On the Body of the Consumer: Performance-Seeking with Wearables and Health and Fitness Apps

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Abstract

Contributing to critical digital health research and the sociology of health consumption, this study investigates the phenomenon of self-tracking and interpretation of consumer data via wearable technology and mobile fitness software applications (apps). It critically analyses qualitative data collected from members of running communities in the UK who are heavy users of apps and wearables. The study seeks to understand the meaning and practice of long-term use of apps and wearables targeted at consumers interested in tracking fitness, and the collection of personal health information over time. The paper offers an interpretative perspective on runners as performance-seeking fitness consumers engaged in long-term self-management of health. These consumers are driven by a profound motivation to visualise and embody a long-term state of fitness. Participants were also hyper-aware of advertising and promotional methods used to engage consumers. The findings raise concerns about the validity of personal fitness data, and how its collection promises improved personal health while visually promoting sought-after fit bodies. Further research is required to understand the transformative impact of fitness-tracking and how individuals negotiate personal classifications of health.

I. Introduction

The rise of a digital network society has allowed personal and social information to be easily combined. While collections of personal health data have existed for decades, today searchable digital databases generate ever-growing records on individuals' lifestyle and health activities. In this context, the health and medical industry is one of the top three fields in the global mHealth ('mobile health': mobile social applications and wearable tech) market, expected to reach US$111.8 billion by 2025 (Grand View Research 2017). Fifty-eight per cent of smartphone users are consumers of mHealth data, regularly accessing and storing health information on their devices (Krebs and Duncan 2015). The mHealth concept sees self and body entwined in an emerging philosophy (and promotion) of digital self-care (Pantzar and Ruckenstein 2015; Sharon 2017). Thus, mHealth plays a powerful and intensifying role in shaping participatory, personalised health practices and, as I will argue, producing new fitness classifications.

Despite the centrality of digital data in everyday life, little has been written about habitual use of commercial mHealth technology as a context for achieving a 'healthy body'. This paper addresses this gap, investigating long-term, dedicated wearable and app consumption to identify the mHealth practices that constitute bodies as sites of fitness. The research benefits from long-term access to heavy users of health- and fitness-tracking wearables and apps. It finds complex specific concerns about the body at the intersection of mHealth technology and new relationships with experts and other sources of professional advice. Participants' descriptions of wearable and app use and awareness of their data being tracked reveal how mHealth practices are being reformulated around individualised body goals. The paper examines the subjective characteristics, including sociability, lifestyle, fitness and fun, of heavy use of wearables and health apps to

understand collective physical rituals and individualising acts of consumption. It draws on literatures in digital sociology, culture and internet studies, new media and communications, and consumer research. The following section examines how studying use of personal health data and self-tracking contributes to the sociology of digital health consumption.

II.   The sociology of digital health consumption

Conceptions of digital health consumption derive from two main areas of research. The first is concerned with social capital, citizenship and civic engagement in relation to patterns of consumption and self-surveillance culture. This includes the dissemination of norms, values and policy in promoting health information. There is a growing wave of interest in the discursive organisational, institutional and governmental transformations typifying interactive health services nurtured by 'digital citizenship' and the relative 'e-scape' (Nettleton 2004: 663) of professional knowledge. This new style of medicine significantly restructures health discourse, with implications for public policy and professional intervention (Lupton and Jutel 2015; Harting et al. 2017). Ajana, writing on biometric citizenship, speculates about the consequences of reconfiguring biological data, 'ranging from border control and asylum regulation to the management of social services and medical records' (2012: 851, 852). This aligns closely with Lyon's (2017) work on surveillance technologies and with Foucauldian readings of social power dynamics, which have been influential on our understanding of health management as 'introducing additional freedom through additional control' (Foucault 2012 [1979]: 69). Devices intended to allow new freedoms enact new forms of control. The growth in self-quantification is emblematic of such self-surveillant practices; that it is done with shared personal health data points to the otherwise little-noticed political economy of platforms

(Barta and Neff 2016), ambiguous valuations of metrics (Ajana 2017) and the market power of algorithms (Beer 2018). Thus, the existence, use and redesign of mHealth services are a result of social and consumer forces. This raises questions of agency, and how *being* and *feeling* healthy may take on constitutive or performative roles through the data we produce and the self-tracking we undertake.

The second key area of research is in digital cultural studies. While this new field has already had some influence through its structural critique of new professional roles and responsibilities, few scholars have concentrated directly on the deep-rooted impact of the commercial health tools that anchor Nettleton's (2004) health-seeker and Ajana's (2012) biometric citizen at the centre of mHealth practices. MHealth products are closely aligned with commercial and marketing use, offering novel ways to meet self-defined consumer needs and goals. This level of personalisation differs from that anticipated by Eysenbach's health consumer, enabled by the 'information age healthcare system' (2000: 1715) to access healthcare resources more efficiently. However, while Eysenbach and, for example, Wyatt et al. (2005) focus on expert, professional information sources, the new digital health consumer is more concerned with a variety of needs, relating to fitness technologies, lifestyle products and body types, that rely on constant data-monitoring and -sharing. Such self-monitoring recalls Shilling's 'body project' in which physical capital requires consumptive practices in the 'investment of spare time and economic capital.' (1991: 654). Jong and Drummond (2016: 760) borrow Wright's (2009) term 'biopedagogies' to define the disciplinary strategies that characterise consumerism within online fitness culture. Such promotional tactics put health directly into the consumer's hands, much as Hardey's (1999) 'doctor in the house' first identified the internet as a source of lay health knowledge. Ajana argues that, far 'from being an instrument of medical knowledge and expertise, the scale has eventually become part of "a private habit

