Mediating the body: technology, politics and epistemologies of self

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Abstract

This paper critically examines the use of digital technologies to track physiological processes (heart rate, physical activity, sleep), daily routines and behaviours (hydration, food and alcohol consumption) as a means of generating personal agency and self-betterment. Looking at problems associated with the 'newness' of self tracking technologies and the knowledge that they garner (e.g. the quantified self), this paper engages specifically with questions of locating the politics of self-tracking. I consider issues such as defining a distinct object of research out of the devices, documentation, and practices present in the diverse and conflicting assemblages of self- tracking; the rapid prototyping, diffusion, appropriation and senescence of self-tracking technology; and the automation of external power and control in contemporary self-tracking. I propose that an analytical category that I term 'latency' offers a heuristic that addresses methodological and theoretical gaps associated with the study of self-tracking in a way that foregrounds the body relative to its own mediation. Further, I discuss the above concerns through the figure I term the 'code/body' – a body appearing via sensors that redefine the body through acts of quantification and technical mediation.

Keywords: Self-knowledge, bio-politics, quantified self, wearable computing

Introduction

The trend towards using wearable devices and mobile applications to track almost any aspect of life is widely celebrated as a means of producing knowledge that can lead to better decisions in regards to health, fitness, personal mobility and wellbeing. Despite such insightfulness, the use of wearable sensor technology to track, record and share health data such as heart rate, physical activity and sleep, consumption of water, caffeine and alcohol, along with a number of other personal variables also exposes the subject to external regimes of power and control. Thus, the popularisation of movements such as the 'quantified self' raises important questions about the relationship between technology, self-knowledge and emergent political dimensions of the body. Given the great interest self-tracking is generating within healthcare and consumer technology sectors, this paper contributes to ongoing debates concerning the scope and limitations of self-initiated body monitoring.

In what follows, I discuss (a) conceptions of the body that are produced through self-tracking, (b) architectures, affordances and routes to market of self-tracking devices and (c) potential methodological innovations arising through theoretical critiques of self-tracking technologies and practices. Three significant methodological challenges associated with studying self-tracking are identified. The first of these is overcoming the novelty of self-tracking as a set of market-driven social practices. Secondly, there is the challenge of finding conceptions of the body appropriate for addressing self-tracking as a form of mediation and knowledge production. Third are the challenges associated with developing analytical frameworks that can be used to understand various forms of self-tracking as distinct

epistemological sites and may then be linked to the prospect of an emancipatory politics of self under technocratic capitalism. I discuss two approaches to these challenges: the figuration of a hybrid or networked body, which I term the code/body (or coded body) and the analytical category of 'latency' (potential technical or social affordances). I suggest that these concepts can link the identified political dimensions of the self-tracked and measured body in ways that offer a productive heuristic for context-specific studies of health-tracking technology.

Self-tracking as 'New Media'

The understanding of the condition of our own bodies is contingent on processes of mediation. Historically, different media technologies have dictated how sense is made of bodily states such as wellbeing, fitness or illness. As Lisa Gitelman asks in *Always Already New: Media History, and the Data of Culture*:

> Is the history of media first and foremost the history of technological methods and devices? Or is the history of media better understood as the story of modern ideas of communication?; Or is it about modes and habits of perception? Or about political choices and structures? Should we be looking for a sequence of separate 'ages' with ruptures, revolutions, or paradigm shifts, or should we be seeing more of an evolution? (2006, p. 1)

Interdisciplinary approaches to self-tracking can be limited by a taxonomic dissection of practices associated with the use of a particular class of technology: for example, sensors, wearables, or ubiquitous computing. This can lead us to assess their outcomes in terms of present or future applications, situating self-tracking technologies against certain technological antecedents or precursors, such as house arrest bracelets, pedometers or heart rate monitors. The over-emphasis on novelty – and the accompanying celebratory accounts that are readily observed in self-tracking discourses – results in a moment of 'slippage' between novelty, orthodoxy and disciplinary constraints. Writing on the future of media theory, McKenzie Wark has recently stated that the following:

