

Tracking towards care

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Tracking Towards Care: relational affordances of self-tracking in gym culture

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Abstract:

In the past few years, self-tracking technologies have been celebrated for the possibilities they offer to “optimize” fitness and wellbeing, yet also criticized for being rigid and isolating. In this article we identify complex tracking arrangements that consist of a variety of data and multiple modalities of tracking emplaced within arrangements of actors and objects (digital/ analog tracking devices and data output). We inquire into how these arrangements afford care. Based on our ethnographic research of gym culture in Denmark, we find that individuals make the technologies “work” for them in ways that shield them from bodily or emotional distress. Fitness practitioners combine digital tracking technologies with analog methods and enroll other human actors in recording, interpreting, questioning, and tinkering with their data; in other words, they perform data work in ways that mend or prevent ruptures and brokenness and thus afford “care.” We highlight the role of the personal trainer, who often complements or salvages the outputs of digital technologies. We argue that tracking has the capacity to afford care and wellness when it is emplaced within socialities and when actors are able to exercise their capacities and knowledge in ways that mitigate the data outputs.

Introduction

Technologies that track the minute details of one's bodily functions and activities are increasingly implicated in the move to make healthcare digital and data-driven in several national contexts (Bossen et al. 2019; Crosby and Bonnington 2020; Henwood and Marent 2019; Lupton 2014a; Pols 2012). These encourage the adoption of healthy and preventative lifestyle practices such as good nutrition and exercise, accompanying the "biomedicalization" of everyday activities (Carter et al. 2018). An incisive critique of this development is that wellness and care have increasingly become domains of individual responsibility, governed by strict and impersonal disciplinary norms, thus hindering rather than fulfilling its promise to optimize well-being (Crosby and Bonnington 2020; Henwood and Marent 2019; Sanders 2017). Yet an emergent literature examines pushbacks against this individualistic responsabilization, noting that users of tracking technologies arrange and embed themselves into human-nonhuman socialities (Schwennesen 2019) and tinker with their technological devices. There are multifarious ways of "domesticating" (Langstrup 2013) technologies that allow users to "co-evolve" (Kristensen and Ruckenstein 2018), not only on a one-on-one basis with devices and data outputs; but by eliciting the assistance and interpretive capabilities of other human actors, including family members (Will et al. 2020) and healthcare professionals (Bossen et al 2019). We thus ask: how and when do human-technology arrangements *work* in ways that perform care?

Rather than taking a dyadic view of an isolated human "subject" and technological "object", we approach technologies as enabling "purposeful action and intentionality" (Latour 1992: 192) within collective lives (Latour 1992; Schwennesen 2019). In line with recent approaches that investigate care and caring relations critically and in situ (e.g., Mol 2008; Mol et al. 2010; Will et al 2020) we devise a conceptual framework which accommodates different arrangements of humans and non-humans that are complicit in the care work of mending and avoiding "brokenness" (Jackson 2013; Pink et al 2018). We attend to the relational affordances, that is, the possibilities of action and interpretation (Gibson 1979), that emerge through the interactions of multiple actors in human-non-human arrangements, in enabling care through tracking and the ensuing collective "data work" (Bossen et al. 2019) of sense-making, analyzing, and making decisions based on data outputs.

In this article, we draw on an ethnographic study of fitness culture in Denmark. Our findings show that many gym-goers harness data through digital and analog self-tracking methods and technologies to

attain their fitness and body goals, and engage in data work to prevent various forms of “brokenness” that potentially arise, especially when these goals are hindered. Findings also show that the users attain a sense of wellbeing about their bodies and their performances when tracking does not take place within a dyadic relationship between the user and the device, but rather feeds into a sociality of data work, which we find comprises the overlapping practices of documenting, steering, questioning and tinkering.