and an everyday domestic discipline'" (2017: 3, quoting Crawford et al. 2015). Similarly, mHealth products reflect the recursive processes put in place by algorithmic design, suggesting distinct differences in emphasis in how individuals focus on health and fitness. A primary concern for the consumer might be the interplay of human and machine agency (Beer 2016) or the targeting of specific consumer groups, such as adolescents, to buy into new mHealth fitness products and services (Freeman et al. 2014; Lupton 2018). The message here is that it is up to the individual to negotiate new exercise regimes and diet techniques to achieve a desired appearance and attain and maintain fitness – in ways that may or may not, in reality, be 'healthy'.

This synergistic (if uneasy) relationship between novel methods of health promotion, marketing and engagement taps into a corpus of earlier meanings in health discourse and consumer health empowerment. Rissel (1994) criticises the distortion of personalisation of health knowledge, noting its significance for consumer empowerment. However, Grace argues (1991: 330) that, far from empowering individuals, labelling them 'health consumers' is a new form of consumer capitalism. Ritzer and Jurgenson (2010) characterise the individual as a 'prosumer' – both producing and consuming digital content. Therefore, digital consumerism is a demonstration of dynamic health communications marketing messages (Manika and Gregory-Smith 2017) as much as the integration of new technologies to regulate bodies and fitness. The need to investigate the blurring of boundaries around these approaches is therefore paramount. Particularly noticeable is the emphasis on visualised health information and self-care, -management and -responsibility. Multiple health discourses are manifest through increasingly digital fitness strategies (often aimed at young women) formed outside the realm of professional knowledge (Depper and Howe 2017). Accordingly, the disciplinary methods used to enact fitness practices are indicative of Foucault's concept of biopower, which

necessitates consumer 'micropractices' in the productivity of 'fit' bodies (Fotopoulou and O'Riordan 2017). This Foucauldian context is central to analysing the reformulation of health practices and the physical capital gained by this study's participants.

III. The mHealth-gaze: how digital health promotion and biometrics shape the body

This section considers more closely how digital sociality (the cultural, meaningful context of digital interactions) is characterised by mobile digital health consumption (investing in, or taking ownership of, ideal physicality using apps and wearables). I propose the concept of the 'mHealth-gaze', influenced by Foucault's (1980) interpretation of the body as a site of investment and control, and the consumer practices that are a product of mHealth commercial services. Fox (1993: 26) talks of the body's value based on the perception of it as a commodity, and how it is consumed and ascribed value so that it can be displayed or, up to a point, dissembled. The mHealth-gaze depends on this dissembled construct of health and fitness, focusing on parts of the body or specific health/fitness concerns (blood pressure, blood sugar levels) to inscribe onto the body points of physical data-tracking to fit the commercial services.

Foucault's (1982; 1988) work has renewed significance applied to novel methods of digital self-surveillance and self-discipline, particularly to how contemporary consumerism promotes the possibility of acquiring a certain body type (Sanders, 2017). This point is demonstrated by *7MinuteWorkoutChallenge*, one of the most popular health-apps globally according to Apple App Store data (2015–2018). For Rich and Miah this activity is significant; users are 'more inclined to use technology to monitor their health and, thus, be more complicit in their own surveillance' (2014: 299). Regardless of

consumers' health knowledge, the Foucauldian context of the mHealth-gaze describes well the disciplinary power and visible self-control required of consumers and the method by which they enact physical capital. These consumers are, in other words, complicit in self-surveillance – echoing Featherstone's reward for 'ascetic body work' (1982: 18) and Shilling's (1991) rise of body elites. Efforts to 'keep fit', often the privilege of the 'upwardly mobile' (Shilling, 1991: 655), intersect with a distinction as an elite, and combine with health-sharing aspects of mHealth activities. For Beer (2016), there is significant labour involved in users' data activation and profile maintenance. As a result, such technologies are never neutral, and are revealing of the politics and effects of this mode of calculation and data-recording about the self. Indeed, mHealth is now a core mechanism through which personal data is shared and, increasingly, engineered by commercial and political interests (Bilić 2016).

This returns us to Ajana's (2017) point about how metrics target individuals and the negative effect of this. In this context, mHealth services have a dual role: capturing data and establishing new behaviour, while also serving the needs of a commercial marketplace. The condition of the mHealth-gaze is thus significant, as it emphasises the practices influencing individuals to be active in their discipline and knowledge about physical fitness. This context is vital to understanding the processes by which the body continues to emerge as a commercial arena, across which social relationships of power are played out as the consumer enters into relationships, as observer and observed, that appear as ordinary methods of self-surveillance and knowledge in the digital age.

IV. Methods

Findings and analysis are based on two types of data, collected in three phases. First, a digital survey was undertaken following canvassing through six national (UK) running clubs (respondents n=667). Participants received a description of the study and gave informed consent. Respondents had to be at least 18, own at least one wearable fitness product and be daily users of health apps. The survey gathered demographic data, and identified key themes and provided an indicative summary of respondents' motivations before qualitative in-depth interviews.