> In the anthropocene era, theory might need to know about a much wider range of design, technology, and even scientific practices. Media theory might try to discover – or rediscover – its continuity with the low theories of each of those domains. It's no longer all that clear what the borders are between media and design. And it turns out that a lot of the best work in science studies is actually a kind of media theory, in which sciences are modes of knowing via particular media apparatuses about some utterly alien and nonhuman world. A promising way out of boring talk about subjects is not to leap into mere speculation about objects, but to study how scientific knowledges actually produce the sensation of nonhuman objects, from black holes to biospheres. (2014)

A prominent theme in the study of new media is the restructuring of location-awareness and the production of personal archives in the context of a network society. Over the past decade, the study of new media within the humanities and social sciences has brought to our attention fascinating experimental projects developed by artists, activists and start-up enterprises. Commonly observed themes in this type of work are critiques of surveillance, attempts to map spatial subjectivities and to develop methods of spatial annotation that enhance traditional 'representations of space' to counter the 'political violence' associated with the deliberate inclusions and exclusions of official cartography (Lefebvre 1991; Neocleous

2003). What stands out about 'critical cartography' is its emphasis on the human body that is brought into 'contact' (see Jethani 2011) with spatial schemata. This is achieved (or attempted) through efforts to produce participant-led projects that annotate maps with user-generated media, and efforts to use environmental sensors to annotate maps with data on environmental variables that cannot be readily observed (Gertz and Di Justo 2012).

The technologies used in contemporary self-tracking such as the FitBit, Jawbone Up or Apple's Health application continue the convergence of Global Positioning (GPS), Radio Frequency Identification (RFID), location-aware mobile touch screen devices, bar and QR codes and digital watermarks into systems designed to enhance everyday mobility and decision making (Jethani 2012). Studying the proof of concept and prototypic systems within this particular class of technology invites reflection on the fidelity with which certain affordances translate into market-ready offerings. Given this, most, if not all, self-tracking technologies are dependent on cataloging data relative to a pre-determined set of upper and lower limits. The production of self-knowledge is a uniquely human, idiosyncratic activity that demonstrates a need for order, reliance on memory and provides insights into our private lives (Keaggy 2007, p. 12). At the same time, a large part of self-knowledge production relies on inventories of bodily performance in given physical environments (Perec 1997, pp. 3-4, 9-10). The potential for distortion and asymmetric control of human proprioception and decision-making is present when such inventorying becomes over-determined by the software architectures and permissions inherent within any given device. This is exemplified in the conditions under which Apple grants third party developers access to information generated through HealthKit.

> Because health data can be sensitive, HealthKit grants users control over their data by providing fine grained control over the information that the apps can share. The user must explicitly grant each app permission to read and write data to the HealthKit store. Users can grant or deny permission separately for each type of data. For example, a user could let your app read the step count data but prevent it from reading the blood glucose level. To prevent possible information leaks, an app does not know whether it has been denied permission to read data. From the app's point of view, if the app has been denied permission to read the data, no data type exists. (https://developer.apple.com/library/ios/documentation/HealthKit/Reference/HealthKit _Framework/)

In seeking to develop critiques of self-tracking it is important to supplement the frame of computer-mediated management and 'the internet of things' (Ashton 2009). Such views hold that an infrastructure of hardware and software outside the human body separates it from its external surrounds. A wearable device attached to the body stands in for the body in such a conception. Given this, I argue that it is equally important to query how sensors are being projected inwards *into* the body. It is also necessary to know the material differences between the phenomena being sensed by a wearable device and its output into a system in which that data is made meaningful relative to predetermined limits. This, in my view, reorients the study of self-tracking practices as new media. Such a project would seek to understand how bodily motifs are used to understand how data-intensive environments function as planes along which the body is extended. In becoming mainstream, self-tracking stands to significantly alter definitions of what is, and is of, the human body. The processes of mediation being forged in the proliferations and convergences of technology within the market of health and fitness-tracking technology have far-reaching implications within the humanities and social sciences. Perhaps the most well-known examples of body mediation and monitoring of recent times is the 'quantified self movement', where participants use

various wearable and sensor-enabled devices to track, record and share bodily states of being such as the following: heart rate, physical activity and sleep; daily routines such as water, caffeine and alcohol consumption, and a number of other personal variables. *The Economist* has described this as follows:

> [The] idea of measuring things to chart progress towards a goal is commonplace in large organisations. Governments tot up trade figures, hospital waiting times and exam results; companies measure their turnover, profits and inventory. But the use of metrics by individuals is rather less widespread, with the notable exceptions of people who are trying to lose weight or improve their fitness … But some people are doing just these things. They are an eclectic mix of early adopters, fitness freaks, technology evangelists, personal development junkies, hackers and patients suffering from a wide variety of health problems. What they share is a belief that gathering and analysing data about their everyday activities can help improve their lives —an approach known as 'self-tracking', 'body hacking' or 'self quantifying'. (2012)

In the next section, I discuss some of the methodological issues associated with the study of self-tracking.

