vaihtoa osana erilaisten inhimillisten ja ei-inhimillisten toimijoiden verkostoa (Olsen 2003, 88). Ei-ihmiset ovat toiminnan ja tulkinnan kohteita ja apuvälineitä, mutta ne myös tuottavat toimintoja ja tulkintoja ympäristöönsä (Latour 1992). Tästä jatkaen ja mittauksen kokemuksiin perustuen tämä artikkeli esittää itsenmittauksen aktivoiminnan politiikan sosioteknisenä tilana: itsenmittauksessa minuutta koskeva tieto muodostuu aktivoiminnan järjestelmässä, ja toimijoiden verkostossa yksittäisten toimijoiden aktiivisuuden ja passiivisuuden välinen raja hälvenee.

Aineiston esittelyn jälkeen tarkastelen ensin tiedontuotannon ja minuuden jäsentämisen työn jakautumista mittauskokoontumissa. Sen jälkeen pohdin itsenmittauksen toiminnallisuutta ja terapeuttisuutta etenkin suhteessa *moraa-liseen* tiedontuotantoon. Kolmannessa alaluvussa keskiössä on tiedontuotannon (ja toimijoiden) muutos itsenmittauskokoontumissa. Lopuksi vedän yhteen keskeiset johtopäätökset.

Aineisto ja menetelmät

Artikkelia varten olen hyödyntänyt helmikuun 2015 ja helmikuun 2016 välisenä aikana keräämäni tutkimusaineistoa. Aineistoon kuuluu 18 puolistrukturoidua haastattelua itsenmittausteknologioita käyttävien henkilöiden kanssa sekä autoetnografista havainnointia itsenmittausteknologian parissa. Sijoittaakseni itseni tutkikseen mittauskentälle olen käyttänyt FitBit Charge HR aktiivisuusranneketta kahdeksan kuukauden ajan vuonna 2015 sekä satunnaisesti erilaisia itsenmittaamiseen liittyviä mobiilisovelluksia. Tämä on auttanut samastamaan käyttäjien kokemuksiin ja tuottamaan näin ”empaattista tietoa” (Pink & Fors 2017, 6) itsenmittauksesta. Muun tekstuaalis-visuaalisen materiaalin, kuten käyttöohjeiden välityksellä olen myös tutustunut haastateltavien käyttämien teknologioiden ja sovellusten teknisiin ominaisuuksiin sekä siihen, miten niiden toiminnallisuus esitetään.

Kaikilla haastateltavilla oli haastatteluhetkellä tai lähivuosien aikana ollut itsenmittausteknologiaa aktiivisessa käytössä, joskin jotkut kertovat myös pyrkineensä lopettamaan mittareiden käytön kokonaan tai osittain tai käyttäneensä tiettyjä mittareita epäsäännöllisesti. Haastateltavat olivat 25–50-vuotiaita, ja haastatteluhetkellä heillä kaikilla oli työ-

tai opiskelupaikka. Haastateltavista naisia oli 11 ja miehiä 7. Haastateltavien nimet on muutettu siten, että niistä selviää vastaajan sukupuoli.

Kysyin haastateltavilta esimerkiksi mitausteknologian käyttöön ja elämänhallinnan käytäntöihin yhdistyviä tavoista, motivaatioista, kokemuksista ja tuntemuksista. Lisäksi kartoitin heidän ajatuksiaan itsenmittauksen yleisty- mistä kohtaan yleisesti. En ole seurannut haastateltavien itsenmittauskäytäntöjä välittömästi niin kuin ne tapahtuvat arkipäiväisessä elämässä haastattelutilanteiden ulkopuolella, vaan heidän kertomustensa pohjalta ja kentällä hankkimaani kokemukseen tukeutuen olen pyrkinyt tarkastelemaan mittauskokoontumoon kytkytymisen ja siinä elämisen vaikutuksia itsesuhteeseen. Haastatteluaineiston tekstianalyysia on ohjannut materiaaliselle semiotiikalle ominainen sensitiivisyys identiteettien prosessuaalista luonnetta sekä ihmisten ja ei-ihmisten yhteistoimijuutta kohtaan (Mol 2002; Law 2004). Haastattelujen lukemisen temaattisina kiintopisteinä korostuivat kysymykset siitä, milloin ja miten itsenmittauskokoontumisen kerrotaan rakentavan kehon ja minuuden tiedon, toiminnan ja mahdollisen muutoksen kohteeksi. Jos ajatellaan, että käytännöt ja aktiviteetit (kuten kertominen, tekeminen ja tietäminen) myös edeltävät todellisuutta

eivätkä vain seuraa siitä (Law 2004), voidaan kertomus- ja kokemuspohjaisen aiheiston avulla avata näkökulmia kehoja ja elämää koskevaan tiedontuotantoon ja poliittisen toimijuuden hajautumiseen mittauskäytännöissä. Haastattelut toimivat kertomuksina, jotka sekä ilmentävät että tuottavat mittauskokooppojen logiikkaa. Ne kertovat siitä, miten minuus on tullut tiedetyksi ja koe- tuksi tai miten arkipäivässä on toteutettu minuuden tietämisen tapoja. Omat kokemukseni mittausteknologian parissa ovat osaltaan auttaneet reflektimaan näitä kertomuksia.

Minuuden tekemisen jaettu työ

"Polar Loop seuraa kaikkea aktiivisuuttasi – askel askeleelta ja hyppy hyppyltä pitkin päivää – ja kertoo, mitä hyötyä siitä sinulle on.

Se palkitsee sinut aktiivisuudesta ja kannustaa lähtemään liikkeelle, jos et vielä ole saavuttanut päivittäistä aktiivisuustavoitettasi.

Yhdessä Polar Flow -verkkopalvelun ja -mobiilisovelluksen kanssa se on täydellinen ratkaisu aktivoitumiseen.

(Polar Loop -käyttöohje, s. 3.)²

Arkipäivän ontologiassa ihmisen ja laitteen välinen asetelma on selvä: ihminen on itsestään huolehtiva toimija, tekno-

logia on väline. Toisaalta jo suosittu Polar Loop-aktiivisuusrannekkeen käyttöohjeessa kerrotaan melko suoraan laitteen toimijuudesta ja laitteeseen liittyvästä tiedontuotannosta. Ohjeessa kerrotaan, kuinka laite seuraa ja arvioi ihmisen päivittäistä toimintaa, kannustaa ja on "täydellinen ratkaisu aktivoitumiseen". Itseä mittaavan laitteen käyttö on työnjakoa: ihmiskäyttäjä aktivoi laitteen seuraamaan itseään ja tuottamaan tietoa omasta toiminnasta (Schüll 2016). Kun laite omalla tavallaan kertoo mitä kannattaa tehdä, laitteen toiminnassa rakentuu myös tietoa siitä, mitä aktiivisuus ylipäätään on. Se on esimerkiksi liikettä ja askeleita. Jos ihminen toimii laitetta tyydyttävällä tavalla, laite tyytyy seuraamaan vierestä ja palkitsemaan. Jos taas ihmisen kehollinen toiminta näyttää tyydyttävällä tavalla, laite joutuu toden teolla töihin, motivoimaan ja aktivoimaan yksilöä erilaiseen suoriutumiseen.

Laitteet motivoivat monin tavoin. Prosessoituaan vastaanottamansa kehon rytmit ohjelmistossaan laitteet voivat tarjota tietoa minän tilasta esimerkiksi värikoodein, virtuaalisin palkinnoin, tehokkuusprosenttein sekä tuntoaistiin perustuvien haptisten värinöin. Esimerkiksi Marika, 43-vuotias kolmen lapsen äiti kertoo, kuinka Polarin aktiivisuusranneke on toiminut hänen elämässään

liikkeen motivaattorina rangaistusten ja palkintojen kautta:

Marika: [...] tää [ranneke] ilmottaa myös että... tulee merkkei jos istuu kauan paikallaan ni tulee sellanen huomautus.

Harley: Okei, niin et siit tulee...

Marika: Nii, et tavallaan sit huomaa et mähän istun tosi paljon. Ja sit, että kun siihen tulee se 10 000 askelta vai mitä ni sitten tulee jo ilotulitusta ja JEE et tuli päivän tavoite saavutettua ni siit tulee sellanen... ja sit ku on niit päivii et jää vähästä kiinni ja perheenjäsenetkin kysyy et mitä sä oikeen teet, ni mä sanon et mä saan tän [päivän tavoitteen] täyteen (nauria). Et sillä tavalla vähän niinku seuraa sitä omaa liikkumistaan.

Toimeenpanevaa voimaa edustavat myös haptiset, tuntoaistiin perustuvat värinä-hälytykset, joista huomattavan moni haastateltava totesi, että ne *todella* tekisivät laitteesta hyödyllisen ja helpottaisivat itsen seurannan työtä entisestään. Tällaisen hälytyksen vaikutuksia kuvaa Mikael, 26-vuotias yliopisto-opiskelija, seuraavasti:

Mikael: [Laitteessa] on ominaisuus, joka varoittaa tai antaa värinä-hälytyksen sillon ku on istunut tunnin

paikallaan... muistuttaa et kannattais välillä käydä jalkeilla et verenkierto lähtis paremmin liikkeelle eikä sillä tavalla tulis altistuttua tällaisille istumisen haittoille. Et se on sillä tavalla ehkä ollu suurimpia muutoksia omassa arjessa et ku tähän tuli toi istumisvaroitusta tai passiivisuusvaroitusta [...] kyllä se sillä tavalla mut saa aina liikkeelle et mä silloin käyn kiertämässä pienen ympyrän ja juomassa vaikka vähän vettä... et sillä tavalla mul ei tuu tuohon sovellukseen sellasta passiivisuusleimaa tai niinku rangaistusta siitä et on ollu sen tunnin paikallaan

Nämä toiminnot ohjaavat usein onnistuneesti kehoja toteuttamaan tietynlaisia toimintamalleja. Ne ovat eksplisiittistä biopedagogiikkaa (Fotopoulou & O’Riordan 2017), jonka avulla yksilöitä koulutetaan kantamaan huolta itsestään. Edellä aktivoituminen rakentuu liikkeen lisäämisenä, kun laite kiihtyvyyssanturinsa (*accelerometer*) välityksellä mittaa liikettä ja palkitsee liiketavoitteiden saavuttamisesta kannustaen näin myös esimerkiksi ”kisailuun itseään vastaan” (Liisa, 38). Sosiologi Chris Till (2014) on tarkastellut itsenmittausta ja tällaista peilillistämisen logiikkaa liittäen ne yhteiskunnalliseen termodynamiikkaan. Hänellä digiajan kapitalismi kristallisoituu

yhteiskunnan energiatehokkuutta ohjaavissa teknologioissa, jotka kannustavat näennäisen vapaaehtoiseen, regeneroivaan liikuntaan, jota kuitenkin arvo(s)-tetaan työnä tai ainakin pidetään yksilön vastuuna ja ”hyvän” kansalaisuuden edellytyksenä. Usein mittarista tuleekin kiihdytin (*thermal exciter*) (Serres 1997), joka stimuloi liikkeeseen.

Kaikki vastaajat eivät suinkaan ole kiinnostuneita ainoastaan varsinaisen tietoisesta liikkeensä, kuten askelmääriensä tai liikuntasuoritustensa, seuraamisesta. Esimerkiksi useissa uudemmissa aktiivisuusrannekeissa on toimintona pinnallinen yön aikaiseen liikkeeseen ja mahdollisesti sykedataan perustuva unenseuranta. Lisäksi on saatavilla unen seurantaan erikoistuneita ohjelmistoja, joiden unta koskeva tiedontuotanto perustuu myös esimerkiksi sydämen sykevälivaihteluihin ja hengitysrytmeihin. Monet kertovatkin, että liikkeen seuraamista tärkeämpää tai kiinnostavampaa on unen seuraaminen. Myös unesta tulee näin aktiivisuuden alusta ja terapeuttinen käytäntö, joka palauttaa (tai ei palauta) kehoa päivän rasituksesta ja myös jäsentää minuutta. Kiihdytin-metaforan kautta en tässä kuvaakaan ainoastaan laitteen kykyä tuottaa lisää liikettä, vaan laajemmin niiden tekemää työtä ”haittoja” vastaan taistelussa; esimerkiksi sitä, kuinka ne tuottavat myös ei-liikkeen tie-

tynlaisen energiatehokkuuden vaalimisen tilaksi. (Schüll 2016, 6; Williams ym. 2015). Unen mittaamisen myötä paitsi liikkeestä (suoritus) myös ei-liikkeestä ja ”passiivisuuden” kehollisista rytmeistä (palautus) tulee tehostamisen ja minuutta jäsentävän arvioinnin kohde.

Jotkut teknologiat hyödyntävät vähemmän eksplisiittistä elämäntaitovalmennusta ja avaavat enemmän refleksiivisiä mahdollisuuksia minuuden jäsentämiseen. Esimerkiksi Sakari, 50-vuotias aktiivinen itsenmittaaja, kertoo terapeuttisina teknologioina vaa’asta ja sykemittauksesta, jotka eivät ehdollista kovin eksplisiittisesti, vaikka kytkeytyvätkin käytössä esimerkiksi yleisiin hyvinvointidiskursseihin tai asiantuntijajärjestelmissä tuotettuihin kontekstiriippuvaisiin viitearvoihin. Samalla Sakari kuitenkin kertoo laitteiden aktiivisesta roolista tiedontuotannossa. Laitteita käytettäessä minuus muotoutuu ”eri tavalla todelliseksi”. Tämä yhdistyy myös itsenmittausta tutkineiden Matthias Boden ja Dorthe Kristensenin (2015, 124–125) huomioihin siitä, kuinka mittauksen ei usein koeta niinkään tuottavan uutta tietoa kehosta vaan todentavan minuutta:

Sakari: [M]ittaamisella asiat tulee niinku hirveen todelliseksi. On ihan eri asia tietää paljon painaa mut jos sä tiedät vaikka viidellä tuhannella

mittauksella paljonko painat niin siitä painosta tulee sulle tosi niinkun... todellista (nauraa). Ja kaikki niinku verenpaine ja syke... et mä meen illalla nukkumaan ja mä aina mittaan ton leposykkeen niin okei vaikka mä tiedän että mä oon rentoutunu, mutku mä nään sen leposykearvon mikä mulla on... ja sitten ku mul on hirvee määrä niitä mittauksia, ja tiedän sen mun lähtötason, niin siitä mun rentoutumisesta tulee ihan eri tavalla todellista. Mä todella tiedän sillai jollain syvällisellä tasolla olevani rento.

Sakaran kokemus johdattaa myös pohtimaan itsenmittausta todellisuuden moninaisuuden kannalta: hyvin perustavalla tasolla kyse on potentiaalin ja moninaisuuden hallinnoinnista ja minuuden aktiivisesta täytöntöönpanosta teknologisessa verkostossa. Sakari tietää jollain tasolla olevansa rento jo ennen mitausta, mutta vasta rentouden systemaattinen mittaaminen saa hänet vakuuttuneeksi. Kokemus kontrollista on mittamisen ydin:

Sakari: [S]emmonen tyyppi joka mittailee vaikka kerran kuukaudessa vähän painoan, niin se ei tajuu tätä ollenkaan, et sitten ku sulla on vaikka 10 000 mitausta, sul on sellasta big dataa mistä sä voit louhia sellasia

muuttujia, niin siitä tulee hirvee sellanen kontrollin elämys... yleisesti elämässä ottaen on aina niin, että sama asia on sekä hyvä että paha, ja niinku tässäkin [mittaamisessa]. Et se perusidea minkä ympärillä tää pyörii on se kontrolli, ja hyvä fiilis tulee siitä ku se kontrolli on ja se kauhu tulee siitä ku sitä kontrollia ei ole.