Following the survey, the researcher contacted running club members who self-identified as 'heavy users' of wearables and apps. During this second phase, participants were interviewed three times at six-monthly intervals, each interview lasting 40–90 minutes. This allowed for acclimatisation to the research themes and for conversations over time. It was also useful in developing an in-depth picture of runners' habits and routines (Shipway and Holloway 2016). Handwritten notes of observations and exchanges during the interviews were transcribed. The in-depth interview data and online survey data allowed for thematic and cross-comparative analysis, constructing an account of the immediate and long-term effects of mHealth technology and knowledge. The aim was to identify the range of individual and social processes engaged with and experienced by participants as they recorded and acted on information about their fitness.

The third phase involved re-contacting interviewees after one year to revisit more substantial themes related to long-term health conditions and discuss other subjective points of health and fitness related to wearable and app use. Where interviewees raised concerns, for example about long-term conditions and experiences of healthcare systems, the sharing of treatment and diagnostic information presented some ethical issues.

Ethical processes were commensurate with the guidance of Durham University Business School's Ethical Committee; participants consented to their experiences being reported.

As this study is one of the first long-term investigations of consumer use of wearables and apps, it was important to research data across a number of databases. Observational data included weekly monitoring of reports from Quara.com, iPhoneNews, Sensor Tower, Backlink Checks and AppAnnie, and Apple App Store analytics for iOS and Android developers published on marketing websites. This provided an indication of an apps user-base, though it is difficult to gauge the validity of such statistics. The monitoring of commercial data also provided talking points during interviews.

Digital runners as participants: routinised modes of behaviour

Before reporting the findings, a moment of reflection is appropriate on the concerns behind this study. By focusing on heavy users of wearables and apps, likely to be aware of their health and have active fitness routines, I sought to investigate the demands and contingencies of the social and physical surroundings of runners. I should note that I am a runner and a long-term daily user of wearables and apps myself. I was interested in building a picture of how routinised modes of behaviour cross over into digital data and disciplines supported by wearable and app usage. Runners are particularly suitable as participants. In planning a run, for example, they tend to have 'related habits': running at certain times, planning certain types of route. Such routines, to quote Dewey's classic conceptual observation about habits, are an 'immensely more intimate and fundamental part of ourselves than are vague, general, conscious choices' (2002 [1922]: 21). Thus, runners' habits are likely to entail a range of distinctive expectations and physical awareness (Allen-Collinson 2011; Vertinsky and Bale 2004; Barnfield 2016), along with everyday experience of the technology. The habitual techniques they already embody to

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stay fit enable investigation of the potential effect of the digital and physical conditions that form part of the routinised behaviours, *the habits*, involved in using technology to track health and fitness. By understanding these modes of routinised fitness behaviour, the study can examine any corresponding change in practice through which wearable and app users seek to alter their bodies.

After completing the first-phase survey, respondents were asked to indicate willingness to be contacted for face-to-face interviews; 138 agreed (21% of survey respondents). Forty were then invited to interview, based on the following criteria:

- at least a one-year user of wearables

- at least a three-year user of health/fitness apps

- running club membership (meaning participants shared key characteristics, such as interest in and knowledge about becoming and maintaining a healthy body)

Those responding within two weeks were recruited, yielding 11 participants aged 19–67 (six women, five men). One was a law student; the others held various professional roles, including a semi-retired consultant. Household income ranged between approximately £15,500 and £80,000, averaging £50,000. Every participant used at least two wearable devices, with one (a personal trainer and occupational therapist) using 11 at any one time. Pseudonyms have been used.

While the sample size is small, the intention was to gain long-term access, allowing in-depth analysis. Such in-depth focus on narratives related to personal health-tracking has been successful for other researchers (Hanold 2010; Shilling and Bunsell 2014). Moreover, the runners included in this study are of special significance in terms of both capturing long-term data, and their willingness to share personal experiences of digital consumer lifestyles. Thus, I caution against solely emphasising large-scale studies, which

diminish the connection between researcher and participants and miss people simply talking about their experiences (Barnfield 2016; Hitchings 2012; Hitchings and Latham 2017).

V. Findings

Participants were involved in the long-term production of Shilling's (1991) physical capital in which the body is a site of consumption in configuring and classifying physique, through activities which invest in fitness and health. They thus reflect the acquisition of physical capital through capturing digital data. The value attached to these representations of fitness varied, and opportunities to convert them into other contexts are not fixed; these dimensions are addressed below.

Digital health introspection and self-awareness

> Using my Jawbone encourages me. I often think that before I run things won't go to plan that day. I feel sick. Sometimes I am sick. When I run, I am motivated and I don't get to feeling sick anymore. I start my run. I see other runners. Forget dawdling about and feeling sorry for yourself […] I enjoy running, I stay in touch with my performance, that's the benefit of my tech. Running is more than running, and I pay attention to it every day. I think wearables give a softer and more natural approach to achieve high-performance […] achieve a good range of movement and set your mind free. (George, 32)

Runners are conditioned by habit, often running the same routes at the same times of day (Barnfield 2016; Shilling 2008); for George, running was as much about enjoying social practices (Nettleton and Green 2014) as attaining a level of fitness. His description of the automated capture of his data as 'softer and more natural' is significant. As health

is rendered more measurable for consumers like George, this creates new opportunities for self-reinforcing fitness based on personal metrics. Such measurement enables new ways of thinking, and for George the motivation to run every day. This accords with Nikolas Rose's influential arguments about biocapital and 'the birth of a new "somatic" *sense of ourselves*, which extends to self and identity itself' (2007: 3, emphasis added). For George and other respondents, the new bodily *sense of ourselves* represents an overt form of esteem, which extends to the self.