A shift towards care

Scholars have examined how data functions as a digital compass in constituting consumers as responsible subjects who can assess how their everyday activities accumulate to affect their health (Fotopolou & O’Riordan 2016; Schüll 2016). Tracking entails relieving oneself of the burden of making the right choices in pursuing “optimization”, by delegating decisions related to nutrition and sports activities, for example, to the calculative capacities of the tracking technologies, which in turn may subject the user to surveillance (Sanders 2017) or relegate them to a less reflexive state (Schüll 2016). Research on everyday experiences of self-tracking provides nuance to these arguments of responsabilization and delegation, recognizing a more agentic and willful “ethico-psychological” (Pols et al. 2019) subjectivity, which is activated by the personalized, experimental, and embodied ways in which humans use their devices and produce, interpret, repair, and communicate with data (Gorm and Shklovski 2019; Lomborg et al 2018; Mopas and Huybregts 2020; Pink et al. 2017; Pink et al. 2018; Weiner et al. 2020; Will et al. 2020). These studies urge us to move beyond the argument that an algorithm or a technology has definitive agential capacities, or that responsibility for one’s pursuit of health and care is dumped upon the technology; allowing for a distributive conceptualization of responsibility (Latour 2005) and care (Mol 2008), both emerging relationally, within infrastructures or arrangements consisting of technologies and human actors (Barad 2007; Lupton 2019; Schwennesen 2019; Will et al. 2020).

Isolation, normative surveillance, and the limitation of reflexivity are problems that some studies point out - in the context of, for example, mental health apps (Crosby and Bonnington 2020) and daily activity tracking (Sanders 2017). Yet, in other contexts, tracking devices and ensuing interpretative and corrective data work (Bossen et al. 2019; Piras and Miele 2017) are embedded in socialities involving professionals and family members (e.g., blood pressure tracking studied by Weiner and Will 2018; Will et al. 2020). When professionals are readily available to aid the

interpretation of data, and to provide “repair work” on the algorithms and outputs of digital devices (Schwennesen 2019; Wienroth et al. 2020), the devices seem to be able to fulfill more of their therapeutic promises; they ease the burden on the healthcare professionals by distributing some of the healthcare work to technological devices that are emplaced in socio-technical arrangements of care (Schwennesen 2019; Wienroth et al. 2020). Patients also engage in interventions that were not intended by the designers of the technologies, or by healthcare professionals, in ways that reconfigure their therapeutic process and relationships (Piras and Miele 2017). We thus discern that it is the enrollment of multiple human and non-human actors into “care teams” (Piras and Miele 2017) performing data work (Bossen et al. 2019), that make the data usable and *useful* (Bossen et al 2019; Pink et al. 2018).

The self-tracking literature often situates care within efforts to co-interpret (Weiner and Will 2018; Will et al. 2020) and “fix” (Schwennesen 2019) data produced by technologies, especially in clinical settings. We discern that this is aligned with a conceptualization of care that is aimed at mending – or preventing – brokenness (Tronto 1993). By tinkering with (Mol et al. 2010) their tracking data, human actor-users are, in effect, colluding with technologies in fostering their well-being. We also note that caring arrangements and interventions offer and support wellness, in fitness contexts outside of those prescribed by medical professionals or pushed by institutionalized healthcare, but chosen by individuals from a marketplace of fitness and training offerings, and wherein multiple actors, technologies, and types of data are emplaced. We develop a framework that is attuned to the particularities of how tracking is arranged, performed, and personalized in multifarious settings, in ways that elicit the care-giving capacities of multiple actors, and that *afford and distribute* care in situ.