Sakaran kuvaama kontrolli, kuten myös eksplisiittisille palkinnoille ja rangais- tuksille perustuva itsen toteuttaminen, voidaankin ajatella juuri epävarman, moninaisen minuuden parsimisena kasaan tietämisen käytännön kautta (Mol & Law 2004). Mittauskokoonypanot kiihdyttävät kehoja toimintaan avaamalla arjen prosesseja mitattavaksi ja tuottamalla näin potentiaalista minuutta, jonka hallinnoinnista yksilö saa kontrollin elämyksen. Kun minuuden tuottamisen työ jaetaan laitteen kanssa, itsen kontrollista luovutaan yhtä lailla kuin sitä vahvistetaan (Gomart & Hennion 1999, 221–227; Schüll 2016), vaikka ihminen kokee mita- tessaan olevansa kontrolloiva, tietoinen osapuoli. Mittauskokoonypanoissa aktiivisuuden ja passiivisuuden väliset rajanvedot siis hämärtyvät, mutta Sakarin ja muiden eksplikoimat affektiiviset kokemukset viittaavat myös kontrollin mielekkääksi tekeviin moraalisiin arviointeihin. Itsenmittauksen verkosto ei pääty

ihmisen ja laitteen yhteenliittymään, saati ala siitä. Mittauskokoonypanoihin kytkeytyy myös yhteiskuntapoliittisia ideoita, joiden kautta esimerkiksi Marikan affektiiviset onnistumisen elämykset ilotulitusten näkemisestä tai Sakarin eksplikoimat ”hyvät fiilikset” ja kauhun kokemukset tulevat ymmärrettäviksi. Keskityn seuraavaksi tarkemmin siihen, miten objektiivisen tiedontuotannon sijaan mittauskokoonypanot tulevat toiminnallisiksi ennen kaikkea moraalisen tiedontuotannon kautta.

Aktivoitumisen järjestelmät ja moraalinen tieto itsestä

Veli (28): Se [unenseuranta] auttaa mua tavallaan niinkun pitämään itteni virkeenä. Joka on sinänsä vähän hölmöä, koska kyllähän sitä tavallaan ite huomaa et jos on väsynyt niin pitäis nukkua enemmän. Mutta sanotaan näin, että se pitää mut niinku oikeella polulla.

Aiemmassa tutkimuksessa (Ruckenstein 2012, 118; Sharon 2016) on todettu, kuinka mittaustuloksia pidetään usein riittämättöminä arjen ja elämän ”objektiiviseen” tulkitsemiseen. Usein mittarit esimerkiksi rekisteröivät vain tietynlaisen liikkeen (askeleet, juoksu) aktiivisuudeksi, jolloin toisenlainen aktiivisuus

(jooga, pyöräily) jää rekisteröimättä. Mittarit voivat myös mitata sykettä eri tavoin riippuen siitä, missä kohtaa kehoa laitetta pidetään. Ihmiset antavat usein painoarvoa myös subjektiivisille tuntemuksilleen, jotka eivät välttämättä suoraan vastaa mittareiden välittämää kuvaa kehon tilasta.

Omassakin tutkimuksessani oli usein havaittavissa, kuinka ihmiset kritisoivat mittareiden yksipuolisuutta, epätarkkuutta, kömpelyyttä ja jopa turhuutta. Voidaan ajatella, että mittauskäytännöissä väistämättä muodostuvat tiedolliset aukot ajavat mittareiden käyttöä: tietoa on saatava lisää aukkojen paikkaamiseen. Toisaalta itsenmittaajille, kuten Velille edellä, erityisen merkityksellistä vaikuttaa usein olevan eritoten mittauskäytännöissä muotoutuva moraalinen tieto itsestä ja ”kunnan” minuudesta – ei niinkään mittareiden objektiivisuus. Tämä on yksi olennainen ulottuvuus, jonka kautta minuus tulee eri tavalla todelliseksi.

Moraalinen dynamiikka tiivistyy myös esimerkiksi Jessican (32) kuvauksessa siitä, kuinka hän koki aktiivisuusmittauksen turhauttavaksi, koska yhtäältä se ei rekisteröinyt askelmääriä niin tarkasti kuin hän oli olettanut ja toisaalta näytti hänelle ”karvaan totuuden” siitä, että aktiivisuus ei ollut oletetulla tasolla. Tämä näennäinen paradoksi kuvaa hyvin

mittareiden toiminnallisuutta: mittarit eivät tunne kehoa mutta tekevät sitä suhteessa ideaaliin ja patologiseen.

Sirkku (26) kertoo haluavansa tehdä asiat illalla ”oikein”, jotta aamulla unenmittausovellus tarjoaisi tyydyttävän pistemäärän, ja yöuni paikantuisi ”vihreälle alueelle”. Sirkun kuvauksessa korostuu sekä laitteen voima liikuttaa (ohjata kävelylle), että pysäyttää (ohjata aiemmin nukkumaan).

Harley: Koetko, että itsenmittaaminen on muuttanut jotain arkisia tapoja elämässäsi?

Sirkku: No on se silleen, just ton unen tarkkailun suhteen, että... kyl mä nyt haluan et sieltä tulee jotain säädyllisiä tuloksia sieltä [sovelluksesta], et kyl mä haluan sen verran aikaisemmin mennä nukkumaan et sieltä ei tuu mitään 53[100] sleep scoresta, kun se näyttää tosi pahalta ja harmittaa [...] kyl mä niinku yritän tehdä joitain asioita oikein sitten illalla, että mä nukkuisin paremmin. Et mä käyn sitten jossain kävelyllä tai yritän tehdä jotain muuta kuin tuijottaa läppäriä. (Sirkku, 26)

Jotta yön aikana kehon hengitysrhythmiä, liikettä ja syketasoja tulostensa laadintaan käyttävä unenseurantaohjelmito tarjoaisi hyvän tehokkuusprosentin,

Sirkku kertoo muuttaneensa toimintatapojaan. Hän haluaa unen ja levon näyttävän kunnollisena, sillä huono suorittuminen ”näyttää pahalta ja harmittaa”. Pistemäärä (*sleep score*) tiivistää unen monimutkaisen kokonaisuuden yksinkertaiseksi luvuksi ja tuottaa nukkumisen terapeuttiseksi käytännöksi ja potentiaalinen hallinnoinniksi. Kun patologinen minuus nostaa päätään esimerkiksi huonon unipistemäärän muodossa, voidaan muutosvoima keskittää itseensä. Laite toimii kiihdyttäjänä sekä provosoiden lisää liikettä että ohjaten aiemmin lepoon. Jälkeenpäin ajateltuna itsellänikin on kokemusta oman näennäisen passiivisuuteni tuottamisesta aktiiviseksi: kun aktivoin Withings-sovelluksen mittaamaan leposykettäni istuessani passiivisena työtuolissa, sain palkinnoksi vihreän merkin ja maininnan siitä, kuinka matala leposykkeeni on ”tree-natun urheilijan” syke. Kehon osalta tämä tilastollinen yleistys meni harhaan eikä tuottanut niinkään tietoa kehoni ”oikeasta” suorituskyvystä, mutta moraalisen aktiivisen minän indikaattorina, osoituksena kunnan minuudesta, se tuntui palkitsevalta.

On jälleen huomattava, että Sirkku ajattelee jo olevansa huono, epäsäännöllinen nukkuja – aivan kuten itsekin tiesin jo omaavani matalan leposykkeen. Mittari vahvistaa (tai kenties haastaa) jo

olemassa olevaa tietoa itsestä. Moraalissa ideaaliin ja patologiseen keskittyvässä tiedontuotannossa olennaista on se, ettei ideaalin tai patologisen napoja voida koskaan pysyvästi saavuttaa. Sen sijaan mittauskokoontuotanto tuottaa nämä minuuden potentiaalit jatkuvasti olemassa oleviksi mahdollisuuksiksi. Yksinkertaisimmillaan 10 000 askeleen ihanne on saavutettava joka päivä, ja uni on prosessi, joka toistuu yleensä joka yö. Käytännössä objektiivisesti epätarkkakin tiedostettu mittari koetaan arkisessa käytössä usein melko luotettavaksi suhteessa esimerkiksi aiempiin mittauksiin. Näin mittari alleviivaa moraalista suhdetta itseseen, minkä myötä yksilö voi ”potkia itseään perseelle” (Aino, 39) ja esimerkiksi yrittää ”pysyä kartalla siitä, mikä on tänään se suhde eiliseen” (Mikael, 26). Mittauksessa tai sen kautta muodostuvassa tiedossa ei kuitenkaan ole pysyvyyttä vaan suhde itseseen on luotava säännöllisin väliajoin uudelleen. Tässä mielessä jokainen yksittäinen mittaus luo paitsi tietoa minuudesta myös potentiaaliksi hajoavaa minuutta, joka rakentuu ymmärrettäväksi vain suhteessa menneisiin ja tuleviin mittauksiin (Sherman 2016, 33–34; Ruckenstein 2012, 118). Informaatioarvoltaan vajavaiseksi koettua dataa voidaan myös tarkentaa täydentävän datan³ välityksellä.

Bode ja Kristensen (2015) kytkevät mittauksen osuvasti ”kaksoisolennon” tuottamiseen (*doppelgänger*), jolloin korostuu minuuden tekeminen ”toista” minää ulossulkemalla. Mittaamisessa rakentuvasta itesuhteesta on usein puhuttu termillä *data double* (Ruckenstein 2014; Lupton 2014). Termi implikoi kahdenvälisestä suhteesta. *Doppelgänger*-käsite tuo lähemmäs prosessilogiikkaa ja moninaisuutta. Filosofit Michel Serresille (1997) kaikkien suhteiden (myös itesuhteen) perusmuoto on triadi, jossa kahdenväliseen suhteeseen kiinnittyy aina *kolmas*, joka on suljettava ulos mutta joka samalla mahdollistaa suhteen. Tämä ulossulkemisen dynamiikka korostuu terapeuttisessa kielessä, jossa keskiössä on itsen ymmärtäminen ja muuttaminen. Muutos tulee merkitykselliseksi vain suhteessa järjestykseen, joka luo muutoksen moraalien (ideaalin ja patologisen) pohjan: mittauksessa on jatkuvasti läsnä sekä parempi että huonompi minä.

Mittauskäytännöt havainnollistavatkin triadista itesuhdetta. Terapeuttisena teknologiana mittauskokoontuotanto pyrkii sulkemaan kolmatta, patologista ja passiivista minää ulos, vaikka käytännössä patologisen on aina myös oltava läsnä, jotta mittaus näyttäytyy toiminnallisena. Kokoontuotanto on jatkuvasti tuotettava tietoa sekä siitä, millainen on oikeanlai-

nen minä, että siitä, millainen on vääränlainen minä. Mittauskokoontuotannon poliittinen työ tulee ymmärrettäväksi taisteluna patologista vastaan. Tämä taistelu on kuitenkin päättymätön, sillä ideaaliminuutta ei tietenkään voi mittauskäytännöissä todella saavuttaa tai patologista karkoittaa; ne vaativat aina varjoissa matkalla seuraavaan mittaukseen. Tämä tekee myös ymmärrettäväksi monien haastateltavien mainitsemää mittauksen ”koukuttavuutta” tai sitä, että mittaus synnyttää monille mielenkiintoa yhä kattavampaan tiedontuotantoon esimerkiksi uusien laitteiden muodossa.

”Toista” minää vastaan taistelu ei aina onnistu eikä mittaus aina johda näkyviin elämäntapamuutoksiin. Sari (46) kertoo käyttävänsä liikkeelle kehottavaa aktiivisuusranneketta, jotta ”mä tiedän et mä liikun tietyn määrän päivässä”. Hänellä liikunnan lisäämiseen liittyy kaksoisympärisen diabeteksen riski, josta hän sanojensa mukaan saa joka vuosi työterveyslääkäriltä ”ukaasin”. Sari kertoo, ettei ole laitteen avulla onnistunut mielestään lisäämään päivittäistä liikettään. Samalla kuitenkin tulee selväksi, että kokoontuotanto on toiminut tuottaen tietoa minuudesta, kun Sari pohtii, että kenties ”aktivoitumisen” on estänyt hänen ”laiska” persoonallisuutensa. ”[T]avallaan mä jotenkin toivoin sitä et se [mittari] niinku aktivois mua liikkumaan enem-

män. Mut ehkä mä oon sit vaan jotenkin niin laiska luonne et niin ei tapahtunut.”

Sarin kokemuksessa tulee näkyväksi, että vaikka laite ei aina onnistu aktivoimaan, se tekee työtä tuottaessaan tietoa minuudesta. Tässä tapauksessa Sari pohtii henkilökohtaista laiskuuden patologiaa syynä siihen, miksi laite ei ole toiminut niin kuin hän odotti sen toimivan. Mittauskokoontamiset siis tuottavat tietoa siitä, mitä aktiivisuus tai passiivisuus ylipäättään tarkoittaa, ja muotoillessaan keholliseen olemiseen liittyviä ratkaisuja myös tuottavat ongelmia (Pols 2010, 173). Mittarit siis tekevät työtä taistelussa myös osaltaan itse tuottamiaan ”ongelmakehoja” ja ongelmaisia minuuksia vastaan. Voidaan ajatella, että mittareita ei ole pakko totella. Vaikka mittari yrittää kehottaa kävelemään enemmän, ihmisen voisi tulkita tämän toisin ja käyttää esimerkiksi matalaa askelmäärää osoittamaan, että vapaapäivä on ollut onnistuneen rento. Usein näiden arkielämän mittajien kohdalla näin ei kuitenkaan tapahdu, vaan ennemminkin vapaapäivän rentous (matalan askelmäärän muodossa) on asia, joka voidaan hyväksyä, kunhan muistaa ryhdistäytyä myöhemmin.

Kehon potentiaalain hallinnointi ja taistelu patologista vastaan pitää liittää aikansa hallitsemiin poliittisiin kehyksiin, jotka niin ikään saavat sekä toimijan

että toiminnan kohteen ominaisuuksia itsenmittauskokoontamissa. Jos seurataan diskursiivista kehikkoa, jossa esimerkiksi liikettä ja unta seuraavia rannukkeita on alettu yleisesti kutsua ”aktiivisuusrannukkeiksi”, aktivointipoliittikka näyttyy yhtenä keskeisimmistä itsenmittausta aktiivisesti ehdottavista ja mielekkäistä itsenmittauskokoontamanoista tuottavista kehyksistä. Kriittisessä sosiaalipoliittisessa tutkimuksessa aktivointipoliittikalla on viitattu 1990-luvulla – rinnan uusliberaalin kapitalismin kanssa – kehittyneeseen eetokseen, joka korostaa työttömän (ts. potentiaalisen työntekijän) vastuuta omasta työllistettävyydestään, oman kompetenssin ylläpidosta (Keskitalo 2013; Julkunen 2013). Aktivointi voi myös viitata laajemmin sosiaaliseen ohjelmaan (Eversberg 2015, 173; Clarke 2005, 448; Newman & Clarke 2009), jossa kansalaisen – jälleen, potentiaalisen työntekijän – on pidettävä huolta itsestään ja työkyvystään.