An unexpected but important finding was runners' emphasis on such internalised dimensions. Given the longitudinal frame, I had expected to capture insight into new behavioural modes related to physical data-tracking; I had not anticipated the emphasis on mental stimulation and health. This point returns us to the heart of the quantified-self perspective: the self is accounted for through numbers and the deployment of Ajana's biometric identity (2017: 4) in a way that redefines the relationship between the body's physicality and identity data. The study evidences new metrics enabling new forms of fitness knowledge. A clear finding was participants' focus on how their health and appearance was judged by others; in this regard, mHealth data enabled a 'sort of self-strength' (Debbie, 45). Shilling contextualises the foundations of individuality and knowledge about the body as encouraged by 'empathy and identification with others' (2008: 30). A key way that the mHealth-gaze was enacted was in gaining a 'fuller' understanding about fitness compared with that of others, as Nicole explains:

> A few years ago I started using Fitbit and RockMyRun. I had been talking to a buddy about my physical alignment as a basis for better performance, and then using apps to track what your body can do. I had been playing around with my running style for while, and this whole thing about wearables kind of pushed me

forward. It made my running more efficient, but it also showed me what I had been neglecting – my mind. (Nicole, 39)

In enacting the mHealth-gaze, Nicole feels attuned to how her body functions but also locates distortions or problems concerning mental health. Here, the new dimensions of mHealth define the whole fitness experience. Participants had new ways of inscribing forms of control onto the body, forming part of this experience. The pervasiveness of this rationalised body and performance culture is unsurprising among runners. A major destabilising factor was the risk of *appearing* unhealthy. For some the experience of 'bad performance' – and, thus, record of bad data – was 'too stressful' and it was 'worthwhile risking injury' (Dom, 23) so that apps and wearables would track an appropriate level of fitness activity. In conditioning the body, mHealth practices also included conditioning health data – sometimes with unhealthy consequences, as Dom's comment demonstrates.

There is an additional layer of complexity to tracking training and sustaining health and fitness biographies, as Chris, 56, illustrates:

> I've Crohn's, and when I was first diagnosed there weren't any apps. So I stayed in line with what the professionals tell me […] my brother's wife was recently diagnosed with endometriosis after she had been using Clue [a mobile app] to chart her fertility […] the end result is that she was given a diagnosis based on what she learned from her app. It had helped that her doctor was able to understand what she was telling them, and that this wasn't just out of context. She had the evidence there for them […] as a family we have a much better view and idea of our health. A much greater self-awareness about what we should be doing.

The ability to track distance, pace, diet, posture, water intake, breathing, intellectual concentration and mindfulness, even fertility, suggests an internalisation of health regimes. Injury and potential ill health jeopardise the ability to 'maintain a clearly identifiable and powerful form of rationalised body culture which values a disciplined lifestyle' (Shilling 2008: 56), and give greater emphasis to the intensification of biometrics and embedding of certain health practices that mean more than simply running faster.

In prioritising health and fitness through digital data, inevitably, wellbeing and other more philosophical conceptions of health became woven into individual consciousness. Chris mentioned 'what we should be doing'. Others referred to their 'sense of mindfulness supporting my body' (Elsie, 40), a 're-affirmation of myself […] spiritually, in my muscles and beneath my skin' (Dom, 23), and charting physical data 'to harmonise my mind, my body and nourish my spirit' (Alfie, 62). The perception of 'rational tech' allowed participants to commit both bodies and minds to activities that addressed 'important emotional needs' (Elsie, 40) and, one might conclude, enabled new classifications of disciplined bodies. Indeed, the most important factor was participants' ability to define their orientations towards their bodies and health, providing a sense of validation, and again confirming the ever-increasing attention to new practices and the metrics on which they are based.

Professional health in crisis; mHealth as the treatment
After initial interviews, interviewees talked most about 'living with', 'coping with' and 'finding out about' ill health. In developing a holistic sense of fitness, mHealth also allowed solutions based on 'a more intimate knowledge of how to heal my body' (Isobel, 67). Being able to visualise healthy and aesthetically fit-looking bodies was an important

motivating factor. Yet long-term use of technologies suggests deeper subjectivities concerned with making time for healing and 'feeling well'.

Lucy, 19, described a dual motivation – to 'help manage' her day-to-day training to improve her 'personal best'; and 'to focus on my inner strength'. In our initial exchange, Lucy shared that she was 'in the [NHS] system […] awaiting diagnosis'. She used apps ('but not the NHS one') to monitor her as-yet undiagnosed condition:

> I've gotten really into finding new recipes on Pinterest, I just decided that I was going to have a complete lifestyle change and see what happens. I stayed up all night once looking at boards […] seeing what was out there, anything to get rid of the dread that my health was out of my control. That this was it for life. I dread the 'being sick' label […] There aren't any apps specific to [my condition] just yet, but I find the recipe shaker and calorie counters *really* helpful to keep track of what I am doing.