Self-tracking and its Stored Political Energy: Some Methodological Challenges

Self-tracking, body-monitoring and self-surveillance are by no means new ideas in the sphere of modern life-politics and consumer culture. In an article published in *The New York Times* – one that has been influential in defining and bringing the 'quantified self movement' to public attention – Gary Wolf writes of self-tracking as being no different to the use of data in other contexts where data-driven communication and decision-making are common elements of stakeholder management strategy (2010). Wolf cites politicians using hustings and polling, doctors counselling patients with evidence-based probabilities, or sports fans drawing on performance and outcome statistics. Metrics can thus be thought of as an accepted part of management and this, for Wolf, includes the management of one's own body and life. Wolf goes on to write:

> Two years ago, as I noticed that the daily habits of millions of people were starting to edge uncannily close to the experiments of the most extreme experimenters, I started a Web site called the Quantified Self with my colleague Kevin Kelly. We began holding regular meetings for people running interesting personal data projects. I had recently written a long article about a trend among Silicon Valley types who time their days in increments as small as two minutes, and I suspected that the self-tracking explosion was simply the logical outcome of this obsession with efficiency. We use numbers when we want to tune up a car, analyse a chemical reaction, predict the outcome of an election. We use numbers to optimise an assembly line. Why not use numbers on ourselves? (2010)

For Wolf, the Quantified Self movement has come through four major proliferations. First is the shrinking and increasing functional capacity of electronic sensors. Second is ubiquity of sensory components through their inclusion in smartphones and wearable computing. Third, social networking produced and normalised sharing personal information. Finally, remote storage and cloud computing coupled with 'big social data' (Coté 2014) made it possible and acceptable to house and contribute personal data to large remote server locations. However,

as Evgeny Morozov points out in *To Save Everything Click Here*: *The Folly of Technological Solutionism*:

> It's hard to imagine the previous generations of self-trackers forming a social movement of some kind – one with its own proselytisers, regular conferences, and a set of shared goals and aspirations. The existence of such a movement would indicate that there was something cool, even laudable, about the very activity of tracking, a tracking aesthetics of sorts. As far as social movements go, this one would be all about celebrating a common means, not a common end. (2013, p. 77)

Notwithstanding a complex technical history which could include items ranging from heart rate monitors and house arrest tethers to medical identification bracelets and thermo-chromic mood rings, a majority of the devices on the consumer market are simple combinations of accelerometer, altimeter and pedometer components used in conjunction with user-inputted information. Rapid prototyping, appropriation, integration and commercial interest in self-tracking does suggest that the material processes of mediating physiology, movement and behaviour play an important role in the social and anthropological study of self-tracking. Deborah Lupton offers a valuable observation here:

> There is much still to be explored in terms of social and cultural analyses of the quantified self concept and its related movements. How do discourses and practices of quantifying the self represent the self and the body? What assumptions, beliefs and values are drawn upon to portray both the Quantified Self movement's own descriptions and commentaries and in popular culture more generally? (2013, p. 26)

The various modes of personal data production – private, pushed (encouraged), communal, imposed or exploited – add further complexity (Lupton 2014). Conceptions of the body that fit these context-specific points of reference are likely to be obscured by self-reports, given their subjectivity. This ambivalence of body is likely to be further pronounced given the unprecedented attention that self-tracking is receiving in the media, from governments, healthcare, entrepreneurs and within the academy. As such, marketisation raises the critique suggested by Whitney Erin Boesel in the below quote:

> … painting neoliberalism with a gloss of numbers doesn't make it new. In this respect, shiny self-tracking apps and gadgets are simply the new bottled water—a single-serving "solution" to a much larger collective problem. Institutions push tracking devices to encourage surveillable activity, not 'movements'. (2013)