Aktivointi on siis kehon ja yksilön sosiaalista hyödyllistämistä, jos ajatellaan, että kehon hyödyllisyys viittaa ennen kaikkea sen potentiaaliseen (taloudelliseen) tuottavuuteen tai vähintään ei-rasittavuuteen. Etenkin yhteiskuntatieteilijä Dennis Eversberg (2015) on Gilles Deleuzeen tukeutuen osuvasti luonnehtinut aktivointipoliittikan logiikka

kaa nykyajassa dividualisaation logiikkana, jossa potentiaalinen työvoima hajotetaan ja kootaan uudelleen kasaan yhä pienempien parametrien (datan) välityksellä tuotantojärjestelmän energiatehokkuuden tehostamiseksi. Itsenmittaus vaikuttaa tuovan tällaisen logiikan myös arkielämään.

Vaikka julkisen keskustelun tasolla aktivointi usein yhdistetään nimenomaan työttömiin, aktivoinnin politiikka vaikuttaa toimivan myös laajemmin ja näkymättömämmin arkipäivässä alleviivaten kunniallisuutta ajassa. ”Sosiaalisena ohjelmana” ja poliittisena aktanttina aktivointi saa samalla myös uusia muotoja mittauskäytännöissä: haptinen poliittikka esimerkiksi värisee ranteessa, jolloin yksilö saa konkreettisen viestin toimintansa kunniallisuudesta. Tiedontuotantoa mittauskäytännöissä voidaan siis ajatella hyvin jännitteisenä. Mittari ei tosiasiaassa tiedä paljoakaan kehoon vaikuttavista yhteyksistä: niistä moninlaisista fysiologisista, mentaalista tai kontekstuaalisista syistä, miksi keho toimii niin kuin se toimii ja liikkuu niin kuin se liikkuu. Kehon tilan arviointi saa motivoivan voimansa ja toiminnallisuutensa diskursiivisesta moraalista arvioinnista, josta ihmiskäyttäjät jakaa vastuun laitteen kanssa. Seuraavassa osiossa syvennän vielä ajatusta siitä, miten aktivoinnin järjestelmän tai verkoston aktantit

ovat kytköksissä toisiinsa. Tämä auttaa myös pohtimaan sitä, kuinka aktivointi järjestyneenä terapeuttisia kokemuksia tuottavana moraalina ja politiikkana vakiintuu ja muuttaa muotoaan itsenmittauskokoonten osana.

Itsenmittaus ja tiedontuotannon siteet

Arkielämässä mittaus tuottaa siis usein tietynlaista (moraalista) faktuaalisuutta minuudesta, ja data saa näin merkittävän roolin tiedontuotannossa, vaikka sen objektiivisuus toki usein kyseenalaistetaan (Sherman 2016, 34). Näin itsenmittauskokoonten voi vakiinnuttaa sosiaalista järjestystä ehdottamansa ja tuottamansa aktiivisuuden logiikan ja itsekontrollin taustalla. Yksilötasolla mittaamista voidaan retorisesti myös haastaa. Haastattelussa mittauksen negatiivisina aspekteina korostuvat yleensä mittaamisen taipumus kääntyä stressitekijäksi, sen riippuvuutta ja pakkomieltä ruokkiva luonne tai sen kyky tuottaa pahaa oloa huonosta suoriutumisesta (Pols 2010, 174–175; Ruckenstein 2012). Tällöin kuitenkin patologia – esimerkiksi ”laiskuus” tai ”neuroottisuus” – vaikuttaa useimmiten palautuvan lopulta ihmiskäyttäjään, joka syytä tai toisesta ei kykene toimimaan ”oikein” aktiivisuuden logiikan kanssa, ja aktivoituminen sinänsä

jää kritiikin ulkopuolelle. Negatiiviset kokemukset voivat johtaa laitteiden käytöstä luopumiseen. Poliittisen toimijuuden analyysille on kuitenkin tärkeää huomioda, ettei tällainen luopuva vastarinta tarkoita mittauskokoonten hajoamista.

Aiemmassa tutkimuksessa on todettu, kuinka laitteet arkisessa käytössä vähitellen ikään kuin katoavat, kun ihmiset unohtavat niiden läsnäolon ja samalla ne ”tarttuvat”, kun niistä tulee osa itseä (Ruckenstein 2012, 113). Toisin sanoen suhde itseän muuttuu, kun kehojen ja laitteiden välillä tuottuu minuutta koskevaan tiedontuotantoon kytkeytyvä side, joka usein kestää vaikka laite ei olisi fyysisenä objektina kiinni kehossa tarjoamassa tietoaan. Aino (39) kertoo, että aktiivurheiluaikoinaan hän mittasi usein sykkeitään tehostakseen harjoitteluaan. Tämä on johtanut siihen, että hän tuntee nyt kehonsa ja sen rytmit:

Aino: Nyt mä en ehkä sillai sitä syketä enää sillee kato että sekin on... mä niinku tunnen itteni että mis kohtaa on joku keskisykealue ei et tarvi sitä niinku tuijottaa mistään, mut sillon just ekat vuodet ku sitä opetteli sitä hommaa ni aika paljonkin seurasin.

Tämä tuo oman sävynsä huomioihin siitä, että monet itsenmittajat käyttävät

tiettyjä laitteita aikansa ja siirtyvät sitten muihin laitteisiin tai lopettavat tyystin laitteiden käytön (Lazar ym. 2015; Lupton 2016). Aino ei kerro luopuneensa sykemittauksista siksi, että hän ei ole enää aktiivurheilija, vaan siksi, että laite on tarttunut; hän tietää nyt sykkeistään eritavalla. Perheenäitiyden ja esimiestyön välillä tasapainotteleva Aino kertoo nykyään käyttävänsä aktiivisuusranneketta jälleen opettelutarkoituksessa ”potkiakseen itseään perseelle” ja ehkäistäkseen päiviä ”jolloin on ihan laiska”. Aino kertoo työelämän olevan rankkaa ja pohtii, kuinka ilman motivaattoria liikuntaan hänen jaksamisensa työssä olisi luultavasti merkittävästi huonompaa. Mittari siis motivoi osoittamalla ei-toivotun, laiskan minän, joka on pidettävä etäällä, ja näyttäytyy työelämän kuormittaviin vaatimuksiin sopeutumisen välineenä. Se on sekä työstä toipumisen että koettujen kovien vaatimusten täyttämisen edellytys. Laite myös kehottaa ja opettaa aktiivisesti pohtimaan päiviä tietynlaisen logiikan kautta: Aino kertoo mittaamisen motivaatiokseen yrityksen välillä ”niitä päiviä kun aktiivisuus on käytännössä nolla”. Tämä logiikka, päivien jäsentyminen esimerkiksi suhteessa ”nolnaan”, jää elämään.

Toimijaverkoston kautta voidaan kohdentaa huomio siihen, kuinka laitteista luopuminen on vain osa mittaus-

kokoonpanojen tai aktivoinnin järjestelmien toimintaa itseä koskevassa tiedontuotannossa.

Toimistotyöntekijä Jessica (32) kertoo, että vaikka hän on lopettanut aktiivisuus- ja sykemittareiden säännöllisen käytön ja kokenut tämän johdosta myös ”vapauden tunnetta” lähtiessään lenkille ilman mittareita, takaraivossa jyskyttää jatkuvasti ajatus siitä, että mittaria olisi käytettävä, jos mieli parantaa kuntoon. Kehon ja kunnon ajattelu datan läpi on jäänyt elämään. Kun mittari irrotetaan kehosta, tekninen datavirta katkeaa, mutta mittauskokoonpanon minuuden tekemisen prosessissa suhde itse on jo muuttunut ja side jollain tasolla usein jää. Vaikka siis konkreettinen laite häviää kehosta, terapeutisena teknologiana mittari on edelleen kiinni minuudessa tai sulautunut osaksi omaa tekemistä ja ajattelua. Tässä tilanteessa liepee kyseenalaista luonnehtia ihmiskäyttäjää aktiiviseksi tai passiiviseksi, vaan ennemmin mittaus on luonut uudenlaisen maailmassa olemisen tavan (Pink & Fors 2017). Mittauskokoonpanoissa ei ehkä ole mielekästä puhua yksiselitteisen aktiivisesta tai passiivisesta yksilöstä, mutta voitaneen puhua uudella tavalla aktivoituneesta subjektista, joka tuottaa arjessaan itseensä kohdistuvaa tietoa – ja itseään – uusin tavoin (Schüll 2016). Itse lopetin aktiivisuuden ja sykkeiden

seurannan kahdeksan kuukauden aktiivisen kauden jälkeen. Sittemmin olen kuitenkin toisinaan palannut lyhyemmissä jaksoissa mittaamisen pariin esimerkiksi leposykkeen tiimoilta, ja mikä tärkeintä, huomannut usein ajattelevani ja jäsentäväni toimintaani päivän aikana laitteiden ehdottaman kvantitatiivisen logiikan mukaan.

Luna (43) kuvaa mittauskäytäntöjen myötä kasvanutta aktiivisuuttaan, kun ”alussa se tuli väkisin, nyt se tulee itsestään”. Hän kertoo, että aluksi tavoitteen (10 000 askelta päivässä) eteen piti tehdä ”tosissaan työtä”, mutta nyt työstä on tullut rutiinia. Luna myös valottaa, kuinka aluksi hän koki tärkeäksi katsoa aktiivisuutta osoittavaa, päivittäisen askelmäärän ilmoittavaa numeroa ranteessa päivittäin. Enää laitteen pitäminen päällä ei ole kuitenkaan niin tärkeää, koska nykyään hän tuntee, kun tavoitteet on saavutettu. Elämään ovat tulleet pitkät lenkit ja tietyllä tavalla kasvanut aktiivisuus, joten varsinainen laite voi jäädä pöytälaatikkoon seuraamaan etäältä. Vaikka hän edelleen yleensä pitääkin laitetta aktiivisesti päällä, hetket, jolloin laite unohtuu kotiin tai ei syystä tai toisesta toimi, eivät enää turhauta samalla tavalla kuin ennen, sillä kokemus päivän onnistumisesta tuottuu ilman konkreettista yhteyttäkin. Luna tosin kertoo, että keskustelumme tuloksena hän miettii

nyt laitteen valjastamista uudelleen opetuskäyttöön; hän miettii minimimitavoitteen nostamista vähintään 13 000 askeleseen päivässä.

Mittauskokoonpanossa siis aktantit muuttuvat. Keho ja minuus muuttuvat uusin tavoin tunnettaviksi ja tunnetuiksi. Teknologiat mukautuvat yksilökehon rytmeihin tarjoten eri tavalla moraalista informaatiota sekä ehdottaen että heijastaen erilaisia toimintoja ympäristönsä kehosta ja sen toimintoista riippuen. Poliitiikka, joka muovaa niin itsenmittausteknologioiden syntyä ja yleisty- mistä kuin niiden tuottaman datan tulkitemistakin, muuttuu värinöiksi ja kehoituksiksi sekä vakiintuu ruumiilliseen olemiseen ja toimintaan.

Itsenmittaus terapeutisena ja poliittisena käytäntönä

Tässä tutkimuksessa itsenmittaus kuvataan käytäntönä, jossa tiedontuotanto itsestä jaetaan ja jossa laitteet heijastavat vaikutuksiaan ihmiseen konkreettisen biopedagogisen ehdollistamisen välityksellä tai avaamalla enemmän näennäisen refleksiivistä tilaa datan tulkinnalle. Joka tapauksessa mittauskokoonpanoissa minuus avautuu potentiaalina, jota laitteet sitten auttavat hallinnoimaan. Olen kuvannut, kuinka arkielämän terapeutisessa tiedontuotannossa mittaus-

kokoonpano tulee toiminnalliseksi mo-
raalista tietoa tuottavana aktivoitumisen
järjestelmänä, jossa minuutta aktiivises-
ti tehdään. Terapeuttisena teknologiana
mittarit sulautuvat ihmiselämiin myös
ilman konkreettista kontaktia. Koke-
mukset vihjaavat, kuinka mittareista
luopuminen voi olla vain osa mittausko-
koonpanojen poliittista toimijuutta arki-
elämässä.

Aktivoitipolitiikka voidaan ym-
märtää yhtenä nykyajan hegemonisena
poliittisena aktanttina ja sosiaalisena oh-
jelmana, jossa tämä potentiaalin hallin-
nointi tulee mielekkääksi ja jonka myötä
hyvinvoinnista ja elämän perustavanlaa-
tuisimmista prosesseista, kuten liikkes-
tä tai unesta, tulee helposti osa uuslibe-
raalin kapitalismin pohjalla vaikuttavaa
kehoja erottelevaa ja luokittelevaa valta-
kamppailua. Itsenmittaus uppoaa vauh-
dilla yhteiskunnan käytäntöihin ja ra-
kenteisiin. Siksi on ajankohtaista tarkas-
tella digitaalisen politiikan toiminnalli-
suutta ja sosiomaterialisuutta nykypäi-
vässä. Tämän tutkimuksen perusteella
itsenmittauskoonpanojen poliittista
toimijuutta ei tule palauttaa ainoastaan
inhimilliseen toimintaan. Tarvitaan li-
sää tutkimusta siitä, kuinka digitaaliset
käytännöt muovaavat arkielämän kaa-
voja ja kokemuksia, ja kuinka arkipäivän
politiikka tapahtuu arkielämässä erilai-
sissa itsenmittauskoonpanoissa yhä

moninaistuvien itsenmittaustarjontien
keskellä.

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1. Ks. kuitenkin Bode & Kristensen 2015.
2. URL https://support.polar.com/e_manuals/Loop/Polar_Loop_user_manual_Suomi/manual.pdf.
3. Esimerkiksi voidaan kokea, että aktiivisuus-
data vaatii kumppanikseen sykedataa. Ilman
sykedataa tieto aktiivisuudesta, liikkeestä tai
kalorien kulutuksesta on ”todellakin teoret-
tista” kuten Timo (26) kertoo. Pidemmälle vie-
tynä esimerkiksi painon, verenpaineen ja syk-
keen kaltaiset indikaattorit ovat Sakarin (50)
tapauksessa saaneet seurakseen omasta aloit-
teesta teetetettyjä laboratoriomittauksia ja mag-
neettikuvia, joista hän saa ”lisää dataa” alati
kasvavaan tietopankkiinsa.

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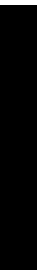
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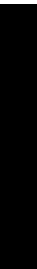
Harley Bergroth työskentelee tohtorikoulutettavana Turun yliopistossa sosiologian oppiaineessa. Hän on julkaissut aiemmin köyhyyden ruumiillisesta kokemuksesta Suomessa ja työstää tällä hetkellä väitöskirjaa teknologisvälitteisistä elämänhallinnan käytännöistä osana *Tracking the Therapeutic* (2015–2019) -tutkimusprojektia. Hän on Suomen tieteen- ja teknologiantutkimuksen seuran hallituksen jäsen.