In her final interview, Lucy talked about her search for a diagnosis 'sharpen[ing]' her self-awareness, 'my body, my sense of worth, my mental health'. However, while Lucy felt motivated to 'try new things', she also experienced destabilisation, wondering 'what is "normal"?' Measuring dimensions of fitness is seen to communicate core aspects of health and, therefore, points to a new localisation of health in how mHealth data is shared with others. The metrics and categorisation of Lucy's health are both deeply personal and subject to public scrutiny, as her concern about being labelled 'sick' demonstrates. This highlights numerous concerns about public use of mHealth data. Kennedy and Moss are critical of data-mining practices as a new way of controlling individuals based on 'what their previous activity patterns look like' (2015: 1). While

protecting personal data was a concern, the role of professionals in interpreting data received more attention (if not criticism). The study found that mHealth metrics did count toward diagnosis; yet seeking professional medical opinion remains an important part of being informed about personal health (Hardey 2010). Illness and injuries are not reducible to the infrastructure of technologies or the data they generate, and using wearables and apps cannot negate the more phenomenological and symbolic impact of ill health. Nevertheless, this study demonstrates how empowering it is for consumers to compare their self-tracked data with professional diagnoses.

Empowerment and the body as data

Defining the body by its data runs counter to the creativity of human activities and physical and mental needs. The connection with the social environment speaks to the way fitness data facilitates identity-based forms of control – what Beer calls 'soft biopower' (2016: 110). Of particular note was how participants created a belief system about their personal development. This dynamic is seen in the belief-transformative practices voiced below:

> I've been amazed at the changes, it shows me what I think of as healthy […] how I feel as healthy has a real impact on my life. I think that a lot of times before [using apps] it was easier to give up, or not to feel motivated. It was easy to forget what you had done, or not to put in context your intentions. I was diagnosed with diabetes last year [and] I have been amazed at how much apps have helped […] I had been [feeling] unwell for so long. Now it's a lot easier to understand what was going on […] I use Glucose Budd[y] and iCook[Book] […] now it is rare that I'll mess up my insulin dosage. (Alice, 27)

Now I judge my own and my clients' performance on real stats. I can monitor

them even when they're away: oh, this person isn't training hard enough, and

they've only done two miles that day […] I've used Nike Band before, and then I

switched it up […] I thought it wouldn't make a difference, I was already fit, I

knew what I could put my body through, I just wanted to kick on with my

personal best! So it's about fitness, lifestyle, and managing the stuff I can't see, like

your fat index to muscle. (Dom, 23)

Alice and Dom are subject to the mHealth-gaze in the transformations they have felt to

the physiognomic elements of the self. Others found 'empowering' this experience that

personal health, like bodies, could be shaped, and conditions could be successfully

managed 'without interference' from medical professionals. These elements emerged

only during the third phase; although participants had been long-term tech users

beforehand, contributing to the study also had an influence, making participants more

aware of their tech use and the emerging digital environments shaping their health and

fitness knowledge.

An aspect of participants' health knowledge was how the *visibility* of bodily governance

enabled elite health classification: 'I post pictures of my protein shakes on Instagram and

link back to my personal training schedule so others can see it. If I feel really good that

day, I'll post a picture [of myself] doing certain exercises' (Alice, 27). Other studies

acknowledge the critical impact of social status on health-conscious consumer and

cultural practices – for example, Sidney Jay Levy's analysis of the meaning of food in

American society: 'Along with age and sex dimensions […] social class distinctions are

pervasive […] there is a tendency to equate higher social position with strength' (1981:

56). Alice's experience suggests that another way to address the impact of mHealth

practices is through analysing social media posts. However, such analysis comes with major challenges, and 'while these data might be big, the level of detail is thin' (Hofstra and de Schipper 2018: 2). This study's participants have relatively high socio-economic status, with time to invest in their fitness and money to buy the latest technology. They are clearly confident about establishing new fitness practices, through wearable and app use, and (like Alice) through sharing experiences on social media. I would argue there is a new point of social agency re-formed by mHealth practices that helps individuals feel more in control and reveals new self-classification behaviour enacted by sharing on social media.

Returning to Shilling's body–society relationship, this sense of physical capital, and how one might be 'educating the body' (1991: 653), can be dramatic:

> [F]or over a year I saw my whole body as a nemesis, stopping me from doing what I feel I had been able to do before as a young man […] My son put me onto a load of apps to keep my cholesterol in check, and my wife had enough of my hints to buy me a Garmin the Christmas before last. The most important thing for me was the feeling of strength, strength and being able to self-manage […] My health has changed from something that was holding me back, to something that has given my independence back. (Alfie, 62)

Empowerment is one aspect of Alfie's experience, yet Alfie's and Alice's comments reveal the power relations in the observer–observed relationship (Foucault 2012 [1979]: 135–230). Alfie mentions his own critical gaze, those of his son and his wife – all mediated by his digital health data. Alice mentions her own critical gaze (she might post an image of herself working out, if she's had a good day) and seeks to control how others

see her. The mHealth-gaze thus offers the individual the ability to apply self-surveillance techniques to set up what are viewed as good health practices. These techniques highlight the centrality, for all participants, of feeling and being well as a result of long-term digital engagement with their bodies.

Seeking creative wellness

There are two sets of self-critical expectations here: anticipated change compared with previous behaviour ('I used to think that it was ok not to exercise'; Chris, 56); and participants' openness to novel methods of self-management and their recognition of their own habits, appearance and rituals. While developing reflexive self-awareness might be freeing from a body previously self-defined as unwell, a picture also emerges in which Lupton's (2014) critique of the quantified self becomes a means through which being healthy is demonstrated to others.