Boesel goes on to remind us that the value in studying self-tracking through defined groups such as those participating in the Quantified Self movement lies in looking at how practices of self-tracking are laying the groundwork for resistance to power that is yet to come, a sort of 'store of potential energy' latent within the technological and political affordances of self-tracking (Boesel 2013). The project of laying the groundwork for emancipatory forms of self-tracking involves a transfer of knowledge practices occurring in hacker spaces (Kera 2012) and meet ups (Nafus and Sherman 2014) or other more formal clinical settings. This is reflected in something Raymond Williams said almost four decades ago:

> … however dominant a social system may be, the very meaning of its domination involves a limitation or selection of the activities it covers, so that by definition it cannot exhaust all social experience, which therefore always potentially contains space

for alternative acts and alternative intentions which are not yet articulated as a social institution or even project. (1979, p. 252)

The stored creative and political energy within practices of self- tracking, I argue, lies in what I term 'latencies' that are contained within the technical production of self-knowledge and the permitted actions that can be taken with such knowledge.

How can the stored energy of 'ethno-epistemic assemblages' of self-tracking be characterised (Irwin and Michael 2003)? The first condition of an emancipatory politics of self-tracking would surely be that members can become informed in ways that could advise on and shape the directions in which body-monitoring technology is developed, tested, refined and marketed. Secondly, latent political energy would be demonstrated in the extent to which self-tracking communities form coalitions with other peer production-oriented groups, open source developers, crowdfunding communities and scientific research institutions. Third, the degree to which device manufacturers; professionals such as doctors, psychologists, personal trainers, dieticians; governments; data providers; established commercial players; start-up organisations; advocates and a range of other context-specific interest groups – which also includes social scientists – exert their influence into these spaces is also a significant factor.

In several ways, the distinction between the individual aspects and the community dimension of personal data collection also has a role to play. The n=1 nature of quantified self-experimentation is only made meaningful in the context of a larger audience. Thus, the activities of n=1 experiments conducted by self-trackers cannot be separated from those activities conducted by other institutions who might be interested in such data at the level of populations. With concepts such as 'citizen science' (Paulos et al. 2008; Cohn 2008), 'data visualization' (Tufte 1983; McCandless 2009) and 'crowdsourcing' (Brabham 2013) common in discourses of technical innovation, medical and social research economics, law and regulation, self-trackers cannot be said to exist independently of these infrastructural and institutional structures. As an attempt to further examine the embodiment of self-knowledge technicity, in the next section I discuss the concept of a code/body – an under-articulated conception of the body which I argue is produced by self-tracking and quantification.

Epistemological Enclosure: Code/Body

The concept of a code/body is adapted from geographers Rob Kitchin and Martin Dodge's book, *Code/Space*. The authors propose that:

> Code/space examines in detail … new spatialities of everyday living and new modes of governance and empowerment through an exploration of the didactic relationship between software and space: the production of space is increasingly dependent on code, and code is written to produce space – hence our title, *Code/Space*, with the slash symbolically binding together code and space into one didactic concept. (2011, p. x)

The motivation to develop this concept and reorient it towards the body originates from a simple observation about the gaze of technologies like the telescope being outwardly projected to understand the world outside the body. In contrast, microscopes, stethoscopes, medical imaging technologies and sensors placed against the skin are directed inward to the mechanisms and processes of inner life. When the constantly evolving nature of self-knowledge is garnered through devices like the above, knowledge of the body's hidden properties unfurls through the transduction of multiple justified beliefs and assumptions about the fidelity of sensor-based mediation of physiological processes.

If, indeed, there are certain universalities that connect the body to supervening technical knowledge-guiding structures that exert their influence over our sense of self, there remains the question of how these might relate and translate bio-politically. The notion of latency provides a heuristic device that helps seek out actor-relations that may grant access to a deeper politics of self-tracking. Simply being able to quantify and see the functioning of the body in ways previously not achievable outside clinical settings provides a false sense of security. For instance, observing a steady resting heart rate says little about vascular health, and the maintenance of adequate daily hydration gives little insight into the underlying health of the kidneys. In revealing certain insights, self-tracking devices also conceal. By imposing goals or assigning value to performance metrics, they mask certain things hidden in plain sight by focusing attention onto rhetorically produced indicators of wellbeing. For such unveilings of the body's inner workings to be legitimately emancipatory, they need to be accompanied by increased awareness of the role played by information visualisation, archiving and processing among those catering to and participating in cultures of self-tracking. Only then can the biases present in modulating the visible body and the invisible and super-sensible aspects of embodiment be addressed within self-tracking assemblages (MacPhee 2002, p. 5).