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**The Datafication of Therapeutic Life Management: Assembling the
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7 The datafication of therapeutic life management

Assembling the self in control society

Harley Bergroth and Ilpo Helén

For people who are willing or obliged to reflect on and proactively modify their personal conduct, a plethora of self-tracking devices are now widely available. By self-tracking devices we refer to near-body gadgets and related software applications that provide measurements of the rhythms and patterns of everyday life – for example, step counts, heart rate, walking distances and sleeping patterns. By providing quantitative data about vital functions or behavioural patterns, these technologies aim at helping people to enhance their self-knowledge, to adjust their behaviour and/or to accomplish self-improvement. As such, self-tracking technologies are entering and altering the domain of the ‘therapeutic’ that emerged and was consolidated during the 20th century (see Madsen, 2014, 2015; Moskowitz, 2001). Instead of approaching self-tracking as merely an instantiation of an overarching and static ‘therapy culture’, in this chapter we study more closely the therapeutic imaginaries and functions of self-tracking in everyday life, and situate the phenomenon as part of always-emergent therapeutic assemblages.

Self-tracking has emerged in conjunction with sociotechnical trajectories that are characterised by the terms ‘data-driven’ and ‘datafication’ in recent discussions (see Pentland, 2013; Ruckenstein & Schüll, 2017). The terms ‘data-driven’ and ‘datafication’ refer to the collection and mining of masses of digital data by high-performance computers. Such practices are expanding to all walks of life, from healthcare to traffic and from energy production to mass entertainment. Advocates of data-driven technologies attach great expectations to their capability to provide precise and predictive control and steering of complex technical systems, including social organisations as well as individual human lives and behaviour (e.g. Mayer-Schönberger & Cukier, 2013; Pentland, 2013; Topol, 2012, 2015). Self-tracking is undoubtedly an important dimension of this development, as it is essentially about the collection and analysis of cumulative data on bodies and personal lives. As self-tracking technologies increasingly saturate well-being-related retail contexts and cultural imaginaries of self-care, self-tracking can well be conceived of as a mode of datafication of everyday life (Lupton, 2016; Ruckenstein & Schüll, 2017).

In order to grasp the formation of therapeutic regimes of action within this data-driven practice, we approach self-tracking and its therapeutic functions with the help of two concepts. First, we deploy the idea of assemblage (*agencement*)

(Deleuze & Guattari, 1987; Marcus & Saka, 2006), which enables an analysis of self-tracking as a mode of action taking shape within and through networks and collections of things and discourses. We focus on how bodies, (technological) objects and political ideas of self-development and self-care come together in self-tracking and form therapeutic assemblages that ‘hang together’ (Mol, 2002) by and through the practice of gathering and analysing data about oneself. Furthermore, the concept of assemblage entails that the assemblage as a whole as well as its parts are in a constant state of emergence (Bennett, 2010; Latour, 2005). This enables us to situate the phenomenon of self-tracking within a global therapeutic assemblage while being sensitive to the possibilities, affordances and relations through which the idea of the ‘therapeutic’ itself becomes a meaningful concept in and through these practices. Second, we lean on Gilles Deleuze’s (1995a, 1995b) ideas of control society and, more specifically, of ‘dividualisation’, which are particularly relevant as regards the therapeutic and political functioning of self-tracking. The concept of the dividual enables us to focus on the data-driven character of self-tracking, that is, how the practice of self-tracking becomes functional by and through data. It also helps us to situate self-tracking in current biopolitical assemblages in which individuals, their lives and their experienced selves increasingly become reduced to, as well as lived by and through, quantification-based haptic and visual information.

Drawing from qualitative analysis of promotional Internet material and interviews with Finnish self-trackers, we focus on the questions of how self-tracking becomes a therapeutic practice and what the idea of the ‘therapeutic’ might mean in the context of such a data-driven practice. We also ask how self-tracking, with its data-driven character, possibly shapes our understanding of the therapeutic. By studying self-tracking practices in this way, we are able to pinpoint contradictions that problematise a straightforward relationship between datafied life management and the therapeutic ethos.

This chapter proceeds as follows. First, we consider self-tracking in relation to the current therapeutic ethos and as an embodiment of dividualisation (Deleuze, 1995b). Then we present our data and methods. After this, we commence our analysis; first, we focus on the framing of self-tracking as a holistic therapeutic practice by technology developers, and show how self-tracking is reflective of what we call fragmentary holism. Secondly, we draw on interviews with Finnish self-trackers to elaborate on how self-tracking becomes a therapeutic practice in action and promotes regimes of perpetual self-assembly. Finally, we discuss briefly the political dimensions of self-tracking as self-control, and provide some concluding remarks.

Proactive self-tracking and the therapeutic ethos

People have used analogue technologies for self-measurement and lifelogging (Crawford et al., 2015; Lupton, 2016), for various reasons, for centuries. However, it may be argued that the rise of a ‘therapy culture’ – the relatively recent success of various forms of therapeutic life-management products and services which often

involve some sort of reflective tracking practices (see McGee, 2005; Madsen, 2015) – has also driven the design, marketing and hype around contemporary digital self-tracking technologies. Whereas such technologies originally occupied quite specific domains such as (clinical) healthcare and competitive sports,¹ the therapeutic idea of pursuing a better life through holistic self-improvement combined with the cultural power of metrics and data (Ruckenstein, 2014: 77; Beer, 2016) has paved the way for the adoption of quantification-driven self-tracking technologies in various spheres of everyday life. Today, consumers certainly find these technologies an integral part of wellness-related retail contexts, and digital self-tracking has consolidated its position as a mundane way of making sense of – and possibly transforming – the body and the self.

Although the variety of regimens of self-help and self-improvement is vast in Western therapy culture (Illouz, 2008; Madsen, 2015), it is quite common in the therapeutic landscape to see that such therapeutic hermeneutics of the self (Foucault, 1993) take place in a reflexive dialogue. In it, a therapeutic instance – a psychotherapist, spiritual guide, peer group, self-help manual or a website – functions as a mirror or an echo that enables the person to acquire insights about who s/he actually is and what s/he can become. It is tempting to think of self-tracking technologies as such mirrors since self-tracking may be thought of as a practice of negotiation with ‘data doubles’ (Ruckenstein, 2014; Lupton, 2013; also Lomborg & Frandsen, 2016) that serve as a basis for investigating one’s own life. Sociologist Deborah Lupton (2013, 2016: 39) associates self-tracking more clearly with contemporary self-help, as she links the proliferation of self-monitoring practices to the rise of popular psychology discourses that offer individualised solutions to personal problems. She analyses self-tracking as self-help-like responsabilisation of citizens on their own health and well-being. Lupton’s arguments are congruent with critical studies that approach the Anglo-American therapeutic self-help as a field of neoliberal self-optimisation and governing. Such critical studies often see therapeutic self-help as a depoliticizing force as it may effectively hide structural and political problems by endorsing the management of personal qualities, traits or personality (e.g. Rimke, 2000; McGee, 2005; Madsen, 2015). However, the idea of an assemblage helps us to see that while self-tracking as a field of action is no doubt influenced and shaped by other forms of therapy culture, a focus on how the ‘self’ becomes enacted in practice within everyday self-tracking assemblages reveals a logic of *dividualisation rather than that of individualisation*. We argue that self-tracking reflects the interplay of the therapeutic ethos and contemporary, dividualising mechanisms of *control*, which also inverts the focus on the self/person as a coherent whole found in much 20th-century self-help.

Dividualisation is a term employed by the French philosopher Gilles Deleuze (1995a, 1995b). With an eye on the proliferation of information technologies at the dawn of the digital Internet age in the 1990s, he presented an outline of control society. He claimed that corrective and normalising interventions by public authorities and experts are increasingly being replaced by practices of control that divide its objects into ever smaller elements, parameters and action-units. Deleuze considered dividualisation as a basic requirement of the functioning of control

in ‘societies that no longer operate by confining people but through continuous control and instant communication’ (Deleuze, 1995a: 174). The rise of digital systems would bring about practices and technologies of monitoring and modulation that work within the flows and transactions between the forces and capacities of living human beings, the environments they live in and the practices in which they participate. For Deleuze, control is continuous and anticipatory, and it works with the help of predictive and prognostic information. The objects of control are conceived of as ‘factors’ or ‘variables’, and their interaction and conjugations are assessable as ‘risks’ and open to modification by meticulous operations and interventions. As a consequence, living human beings as communities, persons and organisms – as units typically conceived of as *individuals* – as well as the environments they live in, become transformed and fragmented into *dividuals* within the matrices of control. In short, dividualization refers to the construction of clear-cut variables, dividing ‘everything’ – vital functions, life events, mood changes, the person, etc. – according to these variables, gathering data about these variables, and looking for patterns, trends or deviations by aggregating the data. Dividualisation pertains to all levels of human existence: to populations as well as to basic biological processes on the cellular and molecular level. It is in connection to dividualisation that we begin to see the logic of holistic self-understanding or holistic transformation, often emphasised in therapeutic parlance, giving way to a more fragmentary understanding of therapeutic life-management.

Data and methods

Our analysis is based on a variety of qualitative research material. In order to examine how self-tracking is presented within the cultural imaginary, we collected textual material from webpages of individuals and organisations that promote and endorse everyday self-tracking. These materials include Quantified Self-related website publications, public blog posts as well as promotional materials of private enterprises that manufacture self-tracking devices. Furthermore, to grasp the experiences related to the therapeutic regimes of action in everyday self-tracking practices, we employed 15 semi-structured interviews conducted with Finnish self-trackers. The interviews were gathered during 2015–2016. Of the interviewees, six were men and nine were women, all of them were employed, studying or both at the time of the interviews. During the last few years, the first author has engaged in diverse self-tracking practices, including an eight-month period of consistently wearing a popular, consumer-grade activity tracking wristband (FitBit Charge HR). This, we feel, has enabled tacit knowledge on the studied field and the ‘workings’ of personal self-tracking assemblages in everyday life.

In order to investigate our overarching research questions, we conducted a close reading of our research material through two main themes. First, we looked into how self-tracking technologies and the data they produce are presented as being useful and meaningful for people in self-discovery, self-adjustment and self-improvement. Second, we investigated how the data serve – and how they are narrated as serving – the pursuit of a good life. Our analysis is not focused on

human-device relations, and we do not try to individuate patterns of use for the deployment of self-tracking devices. Instead, we study self-tracking as a practice and technology of the self (Foucault, 1988). This means that we have analysed how self-tracking as a regime of action springs from, mediates and shapes *one's relation to the self*, and how the self becomes examined, understood and enacted through self-tracking. In addition, the concept of assemblage works as a methodological stance that enables us to focus on constant change rather than stability. This is to say that our analysis is sensitive to the premise that things – such as ‘the self’, the ‘therapeutic’ or the practice of ‘self-tracking’ – are constantly put together from diverse elements and are in a constant flux rather than fixed in place through notions of static ‘essences’ or ‘cultures’. In relation to self-tracking as a proliferating practice of life-management, then, our aim is to show that there is no unequivocal way in which self-tracking ‘is’ a therapeutic practice of self-care. Rather, self-tracking ‘becomes’ therapeutic relationally, that is, in relation to the sociotechnical and political context in which it is practised.

The fragmentary holism of self-tracking

Self-tracking technologies are often implemented in everyday life and social imaginaries in manners that resonate with the therapeutic ethos of self-discovery and the pursuit of a self that is somehow ‘whole’. Perhaps already due to the term *self-tracking*, the practice often becomes associated with the management of an undeniable uniqueness and wholeness of the person that an idea of the ‘self’ stands for. Yet, through general calls for ‘self-knowledge through numbers’, as the Quantified Self movement’s popular slogan goes, people are encouraged to assemble self-knowledge through a wide variety of quantified data (Lupton 2016; Berg 2017). Different instances of and devices for self-tracking measure different and often very limited aspects of personal being – such as a step count or a heart rate. Therefore, self-tracking attracts very specific modes of knowing about personal existence. In being specific in this way, the activity already builds on a quite special notion of selfhood that steers away from looking at ‘unique’ life conditions and settings. In this section, we examine how self-tracking is framed as a therapeutic practice of making sense of the self, and how it is presented as a means for self-improvement. Through this analysis, we shed light on a contradictory tension internal to the dynamics of self-tracking, that we call fragmentary holism.

Our research materials show a plethora of ways by which technology developers narrate self-tracking devices’ holistic capacities. Take, for example, Polar Electro Ltd., the manufacturer of popular fitness tracking wristbands that gather data on daily step counts and patterns of sleep. The company claims that monitoring by the wristband helps the person to become physically more active which, in turn, reduces health risks, increases personal well-being and improves general vitality. In the developer’s promotional words, the device provides a ‘complete’ and ‘truly holistic’ picture of daily activity and ‘highlights the importance of every movement’.² Similarly, the Finnish wellness ring manufacturer Oura claims that ‘[w]ith Oura, you learn *your* optimal times to move, eat and take a break to

get that restorative sleep'.³ The ring collects data on, for example, heart rates and nightly heart rate variability to inform users of their sleep quality. The developers call this a 'holistic method [...] built on years of experience in human performance and the study of circadian rhythms of the body'. Taking another example, HeartMath Inc. is a technology developer that focuses on stress reduction via the measurement of heart rate patterns. The company promotes devices such as the 'inner balance' sensor, and a method for constant monitoring of the changes of the heartbeat by claiming that such tracking leads one towards a state of coherence as long as one 'stays with it'.⁴ It further claims that measuring heart rate helps the person to 'incorporate the heart's intelligence into their day-to-day experience of life' and to 'become the best version [of oneself] more often'. As anthropologist Natascha Dow Schüll (2016) noted in her ethnographic study of health tech exhibitions in the US, the self-tracking industry's marketing constantly implies that the choices we make (in terms of attaining activity, good sleep, relaxation, etc.) reflect something crucial about who we really are.

In the above examples we see an adaptation of the therapeutic language of holistic self-understanding brought into the domain of digital self-tracking. The developers' claims often imply that the person may become something else *as a whole* through permanent tracking. For example, the individual is supposed to increase personal 'general vitality' and become 'physically more active' through step-focused activity tracking, or find 'coherence' and 'inner balance' via heart-beat data. Yet the tension between a holistic approach to personal life (referring to transformation of the individual as a whole) and 'fragmentary holism' (referring to linear optimisation of nuanced functions of the body) becomes evident in the marketing language. The developers paradoxically encourage a better holistic version of oneself (e.g. a more 'vital' or 'balanced' self) by focusing on an algorithmically predefined functionality (such as a step count or heart rate) or necessarily limited combinations of such functionalities.⁵ In addition, by encouraging people to become an improved version of themselves *more often* – for instance *daily* – the self-tracking imaginaries refer to an *ongoing struggle* of transformation. Thus, Polar, Oura and HeartMath end up presenting self-improvement as a linear and ongoing *process* (see Bode & Kristensen, 2015) that is about constant monitoring and constant *potentiality* rather than about actuality.

Fragmentary holism highlights the idea that the 'self' is brought forth as an assemblage – disassembled and put back together through data – in self-tracking practices. First, the self consists of limited 'functions' or 'parameters' such as heartbeats or body movements, which are fragments of living that can be measured – and importantly, separated and combined – by means of self-tracking. In the case of an activity tracker, for example, a seemingly general picture of 'healthiness' or 'vitality' can be assembled by combining measurements on, for example, movement, heart rate and sleep quality. Second, through longitudinal measurement of any specific fragment or vital function, the self is *enacted as a data assemblage*. Several scholars point out the relational character of tracking as a practice that requires assembly work on separate yet entangled data points or data nodes (Ruckenstein, 2014; Day & Lury, 2016; Schüll, 2016). This means

that in order to make sense of and indicate progress or regress, any individual measurement (e.g. a step count) needs to be related to other similar measurements at different points in time.