> I actually used my run tracking to get cheaper life insurance […] they wanted my health data. There's all these different variables you have to state and they are linked to this big database, so I joined the dots for them [and] I can prove how disciplined I can be. It's sort of your own life insurance […] that's a cool way to have data on yourself. (George, 32)

Each participant described moments when they had had 'concerns' about their health or 'felt worse' and had sought new self-management methods. These conversations were shaped by consumer uses of mHealth technology and the imagined outcomes in multiple social and clinical contexts. For example, interviewees discussed their experience of 'bad days' and 'setbacks' and how technologies helped to counter these, prevent 'fading away' (Dom, 23) and gain perspective alongside a 'doctor's point of view' (Lucy, 19). Finding

creative ways to support fitness levels was integral to participants' experience of mHealth and their definition of health needs over time. This echoes the consumer-driven disruption in healthcare and 'the return of that data into the hands of consumers' predicted by Fiore-Gartland and Neff (2016: 119). In terms of reliance on data-intensive technology, the subjectivity of cause and effect is pronounced: Peter, 39, who had arthritis in his knee, spoke about the creative strategies he had employed:

> I find it useful as a pain checker and diary […] I got onto it to make sure I was taking care of my needs. [There are] not two days that feel the same […] sometimes I'm in such pain I'm never going to be myself again – like I've literally come to an end […] I use iMapMy to sync with heart-rate and upload to Map[My]Fitness. I had a go with some of the yoga apps, but […] they sort of detract from what's supposed to be a very holistic experience.

In the past, health monitoring was complicated, involving the need to learn about new equipment or medical terminology. Now, there was a general consensus among interviewees about the 'intuitive', 'smart', 'clever' and even 'fun' benefits of technology. The findings extend previous research on consumer health information, showing that multiple sets of data, along with quantitative ranking, enable users to construct meaningful narratives resulting in specific practices (Hardey 2001; 2010). Over several interviews, a picture emerged of how the accumulation of digital health data produced multiple understandings of a condition about which an interviewee had made conscious choices. For example, Nicole felt that she had 'damaged her progress […] after a holiday'. These simultaneous multiple constructions of fitness – as data and physical effort – allowed Nicole to actively pursue a 'fitter version' of her body.

VI. Discussion

The relationship between attending to health and engaging with the body's limits illustrates that while the ubiquitous properties of mHealth may not determine individual health, they are irreducibly important in the range of creative strategies through which consumers modify their behaviour, seeking out and constructing wellness. Digital tech enables a rationalisation of the body – as a result of multiple datasets, representing, for these participants, hours of activity a week. As Neff and Nafus (2016) emphasise, self-tracking is undertaken with wide-ranging motivations – including access to wellness programmes and membership of fitness communities. In the third research phase, eight of the eleven participants discussed having designed fitness programmes to unlock content and train with others. If this classification of the running body can facilitate a fundamental change in individuals' capacity and experiences, clearly the sense of achievement provided by mHealth content supports new performative contexts and experimental actions aimed at achieving long-term wellness. In contrast, wider societal concerns that personal health information and interactions with others should be kept secret, or within one's personal control (Beer 2016; Lyon 2017), restrict the boundaries of what personalised digital health information means for the individual.

On a more philosophical level, the idea that openness might encourage others into ('certain kinds of') health-related activities was seen as 'a good thing' (Nicole, 39). Clearly protecting personal data and individuals' control over it is important (Sharon 2017). But this study shows that we lack a middle ground ('surely there's a happy medium that keeps us safe?'; Isobel, 67). Selke notes the benefits of self-tracking and lifelogging – based on a 'scenario of a *total overview and alertness* […] on which every retrievable information about one's own life and lifestyle appear highly useful' (emphasis in original, 2016: 2). This

language is consistent with that of the participants, who described 'making sacrifices' and 'moments of crisis' that were resolved, or at least tempered, by interacting with mHealth technology. Other prominent examples include a general experience of feeling dispirited ('I'm miserable when I can't run, I might as well just give up […] throw away my new toys'; Peter, 39); injuries preventing training; ill health; and annoyance, even anger, when the technology malfunctioned. Peter's experience is distinct in that he conceives of mHealth technologies and personal data as 'things': external to the individual, but intimately personal as a locus of interests and identifiable information ('they know all about me'). Recalling Barta and Neff's observation of self-quantification 'assets' (2016: 7), the commodification of health and fitness is in evidence here: fitness is assessed on the basis of synergy with wearable and app, and the individual is required to perform on the basis of recommendations marketed through their tech data. Talk of privacy came through most strongly in the final set of interviews, raising an interesting perspective on the defining characteristics of digital health technologies concerning the ability to mark clearly (and usefulness of doing so) where the data ends and the individual starts.

VII.   Conclusion

Sociological analyses often view the influence of wearables and mHealth from the perspective of technological culture, as an individualised experience within private spheres of people's knowledge and actions. This gives a compartmentalised picture of individuals' habits, and misrepresents the impact of mHealth technologies in opening up communities of knowledge and opportunities for health consumers to make significant lifestyle changes. Long-term wearable and app use allowed this study's participants to construct alternative framings of personal health. While the participants under study form an elite group, the point of emphasis is the gradual realisation of changes to their

behaviour and choices and their self-classification of health. A criticism of focusing on such an elite is that these individuals have time and resources to invest in their health. For those without such opportunities, might the mHealth-gaze take different forms, entail different experiences of digital health-tracking? In short, could class be related to a sense of (dis)empowerment? This represents a significant area requiring further research.