At the level of devices and technical systems, the notion of latency is closely linked to 'affordances' – features and functions of body monitoring systems that allow and limit certain actions, outputs and possibilities (Gibson 1977). Take, for instance, progress towards a goal that can be monitored by the variables measured by a given device. The device's interface and output are aligned to track progress *towards* this goal relative to a predetermined numerical threshold, as opposed to strength of commitment towards achieving this goal, the extent to which behaviour has been altered or the degree of habit reduction. The device itself is more than likely to be technically capable of performing these calculations, but is not programmed to do so. As journalist Gillian Terzis asks, 'could reducing one's activities to a series of inputs and outputs make the pursuit of self-knowledge endlessly circuitous? The more you learn, the less you know: each new app brings with it a new metric to strive for' (2014). In this sense, as argued in Jethani and Leorke (2013) and Parikka (2012), recognising the role that archival, storage and transmission of past or 'dead' media technologies which are always reproduced and revived through discourses occurring after they cease to exist in 'material' form. We can think of the traces left by these projects as archives in motion, archives that are themselves dynamic and changing beyond the purview of those who are producing them in the first instance. This also gestures to the way movements like the Quantified Self movement never operate outside the constraints imposed on them by the internal and external influences that existed at the time of their conception. These constraints and influences might be in the form of the objectives and desired outcomes of the institutions and individuals funding the movements, or users' own assumptions, agendas and ideologies that underpinned their involvement. Beyond this, our own theoretical guiding questions in studying such practices also reclaim and recuperate these projects and mobilise them for particular readings. This must be accounted for in how research into self-tracking is framed and communicated.

More attention should be paid to the way the production of personal data is shaped by the processes of obsolescence, storage and documentation that are an inexorable outcome of any form of self-knowledge production. However, such processes are also specific to the particular 'moments'rfrom which these projects emerge, and which are caught up in ideologies and discourses that mobilise them beyond their transitory, ephemeral intervention in the lived environment (Jethani and Leorke 2013). As such, it is important to recognise the way projects like the Quantified Self movement, life-hacking and bio-hacking are often

assimilated back into or diverted by commercial, institutional and ideological structures that drive their innovation and diffusion – this also includes academic study.

Conclusion

A critical study of technically produced self-awareness based on the ideas discussed above contributes to a body of philosophical and empirical analysis that is engaging with the nuances of the social relations emerging out of the technical, and the subsequently heightened capacity to know oneself. At the heart of this lies the need for a rigorous critique of the ideology of self-knowledge as something that contributes to emancipatory praxis under the current neoliberal orientation of healthcare technology.

Speaking broadly, and somewhat optimistically, critical engagement with the objects, processes, behaviours and relations that are involved in producing the various types of body-awareness involved in decision-making and personal development can stimulate political action and social change. The resulting knowledge may impact the ways in which self-tracking technology is designed and brought to consumers. Further to this, critical investigations of mediated self-knowledge may lead to important questions that challenge the pre-figured egalitarian and celebratory discourses that tend to accompany various projects that apply technological systems as a means of intervention into everyday life. With regard to its contribution to academic disciplines, the approach outlined in this paper contributes to a range of scholarly debates occurring around the study of mediation processes, the nature of software and digital platforms, the augmentative role of new media technology, data visualisation, and body-oriented issues in gender and sex, disability and post-humanism.

What can a code/body help *us* do? It links the identified political dimensions of the measured body, offering a heuristic device for context-specific studies. The various types of technologies used in self-tracking, and the discourses happening around them, present us with the opportunity to rethink the body as significant material element and epistemological site in the digital mediascape. It invites a re-theorisation of the cognitive and material thresholds associated with the intractable problem of mind-body in contemporary work attempting to characterise the social and political dimensions of self-tracking cultures.

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