We can illustrate the idea of the self as a data assemblage through the typical features of self-tracking software. Most self-tracking software visualises self-related data as graphs and charts that can be employed for self-development purposes. For example, the Polar Loop wristband gathers individual steps into longitudinal (daily and weekly) indicators of activity. In this way, the individual is disassembled into individual units of movement by the device's three-dimensional accelerometer, and re-assembled by the software. For example, depending on the device and software, a daily step assemblage on the application screen can take the form of a loop that gradually closes as one gathers steps and nears the daily goal, or a bar that fills up accordingly. A weekly activity assemblage may be visually presented e.g. as a bar chart. Similar logic pertains to measurements of heart rate, sleep, etc.; individual beats or movements are assembled into daily/nightly stats, which are then further assembled into longitudinal graphs. It is also typical that a simple number indicates the tracked self in a moral sense. For example, a self-tracking application may make complimentary claims about the person based on their total number of daily or weekly steps, or offer an 'efficiency percentage' for daily/weekly activity or sleep. Achieving high numbers or hitting 100 percent are then often virtually rewarded with animations, colour codes, trophies, etc. Here individual measurements or measurement combinations are algorithmically assembled into an *evaluation*. It is typical that such 'holistic' indicators of the self can again be disassembled into smaller-scale information in order to get more nuanced data on the specific function, for instance, to see the distribution of steps on a daily or hourly basis. However, in everyday use, to see the 'importance of every movement', as Polar mentions as a goal, is to ultimately trust the algorithm that assembles a personal evaluation. However, completion of a single evaluative checkpoint (e.g. a single day) is never really a completion at all. For example, in the Polar Loop activity tracking software, the person is implicitly encouraged to reach 100% activity (i.e. enough movement) daily. However, the weekly visualisation of one's activity shows a 'daily goal completion average', which groups together daily evaluations and offers a different number, the average.

Considering the self as a data assemblage also means that individual measurements of different functions could or should also ideally be related to each other. For example, according to Polar, when combined with a heart rate monitor, the activity wristband can become an even more precise indicator of 'activity', as it can then offer more accurate quantification-based insight on the intensity of activity conducted, calories burned, etc. It can be argued that the more elements the assemblage has, the more 'holistic' the image of the self it paints. However, the more elements there are, the more data there are on separate functions that can, or need to, be tied together and related to other measurement data.

The point here is that as the tracked self is enacted as a data assemblage, self-tracking as a way of working upon the self always feeds back to the user *through its limitations*. Data could always be more complete and more saturated through

relations, references and repetition. Therefore, the practice is in principle opposed to the idea of a ‘holistic’ understanding of the self. Of course, we do not deny that self-trackers often pay attention to qualitative data – for example, their experiences and sensations – in order to make deeper sense of the quantitative data (see e.g. Ruckenstein, 2014; Lupton, 2016). However, while we grant that people may well experience the gaining of insights into their lives by contextualising the data, we think that holistic humanism and reflexive hermeneutics of the self often tend to be eclipsed or even be made redundant by the technical affordances of self-tracking: the precision of measurement of a specific function or activity at a specific point in time. Polar, for example, directly presents the process of ‘becoming a more active person’ as a project in which the person becomes conscious of her/his step-based physical movement within a day in specific ways and adjusts her/his behaviour to modify these specific modes of action. Such awareness and a trajectory of personal action are induced by the measurement because physical movement (or lack of it) is what the devices and algorithms recognise, react to and respond to by producing data that then provide feedback for the user.

To sum up, from the viewpoint of assemblages of control at work in self-tracking, individuals become increasingly conceived of as compounds of functions, parameters, capacities and resources to be regulated and operated upon. Such control as a mode of governing people and their lives sits uneasily with the holism that nevertheless surfaces as an emic emphasis in the imaginaries of the capacities of self-tracking. For holistic therapeutic practices, the individual person and her/his ‘unique’ life, experiences and aspirations are the focus of practices to govern and modify people, whereas control and dividualisation reach beyond and below the personal by means of the collection and aggregation of masses of data. We claim that while many therapeutic practices are concerned with encouraging people to discover their unique modes of action for self-improvement, digital self-tracking today becomes functional by focusing on self-control and by improving modes of action already predetermined in the devices’ code. In what follows, we will take a closer look at everyday experiences of self-tracking and discuss these experiences as reflective of anticipatory regimes of action.

Self-tracking as a therapeutic regime of anticipation

So far we have seen that self-tracking is often presented as a holistic means of self-inspection despite its tendency to disassemble the self into (longitudinal collections of) functions and variables, which encourages further self-inspection rather than ‘holistic’ self-knowledge. In this section, we focus on the ways in which self-tracking assemblages are narrated to facilitate the idea and ongoing pursuit of a good – or, rather, *better* – life. We thus show how the data assemblages gathered in self-tracking practices unfold into therapeutic regimes of action in everyday lives.

When people speak of their self-tracking practices they usually say that self-tracking makes aspects of the self (activity levels, sleep quality, etc.) ‘more real’. Sari, a woman in her late forties, speaks about how the Polar Loop device enables

her to convince herself that she is ‘really doing something’ in the sense of daily activity. Specifically, she has tried to fight against a *risk* of type 2 diabetes that has been brought to her attention by medical professionals. When Timo (male, 26) talks about tracking daily movement and calorie consumption, he readily recognises the very limited employability of individual measurements and says that he does not necessarily check on the measurements on a daily but rather on a weekly basis. Despite this, he points out that the accumulation of data reveals patterns and creates a very tangible or ‘real’ history, evident in the repository of numbers and graphs. Through this timeline he can then reflect on and analyse ‘how things have been going’ in his life in a more general sense. It can be argued that self-tracking usually makes sense to people as a practice of acquiring knowledge about developments in terms of specific functions, which is also thought to reveal a bigger picture of one’s own life through futures and histories of potential health, physical fitness and wellbeing.

However, despite such experiences, what is characteristic of interviewees’ narratives is the pervasive tension between becoming a self-informed subject and constantly pushing the boundaries of self-knowledge further. In many cases, then, self-tracking in practice becomes anticipatory (see e.g. Adams et al., 2009) rather than evidentiary. Many interviewees acknowledge that self-tracking may provide quite a lot of self-awareness and promote joy and delightful moments when the self is actualised as ‘active’, for example, by reaching 10,000 steps or by producing a good sleep score daily or, even better, *consistently*, but they also reflect that it may easily turn into a repetitive practice, the main attraction of which is to predict and control. As the ‘tracks’ always lead on, self-tracking can spark ever further interest in the self, which makes the idea of the self as an experience of something ‘whole’ quite questionable. For example, Veli, a 28-year-old male, reflects that it is really ‘quite silly’ to engage in sleep tracking because in a sense one already knows how one sleeps. Nevertheless, he self-tracks because the data logs ‘provide motivation for improvement’; that is, the logs and linear graphs psychologically move him to develop himself. This highlights the tendency of self-tracking to produce a processual regime of action in terms of datafied self-mapping.

It is our claim that through fragmentary holism, the purpose of self-tracking often becomes the process of self-assembly itself, as a sense of self-control is pursued. Relating to dividualisation, it seems that self-tracking as a therapeutic assemblage engenders a mode of action that enables not holistic self-awareness *per se* but rather an information-deprived relation to the self on pre-established scales. In other words, the self becomes highlighted as *potential*. This relates to how, in the context of border security, Amoore (2011: 28) speaks of algorithmically forged ‘data derivatives’ that do not centre on ‘who we are, not even on what our data says about us, but what can be imagined and inferred about who we might be’. Self-tracking data derivatives are another example of how improvement is linked with attempted control of potential futures and threats.

In terms of specific threats, our analysis of the promotional material points out that self-tracking devices are often framed as quasimedical devices that are supposed to lead individuals towards health, longevity and regeneration. As such,

they both answer to and produce what anthropologist Joseph Dumit (2012; see also Schüll, 2016) calls a ‘double insecurity’ that the medical industry enacts: not knowing whether one is already ill and never knowing enough about illness prevention. The person is thus always potentially ill. Perhaps the clearest example of this in our interviews comes from Sakari, a 50-year-old male who is a very active self-tracker and describes himself as a scientist of his own life (cf. Heyen, 2016). For example, he makes an effort to track his weight and relaxation (via heart rate) daily, his blood pressure regularly once a year, and occasionally he goes to a nearby laboratory to gain data on various biomarkers of his choice. All this provides him with ‘more data’ in his ever-expanding database of himself. In addition to quantitative data, he also carefully notes any events that may be symptoms of illness. (One example that he provided us with is ‘12th March, nose-bleed, short duration, left nostril’.) He describes self-tracking as ‘at its best a very therapeutic practice’ in the sense of producing a ‘peace of mind’ and feelings of ‘self-confidence’. However, he also states that a central product of self-tracking is the feeling of ‘panic’ or ‘terror’, especially when one sees results that deviate from normal reference values and seem unexplained to him. When asked about whether self-tracking has served his well-being or not, Sakari said that a sense of control provides him with a really ‘healthy feeling’. Explaining the negative side of tracking in more detail, Sakari specified his ideas on control:

It is really about an experience of control... because you cannot really control life, but you can feel that you are in control... and the negative comes from the kind of terror, especially in the face of [measurement] results that are somehow... unexplained [...] and it seems hard for me to grasp what could be negative about [self-tracking]... like if you think that people get all hypochondriac and they increasingly go to the doctor, well I think that’s a good thing in a way. Because this is preventive health care, and it’s better that you go early [to the doctor] to check up on some fine nuance, than going when you’re already sick.

For Sakari, self-tracking seems to become functional as self-control and an ongoing struggle against illness. However, as his life and body are now spatially and temporally divided into ever-expanding data sets by and through self-tracking technologies, it is also quite likely that he will encounter situations in which the feeling of a loss of control, in the form of unexplained data, becomes tangible. He explicitly connects such scenarios with emotions of terror. Here we can see self-tracking as a therapeutic assemblage at work: self-tracking becomes therapeutic as a practice of continuous and preventive health-related control through the dividualising and fragmentary logic of the system. This fragmentation and production of self-related data derivatives mean that a sense of full control often remains elusive. In Sakari’s case, this is implied in the curious sense that self-tracking seems both a vitally important and therapeutic task, but also, in the long run, a battle one cannot win, because ‘you cannot really control life’. Thus, the therapeutic assemblage of self-tracking produces its own purpose by opening up

the self and the body as potential and as an object of continuous control. The self becomes a data assemblage that is not, in fact, approached as a whole individual but as dividualised into trajectories of functions, traits and biomarkers, through monitoring of which a sense of control may be pursued.

As control of potential, self-tracking may be thought of as a constant struggle against the ‘deviant’ within (Bode & Kristensen, 2015). While Sakari wages war on various fronts against ill health, in another example we see the struggle against the disorder and social ill of ‘laziness’ or ‘idleness’, familiar from mainstream wellness- and efficiency-related activation discourses.⁶ Aino is a 39-year-old female, a mother of three children who works in an executive role. She has a background in competitive sports so she has long been familiar with heart rate monitors and other gadgets by which one can optimise physical performance via metrics. For Aino, such techniques have now become a part of coping with the demands of working life. She says that an activity wristband motivates her to move more, and she feels that if she did not exercise she ‘would not have the energy to cope with [the] damn tough demands’ of a stressful job. Here, as with Sakari, the way in which self-tracking comes to serve as a useful technology of the self (Foucault, 1988) is by control of vital potential, although in this case self-tracking is more explicitly connected to the maintenance of one’s productive energy. Aino speaks about self-tracking as an ongoing process of avoidance of the lazy self always lurking in the shadows. She says that the whole point is to ‘give yourself a kick up the ass’ and ‘avoid the days when [my] activity is basically zero’. She wants to avoid inactivity, which she explicitly associates with ‘laziness’. In a quote Aino reveals how the device cooperates *daily* in establishing a sense of self-control:

Of course it was nice when in the summer I went golfing and I got a huge amount of steps... of course it was nice [smiles widely], like WOW, so many steps. But in normal life it is enough for me that the wristband vibrates [haptic vibration, a signal of achieving 10,000 steps] at some point of the day, that I’ve been active.

It goes without saying that a life with an activity tracking wristband that counts steps and measures sleep via movement of the body may enable different modes and patterns of self-control than a life with a weighing scale or with access to high-end laboratory testing. However, the logic of dividualisation in any case frames one’s relation to the self as a relation of control, because the production of the self as data assemblage highlights the self as potential. This is evident in Sakari’s and Aino’s cases. Sakari is potentially always in ill health, even (or perhaps especially) when there are no obvious indications of illness (see Dumit, 2012). The complex assemblages of technical devices, laboratories and biographical notes seemingly enable the person to control this insecurity, although such assemblages also produce the self as an object of ‘tinkering’ (Pols, 2010) with fine-grained nuances. In a similar manner, Aino is potentially always ‘lazy’, since every day is another struggle against ‘laziness’ and ‘low energy’, which in her

case is determined primarily via step count. The process of self-management manifests itself as permanent avoidance of the illness of ‘zero’ activity.

We suggest that while everyday proactive self-tracking is often narrated in terms of the typical therapeutic parlance of self-discovery, self-exploration or self-improvement, interview narratives show that dividualisation and fragmentation of the self are the primary characteristics of self-tracking. Although it may be said that self-tracking enables a process of self-discovery through the longitudinal measurement of fragmented vital functions or activities, in functioning it also creates interests that tie individuals into these sociotechnical regimes of control. The functions of the data as therapeutic life management ultimately become anticipatory rather than evidentiary, as any individual event of tracking does not so much generate self-knowledge as position the self in a continuum of measurements through which future (and past) selves can be imagined and potentially realised. Self-tracking thus persistently produces knowledge-craving subjects whom it supposedly serves, and the self as a ‘whole’ remains persistently unattainable. Self-tracking assemblages, then, present vivid instantiations of control through anticipation because, as we have seen, from marketing rhetoric to everyday experiences these technologies reveal the self as process and as potential, as something to be acted upon consistently in order to actualise a better life. Inasmuch as self-tracking assemblages are articulated as producing knowledge of something ‘real’ about the self, they create a *need to know* by dividing a complex whole of life into trajectories and functions that extend indefinitely. This is fragmentary holism in action.

Therapeutic self-assembly and the politics of self-control

Deleuze (1995b: 179) wrote that whereas life in disciplinary societies is characterised by completions and new beginnings, like trajectories from families to schools, and from schools to work, ‘in control societies you never finish anything’. In this chapter, we have shown how self-tracking as a technology of the self often drives fragmentation rather than unity, and anticipation rather than knowledge. Self-tracking enacts the self, through a focus on linear scales, as an ongoing process and potentiality rather than as something to be found as a whole and coherent. An important consequence is that self-tracking assemblages bring to everyday life a modality of being characterised by perpetual alteration. From the consumer perspective, the therapeutic ethos of holism and stability thus appears appealing and welcome as it promises control, yet it is ultimately futile within the assemblages that produce their *raison d’être* through producing a metastable existence – an existence that is constantly subject to change. Acting to manage this metastability associates self-tracking as a therapeutic regime with the anticipatory control and regulation of potentiality in political regimes. In the last section of our chapter, we probe briefly this political aspect of self-tracking as control.