Equally, the changes to health and fitness indicated by the particular group studied here may not apply to those who resist or have no interest in using technologies to track health. We should view the group as among the first to adopt mHealth actions and make significant personal changes as a result of the long-term and daily use of wearables and apps. The tone in interviews frequently indicated devotion to sustaining good habits. But alongside positive outcomes, the seemingly innocuous example of George's ability to get cheaper life insurance using app data highlights a more disturbing result of the commercial licensing of mHealth data. The mHealth-gaze is complicit here, intimately – literally, worn on the body – embedded in participants' daily life.

In summary, the major recommendation from this study is the need to formalise an alliance between the commercial operators of mHealth technology and the gatekeepers of personal health data standardised by public bodies such as the NHS as well as commercial health operatives. Participants' use of mHealth technology had a significant impact on behavioural change that was also integral to healthcare processes in terms of diagnosis and self-care. A much greater level of transparency is required to draw together thus-far disparate health data and enable trust in the operators and networks that have access to this information. Finally, the benefit of incorporating commercial mHealth apps and wearable technology into fitness routines must be understood by setting traditional interventions against the health promotion methods that define users' data

outcomes. Together, these consequences should supply the building blocks for a change in focus on personally identifiable digital health data as a new direction for understanding health and illness and the embodied subjectivity linked to technologies.

References

Ajana, B. (2012) Biometric citizenship. *Citizenship Studies*, 16, 7, 851–870.

Ajana, B. (2017) Digital health and the biopolitics of the Quantified Self. *Digital Health*, 3, 1–18.

Allen-Collinson, J. (2011) Feminist phenomenology and the woman in the running body. *Sport, Ethics and Philosophy*, 5, 3, 297–313.

Barnfield, A. (2016) Grasping physical exercise through recreational running and non-representational theory: a case study from Sofia, Bulgaria. *Sociology of Health & Illness*, 38, 7, 1121–1136.

Barta, K. and Neff, G. (2016) Technologies for sharing: lessons from Quantified Self about the political economy of platforms. *Information, Communication & Society*, 19, 4, 518–531.

Beer, D. (2016) *Metric Power*. London: Palgrave Macmillan.

Beer, D. (2018) Envisioning the power of data analytics. *Information, Communication & Society*, 21, 3, 465–479.

Bilić, P. (2016) Search algorithms, hidden labour and information control. *Big Data & Society*, *3,* 1, 1–9.

Crawford, K., Lingel, J. and Karppi, T. (2015) Our metrics, ourselves: a hundred years of self-tracking from the weight scale to the wrist wearable device. *European Journal of Cultural Studies*, 18, 4–5, 479–496.

Depper, A. and Howe, P.D. (2017) Are we fit yet? English adolescent girls' experiences of health and fitness apps. *Health Sociology Review*, 26, 1, 98–112.

Dewey, J. (2002 [1922]) *Human Nature and Conduct*. New York: Perigee.

Eysenbach, G. (2000) Recent advances: consumer health informatics. *British Medical Journal*, 320, 7251, 1713–1716.

Featherstone, M. (1982) The body in consumer culture. *Theory, Culture & Society*, 1, 2, 18–33.

Fiore-Garland, B. and Neff, G. (2016) Disruption and the political economy of biosensor data. In Kragh-Furbo, M., Mackenzie, A., Mort, M., Roberts, C., Sherman, J., Day, S., Lury, C., Wolf, G., Nissenbaum, H., Patterson, H. and Fiore-Gartland, B. (eds) *Quantified: Biosensing Technologies in Everyday Life*. Cambridge, MA: MIT Press. pp. 118–122.

Fotopoulou, A. and O'Riordan, K. (2017) Training to self-care: fitness tracking, biopedagogy and the healthy consumer. *Health Sociology Review*, 26, 1, 54–68.

Foucault, M. (1980) Body/power and truth and power. In *Michel Foucault: Power/Knowledge*. New York: Pantheon Books. pp. 55–62.

Foucault, M. (1982) The subject and power. *Critical Inquiry*, 8, 4, 777–795.

Foucault, M. (1988) Technologies of the self. In *Technologies of the Self: A Seminar with Michel Foucault*. Amherst: University of Massachusetts Press. pp. 16–49.

Foucault, M. (2012 [1979]) *Discipline and Punish: The Birth of the Prison*. New York: Knopf Doubleday.

Fox, N.J. (1993) *Postmodernism, Sociology and Health*. Toronto: University of Toronto Press.

Freeman, B., Kelly, B., Baur, L., Chapman, K., Chapman, S., Gill, T. and King, L. (2014) Digital junk: food and beverage marketing on Facebook. *American Journal of Public Health*, 104, 12, e56–64.

Grace, V.M. (1991) The marketing of empowerment and the construction of the health consumer: a critique of health promotion. *International Journal of Health Services*, 21, 2, 329–43.

Grand View Research (GVR) (2017) mHealth app market by type (fitness, lifestyle management, nutrition & diet, women's health, healthcare providers, disease management) and segment forecasts, 2018–2025. August.

www.grandviewresearch.com/industry-analysis/mhealth-app-market (accessed 20 July 2018).

Hanold, M.T. (2010) Beyond the marathon: (de)construction of female ultrarunning bodies. *Sociology of Sport Journal*, 27, 2, 160–177.

Hardey, M. (1999) Doctor in the house: the Internet as a source of lay health knowledge and the challenge to expertise. *Sociology of Health & Illness*, 21, 6, 820–835.