To theorize this care-giving capacity of tracking, we find it useful to draw Gibson’s (1979) concept of affordances, which has been applied to examine the possibilities, permits, and prescriptions (Bloomfield et al 2010) that a technology enables. The affordances of technologies are plural, malleable, and contestable (Michael 2000); they enable and shape how actions are performed (Kiran 2015). We note that as humans become attuned to the directionality that is scripted (e.g., algorithmically) into a technology, a “reflexive intentionality” (Rosenberger and Verbeek 2015, p. 22) may arise, where the technology allows for a more reflexive experience of and relationship to the bodily self. In literature on sporting bodies, we see evidence that tracking in a social manner

enhances the individuals' sensing capacities, allowing finer attunement to one's own body as well as enabling an attention to the performances of others (e.g., Hockey 2006 in the context of long-distance running). What is less understood is how analog and digital data work enable, in complementary manners, not only self-knowledge through enhanced sensing and reflexivity, but also an ability to perform as well as receive caring interventions. We expand existing perspectives, to understand how the enabling capacities of analog and digital technologies emerge in relational social settings, and consequently how this relationality enables the user to perceive, question, and tinker with the technologies, in ways that activate the caring capacities of human actors and technologies.

What then are the action capacities and reflexive possibilities that emerge in the usage of tracking technologies in social fitness spaces? First, all tracking practices allow the storage, access, and sharing of data. Digital trackers, by way of their algorithmic affordances, offer built-in visualizations and displays of biometric data, and some devices suggest particular courses of action. Analog tracking, on the other hand, allows the manual recording and visualization of data in ways that the user chooses, and relies more on the user's bodily sensing capacities (Mopas and Huybregts 2020). Beyond the algorithms and materiality, however, we discern the need to scrutinize the affordances of tracking as emergent within in its lived contexts - especially the gym - where "action possibilities" are negotiated within relations between and amongst human and non-human actors (Bloomfield et al. 2010; Michael 2000), and to investigate how this arrangement of actors can complement each other, in bringing forth their capacities to offer and receive care.

Method and analytical focus

We conducted an ethnographic study of self-tracking among fitness users and personal trainers in Denmark, a context characterized by an increased push by the state towards the digitalization and electronic mediation of healthcare and other governmental sectors, and where digital technologies and app usage are prevalent in households (Gorm and Shklovski 2019). We recruited 30 individuals for interviews, through purposive sampling at gyms. Of these were 25 gym-goers, 11 women and 14 men, aged 24-57. The other 5 were personal trainers, all men aged 25-40. All participants were of middle-class Danish background, and exercised 3 to 7 times a week at a gym. Interviews lasting between 1-2 hours were accompanied by the autoethnographic participation of authors one and three, as well as a field assistant, and were subsequently transcribed and coded (Miles, Huberman &

Saldaña 2014) using NVIVO, to search for logics and mechanisms in engagements with data. Author two took a non-participant researcher role and monitored the authorial team's analytic distance to the field.

Authors one and three observed the usage of a multitude of tracking devices: wearables (e.g., Fitbits, Apple watches, Garmin watches), devices (e.g., heartrate belts, cycle computers, body-scan machines), apps (e.g., Endomondo, MyFitnessPal), Excel or OneNote on smartphones, and paper notebooks. These authors also employed autoethnographic methods; using tracking devices, working with a trainer on a regular basis, and engaging in social interactions during fitness sessions. These participant observations revealed a distinction between two types of self-tracking: digital tracking, which provides users with an interface to collect data and offer algorithmic interpretations; and analog tracking, wherein users generate their own schemes for data collection and sense-making. Observations at the gym also made us realize that self-tracking can alternate between private, as it is undertaken for personal reasons; pushed, as it can be encouraged by and involves feedback from other actors (e.g. personal trainers and peers); and at times also communal, as data is shared with others (Lupton 2014b). These themes and relations were further pursued in the interviews.

Our analytical design focused on identifying how tracking technologies mediated perceptions, action, and experiences (Verbeek 2011) of fitness, noticing the feedback loops provided not only by the data, but also by the coaches and peers. We discerned that the mixing of humans and technologies has the potential to "afford" and complement each other, and we identify in our data highly personalized and intimate care arrangements that develop in the context of gym culture through these multi-actor arrangements of human and non-human, digital and analog elements. We identify four emergent practices that we refer to as data work: documenting, steering, tinkering, and questioning that are structured in relation to how users, as well as other human actors, engage with self-tracking. Next, we demonstrate how these four practices bring forth the caring capacities within human-nonhuman, analog-digital arrangements.