Our analysis of self-trackers’ narratives brought up struggles against ill health and laziness, both of which are identifiable as long-running trajectories of struggle in Western ethics. Considering these struggles further along with Deleuze’s

ideas of control society we may connect them with sociotechnical visions and programmes of ‘perpetual education’ and ‘personalised medicine’ which rely on processes of dividualisation. If we consider self-tracking, on a general level, as perpetual education – resonant with what Fotopoulou and O’Riordan (2017) call ‘biopedagogy’ – we can connect it with social programmes of *activation*. In critical social policy literature and in public discourse, ‘activation’ has typically referred to a variety of local and international policies, hugely influential across OECD countries, through which the unemployed or the ‘excluded’ have been made responsible for managing their labour power, working abilities and personal life in general (Eversberg, 2015: 173; Clarke, 2005: 448). Yet, as a programme or an assemblage, activation is itself contingent; it takes shape in relation to neoliberal market rationale and the logics of restructuring of the welfare state, through which the state and public powers seemingly withdraw from securing individual lives and from interfering with them. Furthermore, ‘activation’ may work as an umbrella term that covers a variety of traits and qualities such as, for example, education, the utilisation of prior work experience, health, well-being, mental awareness or aesthetic appearance. All of these are closely intertwined with the ability to *self-manage and maintain the social and economic utility – that is, labour capacity and productivity – of one’s own body*. In this context, the point of self-tracking is to educate people not on their daily step counts or heart rates during sleep *per se*, but mainly on caring for and managing personal ‘vitality’ by themselves in order to reduce the ‘deadweight’ in the productive system (see Eversberg, 2015). Activation is thus a programme that is actualised through mundane technologies far beyond its rhetorical target population, that is, the unemployed, the precariat and the ‘excluded’ who are typically not the target group for self-tracking devices. We see how activation becomes actual with Aino, who worries about – and finds therapeutic functions in – managing her energies and capacities, that is, her labour power, through a struggle against laziness in a demanding and stressful work environment. In Virve Peteri’s chapter in this book, we see spatial arrangements of the office space as a new mode of activation and mobilisation of workers and their labour power within organisations; in this chapter, we see parallel strategies of activation with self-tracking technologies in everyday life and outside organisational contexts.

Self-tracking as an assemblage of control also has an affinity, and perhaps a more concrete one, with a major imaginary of future healthcare envisaged as ‘personalised, predictive, preventive, and participatory’ (Hood & Friend, 2011). The advocates of ‘personalised medicine’ conceive of it as being embedded in advanced biomedicine like genomics and stem cell technology and claim that it will improve clinical care and shift the emphasis of health care to prevention with the help of more precise and patient-centred medical knowledge (for an overview, see Tutton, 2014). In addition, personalised medicine is expected to considerably reduce the costs of healthcare. Over the past few years, visions of personalised medicine have re-focused on the collection and appropriation of masses of health-related personal data (Prainsack, 2017; Ruckenstein & Schüll, 2017). According to the promoters, data-driven medicine would enable anticipatory

health monitoring and preventive interventions, as well as medication and other therapies, targeted far more precisely at specific risk groups or individuals (e.g. NAS, 2011; Hood & Friend, 2011).

Self-tracking works in congruence with the data-driven personalised medicine that is expected to revolutionise modern medicine, health policy and society (NAS, 2011; Hood & Friend, 2011; Mayer-Schönberger & Cukier, 2013; Pentland, 2013; Topol, 2015). This congruence builds through the logics of control and dividualisation, both of which are embedded in massive data sets and have a focus on individual parameters and malleable patterns (see Sharon, 2017). Personalised medicine is often seen as a frame for preventive lifestyle and proactive medical interventions, supported by perpetual self-monitoring and control. As seen in our examples, many companies promoting self-tracking – as well as self-trackers themselves, such as Sakari – focus on the measurement of health-related parameters of vital functions and behaviour and narrate self-optimisation by digital tracking devices in a manner similar to preventive healthcare.

Personalised medicine is expected to have effects across populations, societies and even globally. The dividualisation taking place in such practices also lays the ground for the pervasiveness of ‘therapy cultures’ as personal lives are perpetually in need of preventive interventions: for example, always rather potentially ill (metastable) than healthy organisms (stable). Personalised medicine is thus another political programme that lays the ground for the sociotechnical instantiations and alterations that are shaping current therapy cultures towards a focus on ongoing self-control and metastability rather than healing, wholeness and stability.

Conclusion

In this chapter, we argue that while self-tracking can be theorised in terms of its connections to the general therapeutic ethos of self-discovery and self-improvement, it is a data-driven practice of dividualisation. As such, it creates regimes of action that build on the idea of perpetual self-assembly and which thus fit uneasily with any overarching characterisation of ‘therapeutic cultures’. Instead of holistic and reflexive self-inspection we often see the fragmentation of the individuals and their lives into ‘functions’ and ‘qualities’ presented by graphs and charts, and in ways that focus on the self as a process that should be worked upon consistently. So, in terms of how these technologies come to serve life, they serve not as holistic actualisation of the self but as a means of ongoing control and management of potential. As life-management techniques, these technologies have a tendency to actively produce the kinds of regimes of perpetual action that they promise to dissolve. Furthermore, self-tracking as a technology of the self exemplifies how current therapeutic assemblages can also intertwine with political programmes and discourses such as citizen activation and personalised medicine. We see self-tracking as to some degree pertaining to the emergence of societies of control as sketched by Deleuze, especially through a focus on increasing complexity and persistent incompleteness, which both attract endless monitoring.

Acknowledgements

The authors wish to thank the Academy of Finland (grant number 292408, grant number 313703, grant number 289004) and Kone Foundation (Crossing Borders for Health and Well-being) for supporting this work.

Notes

- 1 Mika Pantzar (2012: 133) has noted that when Finnish technology developers such as Polar Electro tried to introduce and sell heart rate monitors to American consumers at the end of the 20th century, they faced resistance as it was thought unclear why the average consumer should need one.
- 2 https://www.polar.com/us-en/about_polar/press_room/polar_launches_polar_loop and https://support.polar.com/fi/support/the_what_and_how_of_polar_24_7_activity_tracking?product_id=64271&category=faqs [accessed on March 23, 2018].
- 3 <https://ouraring.com/> [accessed on March 28, 2018, italic as in original source].
- 4 <https://store.heartmath.com/innerbalance> [accessed on March 28, 2018].
- 5 For example, a measurement of sleep quality may be based on a simple parameter, such as movement, or it may be based on a combination of parameters, such as movement data, heart rate data and data on breathing rhythms.
- 6 For example, these discourses now frame sitting as a public health threat (Peteri, 2017) and manifest themselves in various campaigns in workplaces encouraging people to be physically active during workdays.

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**Vuolanto, Pia; Bergroth, Harley; Nurmi, Johanna & Salmenniemi, Suvi
(2020)**

**Reconfiguring health knowledges? – contemporary modes of self-
care as ‘everyday fringe medicine’.**

Public Understanding of Science 29(5): 508–523



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Public Understanding of Science
2020, Vol. 29(5) 508–523
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DOI: 10.1177/0963662520934752
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Abstract

The contestation of expertise is perhaps nowhere more pronounced than in the field of health and well-being, on which this article focuses. A multitude of practices and communities that stand in contentious relationships with established forms of medical expertise and promote personalised modes of self-care have proliferated across Euro-American societies. Drawing on multi-sited ethnography in three domains – body–mind–spirit therapies, vaccine hesitancy and consumer-grade digital self-tracking – we map such practices through the concept of ‘everyday fringe medicine’. The concept of everyday fringe medicine enables us to bring together various critical health and well-being practices and to unravel the complex modes of contestation and appreciation of the medical establishment that are articulated within them. We find three critiques of the medical establishment – critiques of medical knowledge production, professional practices and the knowledge base – which make visible the complexities related to public understandings of science within everyday fringe medicine.

Keywords

health and new technologies, lay expertise, patients, public understanding of science, science experts, studies of science and technology

1. Introduction

Sociologists of science have long been drawing attention to the changing status of expertise in contemporary societies (Collins, 2014; Wilcox, 2010; Wyatt et al., 2010). Although expertise and experts continue to enjoy high regard and trust in a number of spheres, contemporary media and

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particularly the Internet have crucially transformed the ways in which expert knowledges are constructed and claims to expertise are made. A host of new ‘cultural intermediaries’, such as life coaches, food bloggers and lifestyle gurus, populate the media landscape and offer guidance on issues of health and well-being. Such forms of ‘lay expertise’, often drawing on experience-based expertise, have become increasingly influential in various arenas of social life (Wilcox, 2010). Harry Collins (2014; see also Collins and Evans, 2002) has pondered whether the apparent loss of public trust in scientific expertise means that more or less ‘anything goes’ in the contemporary expertise game, and some have even gone as far as envisioning the ‘death of expertise’ (Nichols, 2017). Such accounts signal intensified struggles over what counts as expertise and who can be an expert.

The contestation of expertise is perhaps nowhere more pronounced than in the field of health and well-being, on which this article focuses. A multitude of practices and communities that stand in a contentious relationship with established forms of medical expertise and promote personalised modes of self-care have proliferated across Euro-American societies. Often such practices have been captured through the concept of ‘complementary and alternative medicine’ (CAM), typically presented as ‘the other’ of the Western biomedical paradigm. However, as several commentators have pointed out, the concept of CAM and its many related terms, such as natural and traditional, are controversial (Barcan, 2011; Gale, 2014; Louhiala and Puustinen, 2012; Saks, 2003) in that they tend to connote a polarised understanding in relation to biomedical knowledge. Critique is rarely simply ‘against’ biomedical knowledge, but is rather a complex and even paradoxical mess of ideas pertaining to morally proper and individualised modes of health-related knowledge production (see Jauho, 2016). As we will highlight in this article, many of the everyday self-care practices cannot be unambiguously categorised as either merely ‘alternative’ or ‘biomedical’, but they rather destabilise and negotiate the alternative-biomedical boundary in many ways.

This article tackles questions of expertise and health-related knowledge by drawing on multi-sited ethnographic research into the ways in which users of different self-care practices perceive and encounter the ‘medical establishment’ – medicine, medical knowledge, medical expertise and health authorities. At the heart of our investigation lie the following questions: *What rationalities and claims to expertise underlie engagement in these self-care practices? What relationships to the medical establishment are constructed in them?* The purpose of the article is twofold. First, we make a theoretical contribution by introducing the concept of ‘everyday fringe medicine’ (EFM). This concept allows us to respond to the critique levelled at the concept of CAM and to capture the complexity of contestations of the biomedical paradigm in everyday self-care practices. Second, we illustrate this complexity by introducing three forms of critique of the medical establishment articulated within EFM that show how EFM practices *both* challenge *and* collaborate with biomedical modes of health expertise and science.

By addressing these questions, the article contributes to the literature on the public understanding of science and the sociology of health expertise in three ways: first, by developing the novel conceptual tool of EFM to theorise the logics of everyday self-care practices and their relationships to medical knowledge and practices; second, by empirically highlighting the complexity of critiques of the medical establishment among EFM users and third, by making visible the complexities related to the public understanding of science. While in public discourse many forms of the lay appropriation of medicine continue to be framed as ignorance or misunderstanding of medical science, the modes of critique and contestation evident in EFM direct the gaze towards the social shaping of epistemic authority by elucidating various modalities of engagement with the medical establishment.

The article will proceed as follows. We will first outline the way in which our conceptual and empirical arguments developed during the course of a research project on self-care practices. We

will then relate our research to sociological discussions of ‘alternative’ health practices and introduce in more detail the concept of EFM as a conceptual aid for investigating the multiple relationships with the medical establishment in contemporary health landscapes. In the subsequent sections, we will illustrate three forms of critique emerging in our ethnographic materials, before providing conclusions.

2. Ethnographies of self-care

The research materials for this study come from the research project *Tracking the Therapeutic: Ethnographies of Well-Being, Politics and Inequality* (2015–2019), which investigated a variety of self-care practices in Finland. Taking an ethnographic approach, the project uncovered how and why people engage with everyday self-care practices and how they make sense of and experience them (Marcus, 1998). It also interrogated the multiple forms of knowledge that people produce, synthesise and mobilise in caring for themselves and those close to them. In this article, we focus on three self-care practices studied on the project: body–mind–spirit practices, vaccine hesitancy and self-tracking. We thus address a spectrum of contemporary modes of self-care ranging from ‘holistic’ and ‘natural’ practices to technoscientific practices and ‘hip’ consumer health technologies.

Finland offers an interesting case for studying evolving relationships to the medical establishment, for several reasons. Finland is a Nordic welfare state with a strong public healthcare system, where there is a strong trust in medical authorities and science institutions (Finnish Science Barometer, 2019). The boundary between official medicine and its ‘alternatives’ is sharp. CAM is not officially recognised, and unlike in most Nordic countries, there is no legislation to regulate it (CAM Regulation, 2013). The discussion around different modalities of treatment is highly polarised. While around 30% of Finns have used some form of CAM (Kemppainen et al., 2018), these treatments tend to be viewed with suspicion by medical professionals and authorities, as demonstrated, for example, in the term ‘belief medication’, promoted by the Finnish medical professionals’ association (Finnish Medical Association, 2017).

Fieldwork on body–mind–spirit practices targeted both professional healers and people who performed the practices as part of their everyday self-care. Roughly half the research participants worked as full-time or part-time healers. However, the boundary between healers and those who perform body–mind–spirit practices as part of everyday self-care is blurred, since professional healers also engage in them in their own everyday self-care, while ‘non-professionals’ occasionally administer these practices to their friends or family members free of charge. We can thus conceive of them all as ‘practitioners’ in the sense described by Thomas McLaughlin (1996: 22), who suggests that those who practise a given craft or skill always develop a ‘vernacular theory’ of their practice, that is, how it ought to be practised and the values, concepts and worldviews associated with it. The research participants were identified through the Internet and at a range of public events, as well as through a snowballing technique. All of them engaged with a wide array of practices, including mindfulness, reiki, life coaching, angel healing, yoga, art therapy, self-help reading, folk healing, acupuncture, reflexology, aromatherapy, astrology, herbal medicine, homoeopathy and many more. The research materials include interviews ($n=32$, 30 women and 2 men), media materials (webpages, popular books, newspaper columns, etc.) and participant observation at a range of body–mind–spirit events. The interviews explored the practitioners’ experiences of and motivations for engaging with body–mind–spirit practices, the role these practices played in their everyday lives and in society more generally, their perceptions of and encounters with official medicine, and their political views and engagements.

Fieldwork on vaccine-hesitant families included ethnographic interviews with parents of partially vaccinated or non-vaccinated children ($n=33$, 31 women and 2 men) and observations on

social media. Participants were mostly reached through a vaccine-critical open Facebook group. Later, those who had already participated also referred more participants to the study. The participants had opted out of all or several of the recommended vaccines for at least one of their children. Some had fully vaccinated their older children before starting to question vaccination. The participants had a total of 97 children, aged between 23 years and 2 months. Of these children, 46 were unvaccinated, 38 were partially vaccinated and 13 were fully vaccinated until at least the age of 6 years. The interviews covered three major themes: the experiences and reasons that had led participants to question vaccination, their health attitudes and practices and their encounters with healthcare professionals. Participants were asked where they sought information about vaccines and how they evaluated the information they found from different sources. They were also asked whether they trusted medical research about vaccines.