Hardey, M. (2001) 'E-health': the internet and the transformation of patients into consumers and producers of health knowledge. *Information, Communication & Society*, 4, 3, 388–405.

Hardey, M. (2010) Consuming professions: user-review websites and health services. *Journal of Consumer Culture*, 10, 1, 129–149.

Harting, J., Peters, D., Grêaux, K., van Assema, P., Verweij, S., Stronks, K. and Klijn, E.H. (2017) Implementing multiple intervention strategies in Dutch public health-related policy networks. *Health Promotion International*, online ahead of print, 13 October.

Hitchings, R. (2012) People can talk about their practices. *Area*, 44, 1, 61–67.

Hitchings, R. and Latham, A. (2017) Exercise and environment: new qualitative work to link popular practice and public health. *Health & Place*, 46, 300–306.

Hofstra, B. and de Schipper, N.C. (2018) Predicting ethnicity with first names in online social media networks. *Big Data & Society*, *5*, 1, 1–14.

Jong, S.T. and Drummond, M.J. (2016) Exploring online fitness culture and young females. *Leisure Studies*, 35, 6, 758–770.

Kennedy, H. and Moss, G. (2015) Known or knowing publics? Social media data mining and the question of public agency. *Big Data & Society*, *2,* 2, 1–11.

Krebs, P. and Duncan, D.T. (2015) Health app use among US mobile phone owners: a national survey. *Journal of Medical Internet Research: mHealth and uHealth*, 3, 4, e101.

Levy, S. J. (1981) Interpreting consumer mythology: a structural approach to consumer behavior. *The Journal of Marketing*, 45, 3, 49–61.

Lupton, D. (2014) Health promotion in the digital era: a critical commentary. *Health Promotion International*, 30, 1, 174–183.

Lupton, D. (2018) 'I just want it to be done, done, done!' Food tracking apps, affects, and agential capacities. *Multimodal Technologies and Interaction*, 2, 2, 29.

Lupton, D. and Jutel, A. (2015) 'It's like having a physician in your pocket!' A critical analysis of self-diagnosis smartphone apps. *Social Science & Medicine*, 133, 128–135.

Lyon, D. (2017) Surveillance culture: engagement, exposure, and ethics in digital modernity. *International Journal of Communication*, 11, pp. 824–842.

Manika, D. and Gregory-Smith, D. (2017) Health marketing communications: an integrated conceptual framework of key determinants of health behaviour across the stages of change. *Journal of Marketing Communications*, 23, 1, 22–72.

Neff, G. and Nafus, D. (2016) *Self-Tracking*. Cambridge, MA: MIT Press.

Nettleton, S. (2004) The emergence of e-scaped medicine? *Sociology*, 38, 661–679.

Nettleton, S. and Green, J. (2014) Thinking about changing mobility practices: how a social practice approach can help. *Sociology of Health & Illness*, 36, 2, 239–251.

Pantzar, M. and Ruckenstein, M. (2015) The heart of everyday analytics: emotional, material and practical extensions in self-tracking market. *Consumption Markets & Culture*, 18, 1, 92–109.

Rich, E. and Miah, A. (2014) Understanding digital health as public pedagogy: a critical framework. *Societies*, 4, 296–315.

Rissel, C. (1994) Empowerment: the holy grail of health promotion? *Health Promotion International*, 9, 1, 39–47.

Ritzer, G. and Jurgenson, N. (2010) Production, consumption, prosumption: the nature of capitalism in the age of the digital 'prosumer'. *Journal of Consumer Culture*, 10, 1, 13–36.

Rose, N. (2007) Molecular biopolitics, somatic ethics and the spirit of biocapital. *Social Theory & Health*, 5, 1, 3–29.

Sanders, R. (2017) Self-tracking in the digital era: biopower, patriarchy, and the new biometric body projects. *Body & Society*, 23, 1, 36–63.

Selke, S. (ed.) (2016) *Lifelogging: Digital Self-Tracking and Lifelogging – Between Disruptive Technology and Cultural Transformation*. Wiesbaden: Springer VS.

Sharon, T. (2017) Self-tracking for health and the quantified self: re-articulating autonomy, solidarity, and authenticity in an age of personalized healthcare. *Philosophy & Technology*, 30, 1, 93–121.

Shilling, C. (1991) Educating the body: physical capital and the production of social inequalities. *Sociology*, 25, 4, 653–672.

Shilling, C. (2008) *Changing Bodies: Habit, Crisis and Creativity*. London: SAGE Publications.

Shilling, C. and Bunsell, T. (2014) From iron maiden to superwoman: the stochastic art of self-transformation and the deviant female sporting body. *Qualitative Research in Sport, Exercise and Health*, 6, 4, 478–498.

Shipway, R. and Holloway, I. (2016) Health and the running body: notes from an ethnography. *International Review for the Sociology of Sport*, 51, 1, 78–96.

Vertinsky, P.A. and Bale, J. (eds) (2004) *Sites of Sport: Space, Place, Experience*. London and New York: Psychology Press, Routledge.

Wright, J. (2009) Biopower, biopedagogies and the obesity epidemic. In J. Wright and V. Harwood (eds) *Biopolitics and the 'Obesity Epidemic': Governing Bodies*. New York: Routledge. pp. 1–14.

Wyatt, S., Henwood, F., Hart, A. and Smith, J. (2005) The digital divide, health

information and everyday life. *New Media & Society*, 7, 2, 199–218.