Fieldwork on self-tracking included interviews ($n=19$, 7 men and 12 women) with people who had recently conducted voluntary, proactive self-tracking using one or more consumer self-tracking devices, such as activity tracker wristbands, sleep-tracking devices, heart rate monitors and laboratory measurements. It also included media materials, marketing materials on self-tracking devices, observations at digital health-related events in Finland and observations of discussions in a Finnish self-tracking-related Facebook group ('Quantified Self and Biohacking Finland'). Research participants were reached both through the abovementioned Facebook group and through people who had no known contact with such groups. Thus, the participants represented a heterogeneous group, as some were enthusiastic self-trackers or early adopters, while others had very limited experience with such technologies. The interviews covered their motivations for and experiences of self-tracking, and how they viewed the significance and future development of self-tracking. Participants were not explicitly asked about their relationship with official or alternative modes of health knowledge, but these themes emerged spontaneously in the course of the interviews. Most research participants did not express explicit doubts about science or medicine and used the devices to 'stay in shape' according to expert guidelines. However, more experienced self-trackers mentioned their desire to employ self-tracking as a mode of personal data analytics.

Our analysis focuses on the interview narratives and media materials, with ethnographic observations providing contextual sensitivity and background information for the interpretative work. The research materials were analysed using qualitative content analysis driven by the theoretical focus of the article. The analysis first centred on the boundaries and hierarchies between EFM and biomedicine (both medical practice and medical research) described by the participants. In the subsequent rounds of analysis, we traced the participants' relationship to biomedical research and knowledge, as well as their engagements with the medical community and health authorities. We discovered that despite the apparent differences in the three self-care practices we addressed, similar themes and arguments kept surfacing regarding the medical establishment and especially scientific medical expertise. Moreover, in all these sites, the arguments tended to reflect a notable interest in and multifarious attachments to medical science and biomedicine, instead of simple ignorance or hostility. This led us to examine in more detail what these different health practices could reveal about the changing and tumultuous social terrain of health expertise. By bringing together the research materials gathered during fieldworks, our ultimate aim was to relate these sites of self-care to each other and flesh out ways in which EFM users made sense of their relationship to biomedicine, medical practices and encounters with medical personnel. When thinking about how to conceptualise the different forms of self-care in relation to the social construction of *expertise*, we felt restricted by the existing conceptual frameworks. Discussions of 'complementarity', 'alternative health' or counter-expertise did not seem fitting to describe the complexity of the practices or their critiques of medicine. We then arrived at the concept of EFM, through which we

were able to tie together these different domains of self-care and their interaction with medical science and biomedical modes of thought and action.

On the basis of our analysis, we identified three forms of critique: (1) the critique of medical knowledge production, (2) the critique of medical professional practices and (3) the critique of medical experts' knowledge base. It is important to note that these different types of critique are not mutually exclusive but overlap in many instances. The point here is not that all practices reflect all these forms of contestation equally (they definitely do not), but merely that all of these practices work as everyday regimes of self-care in which contestation (or acceptance) of medical expertise is negotiated. In our analysis, we have aimed to present the forms of critique in a succinct manner and illustrate how critique towards health knowledge promotes both evaluation of and engagement with medical knowledge or the medical establishment. Our main contribution relates to the concept of EFM, which we suggest can be employed to further research on both 'traditional' and emerging forms of health-related knowledge production in the context of public understanding of science and expertise. The empirical illustrative analysis in this article serves to underline this point.

3. From complementarity to EFM

Traditionally, the term 'fringe medicine' has encompassed a wide range of therapies and health practices, such as herbal remedies (Evans, 2001) and hydrotherapy (Peeters, 2010), that are situated 'at the fringes' of official or generally accepted forms of healthcare. However, the concept is seldom used compared with the more familiar concepts of 'complementary', 'alternative', 'traditional', 'quack' or 'irregular' (on these concepts, see Gale, 2014). Studying CAM, Derkatch (2016: 7) suggests the terms 'fringe patients, fringe illnesses, fringe practitioners and fringe health models' to describe broad means of caring for one's own health which 'fail, somehow, to fit within the accepted boundaries of mainstream scientific medicine'. Inspired by this elaboration, we suggest that the term 'fringe medicine' can capture the multiple traditional and modern forms of self-care practice that critically *engage with* biomedicine or can be situated at the *boundaries* of medicine and medical practice. To this concept, we have added the temporal dimension of 'everyday' to emphasise that such self-care practices often constitute a routine part of daily life. Of course, in common sense thinking, it might be argued that whereas a mode of self-care, such as vaccine hesitancy clearly 'does not fit' with the biomedical paradigm, the data-oriented rationality of tracking and analysing one's activity or sleep with digital gadgets in many ways does. However, even the latter form of everyday self-care is most often labelled – by technology developers, users and medical instances alike – as 'non-medical' technology, and often, for various reasons, as inadequate on its own for the individual to really understand their health and well-being. In this sense, self-tracking too can be argued to occupy the biomedical fringe. The crucial point, however, is that although they take a critical stance, none of these practices seek to entirely abandon or reject biomedicine or science-based knowledge.

The important question, then, is not the extent to which EFM practices comply with, resist or even reject dominant medical practices by adopting non-normative health behaviours, as some previous research has outlined (e.g. Keshet and Popper-Giveon, 2018), but rather how these forms of everyday health behaviour 'mix and match' biomedical and alternative modes of knowledge and practice in acting on and knowing about one's health and well-being. At the heart of EFM is the acknowledgement of its contradictory character; the ways in which it *both* aligns itself with biomedical expertise *and* seeks to transform it. For us, the term EFM highlights how self-care practices build not only on the contestation of scientific expertise but also on the appropriation and acceptance of medical science; not only on the rejection of biomedical knowledge but also on

active interpretations of and ‘working with’ medical knowledge and scientific or evidence-based modes of knowledge production on health and illness.

Thus, EFM allows us to capture a broad set of practices and groups that share certain values, traditions and modes of knowing about health and well-being that appear to challenge biomedical practices in some ways while also supporting them in other ways and suggesting new modes of collaboration with them. Importantly, while the term ‘alternative’ denotes exclusion from that which is hegemonic (Barcan, 2011; Gale, 2014), ‘fringe’ focuses on that which is on the edge, boundary or margin (or maybe marginalised). EFM is not ‘complementary’; sometimes it is almost fully aligned with biomedicine, and usually it is somewhere in the grey boundary zone between many intersecting worlds. Thus, unlike the concept of CAM, EFM does not assume a medical starting point and does not position any health practice a priori as being on the ‘outside’ (due to lack of evidence, for example); rather, it adopts a novel, social scientific point of departure, especially in relation to the growing contestation of expertise. While the concept of ‘fringe medicine’ could be perceived as value-laden and pejorative, we do not mean to employ it as such. Instead we wish to underline the constant negotiation and co-creation of expertise by highlighting the ways in which those ‘at the fringe’ engage with and negotiate medical scientific knowledge production and professional practices. Taking a cue from the call in social studies of science and expertise to pay close attention to the formation of systems of knowledge with an open mind (Harding, 2008; Wilcox, 2010), our analysis addresses the ways in which users of EFM assemble health knowledges by relating to knowledge production in medicine (medical research), expert knowledge (the work of physicians and other professionals) and official health recommendations (e.g. by state authorities).

Previous research on the public understanding of science pertaining to groups that are critical of the medical establishment has shown that in public discussions and academic circles alike, many forms of the lay appropriation of scientific claims still tend to be framed as public ‘misunderstandings’ (or ‘ignorance’) of science or constructed as ‘the other of science’ (Goldenberg, 2016; Harambam and Aupers, 2015). Such work evinces that despite discussions since the mid-1990s of the inappropriateness of the deficit model – that is, the tendency to see the public as ignorant or poorly informed – there is still more to explore in the understanding of science among its publics (Goldenberg, 2016; Harambam and Aupers, 2015; Jauho, 2016; Stocking and Holstein, 2009; Wynne, 1995). In line with this research, we argue that the deficit model obscures how EFM users critically and selectively engage with and negotiate medical science and expertise. Similarly to Harambam and Aupers’s (2015) study of conspiracy theorists, our purpose is not to assess the truth value of EFM epistemologies but rather to highlight the social processes through which the relationship to scientific knowledge and expertise is built up in EFM.

Quite early on in our research, we noticed that EFM practitioners did not perceive anything a priori wrong or suspect about pursuing medical knowledge through scientific means. Rather, the critical arguments revolved around moral, humanistic, epistemological and evidence-based rationalisations of how scientific knowledge production, medical professional practices and the formulation of the medical knowledge base should work ‘better’. In the following sections, we will lay out three forms of critique present in our research materials to demonstrate EFM users’ rationalisations of health practices, as well as the intersections of such rationalisations among the three EFM domains we studied. By so doing, we will illustrate the ways in which practitioners of EFM seek to both challenge and collaborate with the medical establishment. The analysis is not meant to compare different EFM domains or to set up stark contrasts between them. Rather, our goal is to demonstrate the analytical purchase of the conceptualisation of EFM by teasing out the discursive strategies and rationalisations through which all these practices may be thought to hover at the fringe of biomedicine.

4. Critique of medical knowledge production

The first form of critique centres on medical knowledge production. It addresses most notably the logic of (medical) capitalism, and more specifically the idea that health is subjugated to market logic and profit. Research participants were sometimes deeply concerned that economic interests dictated research, treatment and the overall politics of health, which rendered medical science and expertise unreliable or suspect, if not downright corrupt. This critique conjured an image of a 'bio-medical complex' through which economic, political and medical interests intertwined and reinforced each other.

The participants considered that a substantial amount of medical research on the safety and effectiveness of pharmaceutical products was biased, flawed or distorted. They were concerned about the negative side effects of medications and vaccinations and argued that such products were pushed onto the market, despite their known side effects. In their view, biomedical research failed to meet the moral and ethical standards required of the field, and medical knowledge often took the form of corporately induced ignorance. A typical line of argument was summarised by Jenny, a vaccine-hesitant parent, who argued that 'scientific data is a bit questionable because what is being researched, what the hypotheses are and how research is being done is tied to money'. Irene, the mother of an unvaccinated child, echoed this by saying that pharmaceutical companies could confirm the results they wanted by doing choice work on how they delimited or cropped the data and which differences or significances they chose to highlight. A typical suggestion for the transformation of medical research in such critiques was to point out the ties that researchers or research funders might have, or to rationalise and cite examples of the ways in which research might have been distorted by the picking and choosing of results or data. Another major concern was the perceived distortion or corruption of medical science due to the dominance of pharmaceutical companies in the funding and conduct of biomedical research. Hanna, a body–mind–spirit practitioner, argued,

They just medicate and medicate in order to barely keep you alive, and then you need more drugs, since there are always side effects, and of course it's good that they can keep you alive because then they can sell you more drugs.

Part of the critique was also targeted against the biomedical paradigm as 'the only game in town' (Barcan, 2011), that is, the only form of evidence and expertise that is recognised. The participants complained that if EFM knowledge or experiences did not fit this paradigm, they were rendered invisible and deemed irrelevant. This was summarised by Pia, an entrepreneur in her 40s who practised body–mind–spirit techniques:

There's so much alternative care and knowledge available, including research, but because it is not medical research it is not accepted in the healthcare system. Why? Because they just keep repeating that it's not medically proven, although there's loads of studies on functional medicine that have shown, for example, that milk is not good for people. . . . But because these are not biomedically studied, they do not exist.

It is important to note that even those who were most explicitly critical of medical capitalism typically did not reject medical research or science as such, but rather problematised the funding of clinical research and expressed concern over how vested economic interests shaped health policies and care practices. In their view, scientific knowledge should be free from vested interests – a critique directed at the 'purported neutrality or objectivity of scientific research' (Harambam and Aupers, 2015: 473). Of course, the critique that medicine has been commodified, and that health has become subject to the capitalist logic of profit-making, is not new; it is a long-standing critique

in both holistic health movements and the social sciences (see e.g. Dumit, 2012; McKee, 1988). What is interesting today is how such critique takes shape in relation to emerging contemporary and technoscientific forms of everyday self-care.

While in interviews with self-trackers this type of critique was not explicit, and many self-trackers expressed strong trust in the medical establishment, some participants did draw links to 'biohacking', referring to discourses about approaching one's body as a system to be 'hacked' in the original (positive) sense of the word, that is, tweaked and improved by tinkering with it on one's own terms. Interestingly, the local Finnish manifestation of the global 'Quantified Self' movement (see Lupton, 2016) – Quantified Self and Biohacking Finland – has in recent years been pioneered and personified by a trio that consists of a technology entrepreneur, a nutrition expert and a medical doctor who is a practitioner of functional medicine. They have all appeared as speakers in numerous health-related events and together have published the popular non-fiction book *Biohacker's Handbook* (Arina et al., n.d.), and their public performances have reflected a tense relationship with biomedicine-based knowledge in multiple ways. For example, the biggest Finnish daily published a piece on biohacking in November 2013 where one member of the trio told having self-cured a stress-based ulcer (Frilander, 2013). He had achieved this by first reading through hundreds of scientific articles and then developing a systematic personal programme that involved tracking a multiplicity of biomarkers with consumer-grade self-tracking technologies and using private laboratory testing services because all one could get from official healthcare was medicine that seemed to help only for as long as it was taken. Here the 'work' done with medical research involved reading medical literature and using it to design a regime of personal self-care that built on lifestyle changes and nutritional choices instead of medicine. So in biohacking and self-tracking discourse, medical science is revered, but self-tracking may become constructed as a sociotechnical domain of self-care that enables personal 'science-based' knowledge production while also incorporating discourses of suspicion towards medicine or medical products. It can convert into full-blown moral critique against corruption if official (health) information is perceived as misleading or skewed. Such moral critique was also articulated by another member of the biohacking trio, who claimed that official Finnish nutrition guidelines are designed to serve the interests of local food industry (Simola, 2013), a critique often voiced by body–mind–spirit practitioners and vaccine-hesitant individuals, too.

The main object of this form of critique, then, is the field of medical and health-related science and expertise in their sociopolitical context, often pointing to the corruptive influence of medical capitalism. In this sense, the critique points to the 'invisible hands' (Sismondo, 2018) of pharmaceutical industries and other commercial actors behind biomedical knowledge production, which is one of the common ways in which health practices are positioned at the 'fringe'. This 'corrupt' and/or capitalist logic of health may be abandoned or 'rejected' in everyday practice by deliberately adopting a stance of opposition through the selective utilisation of biomedical products. For example, some of our vaccine-hesitant families and body–mind–spirit users explained that they might consult a medical doctor to receive a diagnosis but then treat the condition with EFM, for example, by homoeopathic methods. Furthermore, some body–mind–spirit therapy users and self-trackers talked about gathering data – by analogue and digital means, or, for example, using consumer services for laboratory tests without a doctor's referral – and then doing interpretative work, seeking to balance their health through a personalised assemblage of medical and EFM knowledge. These examples highlight how EFM practices draw on many knowledge regimes and practices, not only medical, although biomedicine usually remains sometimes in the background, sometimes in the foreground and at least as a safety net in case all else fails.

We argue that EFM users in no way deem science in general or medical science, in particular, to be useless or irrelevant (see also Harambam and Aupers, 2015: 473). Rather, and similarly to the

findings of studies of lay perceptions of medication (Webster et al., 2009), they maintain that bio-medical research and practice should ensure patient safety and be based on efficacy, and that the avoidance of side effects should be stressed more than is currently the case. The medical establishment, in the form of scientific literature and/or expert knowledge, should be developed through both the idea of personalised self-care and the attempt to 'purify' it by challenging medical capitalism. In this critique, although participants are taking issue with the practices of medical knowledge production, they are also expressing a desire to participate in the articulation of the ethical and moral principles of research and health knowledge. They demonstrate their desire to engage in defining the practices of scientific research and especially in delineating its responsible conduct. They also strive to explore and politicise the consequences of the commercialisation of research. Thus, while being a way to challenge and criticise medical knowledge production, this critique also highlights the possibility that EFM users' concerns may have gone unrecognised by the medical establishment (Wynne, 2006: 219).

5. Critique of professional practices

The second form of critique targets the bio-reductionist professionalised medical expert system, the thrust of the critique being medical professionals' unwillingness and inability to 'meet people' as emotional, spiritual and communicative human beings. It also partly reflects a more general perception of the medical (scientific) expert system as exclusive, unreachable or too bound up with its own impersonal and mechanistic ways. For many, it is not just medical treatments and medications that have healing power and constitute care but also, very importantly, communication and embodied encounters between patients and health professionals. The participants criticised health professionals for not being capable of, or not being allowed to, 'connect' on a personal or emotional level and acknowledge emotions as a significant part of human life and health. While many readily acknowledged that a visit to a doctor was often necessary, they harboured doubts about the system's capabilities to care for or heal them. Despite these participants' critical views, in practice, there seemed to be a tendency similar to that found by Attwell et al. (2017): even the most vociferous critics of the medical establishment relied on medical knowledge in some instances, such as with broken bones, but they tended to seek emotional and bodily healing encounters elsewhere, in the EFM domain.

Many participants proposed that medical professionals should fulfil their function of care in society by taking emotions seriously, as well as by acknowledging personal experience and experiential knowledge as crucial resources for successful care. The participants recounted incidents when medical personnel and experts had been blasé, indifferent and (too) 'professionalised' in relation to people's own experiences and systems of knowledge. Such critique typically identified medical training as a root cause of this. Medical training was seen as overlooking the emotional and spiritual dimensions of health and illness, and as leaving medical professionals unwilling or unable to acknowledge patients' needs, experiences and competing knowledge claims. Isabel, a vaccine-hesitant mother, explained this point:

The problem is, if you go see a doctor or a nurse and you say that we really suspect that we've experienced adverse effects from a drug or a vaccine. But they firmly believe in what they've been taught. So they judge you very easily. They don't even let you finish talking. And that suppresses all discussion.

Nora, a body-mind-spirit therapist argued that 'what really makes these treatments effective is the therapist's presence to the client, that the client can feel that, for once, she gets seen, heard and accepted'. Nora attributed a crucial healing effect to this recognition and compassionate validation of the client's experiences' (see also Sointu, 2006).

Among self-trackers, it was typically recognised that medical personnel may or may not be open to people's own deductions about actual or potential health threats, or about states that people had monitored or observed in their data. For example, it could be perceived that doctors can be somewhat uneasy about letting patients step into their territory of expertise. Also, as is typical in biohacker discourses more generally, while medical expertise was typically highly appreciated, participants sometimes implied that doctors treated illness mechanically, instead of really adhering to the complexities of well-being. For example, Jari, who had been rigorously measuring various aspects of his life for years, and whose motivation to self-track was now mainly to conduct an ongoing 'expedition into himself', clearly held medical expertise in high regard, but also pointed out that there was now a 'big discussion' about well-being in the sense that various events and seminars explore different dimensions of well-being grow in popularity. He highlighted the meaning of happiness for well-being said there was no straightforward definition of well-being, although 'doctors might say that well-being is the absence of a diagnosed sickness'. Especially in relation to preventive care, such articulations imply that holistic and 'alternative' influences work to shape self-tracking into a practice that opens up possibilities both to support biomedical knowledge production and to criticise the expert system as too professionalised or too set in its own ways.

This critique resonates with the discourse of 'personalised healthcare' (Topol, 2015; see also Harris et al., 2010; Sharon, 2017), which encourages health-related participation, proactive action and self-awareness. Personalised medicine is often presented and promoted as a field of collaboration and partnership between official medical professionals and actual or potential patients. However, with its emphasis on individual action and responsibility for one's own well-being, it can also be both reflective and formative of varying degrees of critique of medical expert systems. As has also been argued for CAM modalities, for EFM users holism may act as a form of recognition of the multiplicity of emotions, thoughts and lifestyles (Barcan, 2011: 25).

In this critique, the existence of a professionalised medical expert system is not questioned; rather, it is seen as inflexible, wrongly calibrated or incapable of performing its function in society because it is reductionist instead of holistic, or not open to dialogue. The critique is thus not primarily against the expert system as such, but points to EFM users' concerns about failures in emotional and embodied communication practices, lack of recognition and/or society's inadequate acceptance of personal experience as a crucial resource for fulfilling care functions. On the other side, these concerns may be interpreted as a willingness to further develop the good practice of medical professionals. Also, it can be highlighted that EFM users' focus on assessing professionals' communicative practices points towards important interconnections between trust and dialogue that may have gone unrecognised by the medical establishment (Goldenberg, 2016: 574).

6. Critique of the knowledge base

The third type of critique focuses on experts' knowledge base, which consists of population-level recommendations and evidence-based guidelines. It stresses the significance of personal evidence and the individual's personal knowledge production alongside population-level generalisations. The participants employed a variety of methods from personalised experience-based or data-based knowledge that for them constituted evidence.

Our research participants often expressed a willingness to experiment on their own lives and bodies, and even to act as a 'scientist of one's own life', as one of the self-trackers put it. They were often keen on experimenting, for example, with various body–mind–spirit therapies, nutritional choices, exercise patterns, creative practices (singing, dancing, painting etc.) and other behavioural changes to improve their health and well-being and on seeking to 'validate' their experiences of the effects of such choices through self-compiled data (in the context of self-tracking as a research-like

activity, see Heyen, 2020). For self-trackers, digitally compiled data enabled a possibility to investigate, for example, how changes in everyday habits affect sleep, recovery or blood pressure. In the body–mind–spirit sphere, an alternative therapist Marcus had ‘tested’ flower remedies on himself and his dog, searching for evidence that these remedies ‘really worked’:

I have used these remedies and experimented with them. The first case where I clearly saw the effect was my Australian terrier. She had a urinary tract infection that had been treated with antibiotics and homeopathy, but they didn’t help. So I thought let’s try these flower remedies, and within two days the dog was well.

Here the term ‘data’ may refer to a range of evidence, from digital measurement logs (such as those that self-tracking applications record) to mental records of one’s own experiences.

In this way, the participants acted as active producers and collectors of knowledge and assembled bits and pieces of information in an attempt to create a personalised or situated system of meaning (for similar results, see Broom, 2009; Pantzar and Ruckenstein, 2017). They compiled knowledge from a range of sources: medical and psychological research, but also from their personal experiences and those of friends, relatives and acquaintances, Facebook groups, blogs, websites, and books and training sessions on alternative medicine, popular psychology and new spirituality. Thus, while drawing on scientific knowledge to formulate their perceptions of health and their relationship to evidence-based recommendations, EFM users also assembled ‘social ideas, religious beliefs, situated experiences and specific worldviews’ (Wilcox, 2010: 55). Through this kind of assemblage, the participants critically assessed, redefined and diversified the knowledge base of medical recommendations and guidelines.

While many acknowledged that ‘anecdotal evidence’ from personal experience did not necessarily prove anything in a scientific sense, they sometimes tried to connect their experiential or data-based evidence with scientific evidence, as a mode of personal science and practical knowledge production (see also Heyen, 2020). Some self-trackers brought up the idea that in their interactions with medical experts, they could ‘prove’ something through data, or that in encounters with medical personnel, the data could act as an intermediary that also backs the expertise of the doctor, as doctors would not have to rely merely on what the patient says. Simultaneously, EFM practitioners may end up working on their own interpretation of experts’ evidence-based terms and sometimes also seek to transform the meaning of ‘evidence’. What is central in these instances of experimentation is the participants’ perceived adherence to the principles of scientific scepticism. Medical knowledge was not necessarily prioritised over other forms of knowledge, as long as there was some kind of perceived systematic scepticism involved, whether this scepticism manifested in digital data-based experimentation or in other forms of rationalisation through trial and error.

As with the other two forms of critique, the critique of recommendations and guidelines may also be seen as inclined towards collaboration with experts. Erika, a mother of five partly vaccinated and non-vaccinated children, was actively engaging with representatives of the National Institute for Health and Welfare, trying to work with them to find answers to questions that had not been sufficiently answered by existing scientific evidence:

I’ll ask questions if I have them, and I’ll see if they have another answer [than the one I’ve found]. I like to see what the experts think. [. . .] They do know a lot, it’s just that sometimes they leave relevant information out [when communicating about health].

However, she lamented that the representatives of health authorities would often end the discussion ‘when the questions get too tough’. In some ways, the participants’ views complied with

what Giddens (1991: 3) has called the ‘institutionalisation of the principle of radical doubt’ in late modernity, which insists that ‘all knowledge takes the form of hypotheses: claims which may very well be true, but which are in principle always open to revision and may have at some point to be abandoned’. It is important to underline that this form of critique may also be interpreted as an adoption of the ideal of the neoliberal self-monitoring and self-governing health citizen (Wyatt et al., 2010), even though it sometimes manifests in forms that are deemed ‘unorthodox’ or even dangerous by official medicine.

This critique voices a willingness to participate in both macro-level and micro-level knowledge and ‘evidence’ production. Here we see a strong drive towards collaborative action, as users of EFM wish to bring their own evidence to the table. Based on the ethnographies, we do not know for sure to what extent the participants collaborate with the medical establishment, and their notions could be interpreted as attempts to demonstrate their rationality in an ethnographic interview situation. However, it seems that the participants are willing to produce material from their own experiences and data collection activities to feed into and reform recommendations and guidelines (cf. Jauho, 2016: 338). This may highlight that the issue has not aroused enough attention in the medical establishment. Also, they are eager to ask ‘wicked questions’ about evidence, and they expect to get credible answers to their concerns, suggesting that among many EFM users’ perhaps irrationalised concerns, there might be some unrecognised reasonable questions (see also Wynne, 2006: 219).

7. Conclusion

In this article, we have suggested the concept of EFM to bring together various critical health and well-being practices and to unravel the complex modes of contestation and appreciation of the medical establishment articulated within them. While we do not suggest that the concept of EFM should (or even could) entirely substitute for the concept of CAM, we argue that EFM allows us to address and rectify some of CAM’s problematic aspects. The first is that the concept of EFM can better capture the multiplicity of self-care practices and their varying relationships with the medical establishment than the dichotomous approach suggested by CAM. We have shown that even in instances that tend to be interpreted as ignoring science and/or spreading misinformation – accusations often levelled against vaccine-critical expressions and body–mind–spirit practices – we find active attempts to apply the scientific ideals of ethical conduct, rational scepticism and evidence-based knowledge, albeit in ways that may clash with medical knowledge. Second, EFM’s location at the boundary allows us to appreciate that the same people can be both critical and compliant simultaneously or can accept the medical establishment on some issues while opposing it on others, whereas the CAM concept – somewhat unjustly – indicates blank opposition to the medical establishment. Third, we wish to highlight that while CAM tends to foreground exceptionality, the concept of EFM captures practical and (at least from the point of view of users themselves) normal daily routines that belong to the continuum of practices that users might perform for their health. Fourth, as a much-used concept, CAM has attained some stability as a set of practices defined by the medical establishment, for example, as a ‘Medical Subject Headings’ entry term (National Library of Medicine, 2020) or a medical association’s definition of therapies that automatically fall outside the medical realm (Finnish Medical Association, 2017), whereas the concept of EFM allows us to include emerging practices and new conglomerations of activities that mix and match issues that CAM treats as incommensurate.

Thus, the concept of EFM has enabled us to shed light on the broader phenomenon of critique and contestation of the medical establishment. All three forms of critique show that people do not simply reject biomedicine but seek to appropriate its ways or ideals as part of their everyday modes

of self-care. We wish to conclude by drawing broader critical conclusions on the basis of our analysis. First, we have highlighted that all the EFM domains addressed in this article afford both a critique of medical knowledge production, professional practices and medical experts' knowledge base and a will to contribute to and improve them. Rather than waging the straightforward crusade against science which 'non-medical' health practices are often accused of in public debates, EFM users express a willingness to collaborate and engage with the medical establishment. This points to the need for the medical establishment to develop public engagement with its critical or 'othered' groups. This may be achieved by sharing the activities of medical science with the public, encouraging and listening to critical groups' feedback regarding medical professionals and engaging with the public when formulating recommendations and guidelines based on evidence.

The latter point has consequences that need to be thought through in the context of medical knowledge production, in medical professional work and in the formulation of population-level evidence-based guidelines and recommendations. It might be beneficial to approach patients as knowledgeable subjects who are able to engage with medical knowledge. Also, it is important to acknowledge that there is knowledge production among the public of which scientists and medical practitioners may not be aware and that people are using and referring to this knowledge in their health practices. It may be important to assume that time needs to be spent on encounters with patients, and that the work of professionals needs to focus increasingly on explaining the bases of biomedical knowledge production, the professional practices themselves and the bases for scientific evidence. Medical encounters thus require dialogue, negotiation and the translation of different epistemes and systems of knowledge.


In relation to the simultaneous embrace and critique of biomedicine and its ideals, it is noteworthy that within all the EFM practices in this study, the critique also frequently turned inwards. This meant that the EFM practitioners drew moral boundaries between 'rational critics' and 'irrational' fellow practitioners. In this way, they were often involved in identity work, delineating the contours of what counts as 'legitimate critique'. They sought to disidentify themselves from those they perceived as 'extremists', 'conspiracy theorists' or 'amateurs', or more generally from those whom they saw as not taking the principles of scientific scepticism and evidence-based thinking seriously, or as uncritically adopting everything they read online rather than 'using their own brains' and demonstrating critical thinking and an appreciation of professional knowledge. One reason for this presentation of the self as a critical subject might be the desire to demonstrate one's potential ability to collaborate with medical researchers, professionals and experts, and thereby to gain legitimacy for EFM as a form of care. In part, this inward critique can also be seen as an attempt to further popularise, elevate and even professionalise the status of critical practices (cf. Givati and Hatton, 2015) that are often stigmatised in society.


Finally, as we have argued, rather than being ignorant about scientific principles, inattentive to societally, economically and culturally bounded mechanisms of knowledge production, or compliant with any kind of mistreatment in communications between professionals and patients, EFM users' accounts could be interpreted as strategic action geared towards drawing the lines between good and bad practices of knowledge production and between ideal and unsuccessful patient-professional communication and towards creating a division between evidence-based and experiential knowledge. In other words, they could be interpreted as creative boundary work (Gieryn, 1999) that aims to create a space to define the medical establishment and simultaneously legitimise various EFM practices and actions. EFM users seem to be aiming to raise the status of EFM and/or gain symbolic recognition by employing the language and logic of scientific knowledge production and expert actors such that they themselves are also players in the expertise game. This boundary work and the power game related to it remain to be explored further in future research.


Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This article has been supported by the Research Council for Culture and Society, Academy of Finland (Grant No. 289004), Emil Aaltonen Foundation (Health, Knowledge and Expertise – project) and Kone Foundation (Crossing Borders for Health and Well-being – project) for which we wish to express our gratitude.

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OF TURKU**

ISBN 978-951-29-8202-8 (PDF)
ISSN 0082-6987 (Print)
ISSN 2343-3191 (Online)