Documenting progress in a context of sociality

All participants share the desire to record and document training regimens and their outputs, and report rationales such as wishing to access and monitor their "progress," and the "quality of their

training.” Documentation, in its capacities to record, visualize, and track progress, is itself seen as rewarding, as participants using digital technologies tend to regard numbers and metrics as objective representations of their progress. Checking data after each workout, considering the amount of training, and comparing with earlier workouts to see the increase in intensity, generates an enabling and motivating effect.

Lone, for example, uses a body scan machine at her fitness center, a device measuring the percentage of fat and muscle along with her weight, which is also synchronized with an app on her smartphone. She recounts, “While focusing on getting stronger, something that has really motivated me is the use of apps. I could see when I looked at my body scan that my muscle mass had increased ... I could see my maximum lift. This is top motivation.” Lone finds that the visualization of her physical activities make her feel motivated and “very strong, both physically and psychologically,” and thereby links embodied and datafied sensemaking. Nadja, who lifts weights and keeps track of her daily training and personal records, also expresses a fascination with the “cool graphs” her app makes, and her ability to calculate percentages and compare her performance across time. Seeing these visualizations entails a “micro event” (Schüll 2016) for these participants: a structure of reward that facilitates a heightened sense of accomplishment (Pink et al 2017), which in turn “hooks” them and keeps them in the “flow” (Lomborg et al. 2018) of using the app or device.

Many users combine digital tracking with analog tracking using excel sheets and notebooks. In these cases, the user decides which numbers and metrics to document, as well as the times and means of collecting data. Analog tracking does not have the same capacity to produce visual feedback loops as digital tracking but it affords flexibility and greater room for personalization. Nadja complements her app with a paper notebook, in which she focuses on numbers and finer details, rather than curves and graphs.

I started out by writing down my activities, my times, number of repetitions, my weight, but gradually I developed it. ... Now, for instance, I can see that we performed a power snatch on Saturday and there I can see if I forgot about my elbows, or if I performed a technically poor lift because I was too fast with my elbows. So it reminds me of what to pay attention to.

Like Nadja, Mikael enjoys the flexibility and personalization that the notebook affords, taking notes and scrolling through the pages even while training; he draws motivation from seeing that “at the time, I only squatted 115, now I have increased that by 40 kilos.”

The notebook allows the users to be thicker in their qualitative descriptions of their workouts, and provides a contextual history to their training. Scrolling through past records, reliving those moments, and reintegrating lessons from the past into future training are affordances for bettering one’s fitness work that draw upon the notebooks’ material properties. Some also make personal diary entries and drawings of exercises and bodily postures. Those who use analog tracking find that it offers stability as apps may break down and, if they are switched, one’s full training history can be lost. Some also report changing what, how, and when they record over time, which indicates the notebook’s flexibility to develop and fine-tune data collection in line with the user’s developing fitness acumen and knowledge.

These analog tracking practices also enable a corrective to initial bodily sensations, allowing for an interaction between discursive (that is, language and data based) and embodied (that is, more sense-based) modes of self-reflexivity (Pagis 2009) regarding the success or failure of a training session. This is the case with Ditte, who uses a notebook to keep track of her weight-lifting and CrossFit exercise.

Sometimes I leave [the fitness center] with the feeling that I had a shitty training, then a month later I go back [and look at my notebook] and think, maybe it wasn’t that bad, that last time I performed this exercise – back then I lifted ten times. ... and now, for example, I can lift the same weight fifteen times.

In both digital and analog tracking the possibility of communication and sharing plays a crucial role in motivation. Different types of tracking afford different lines of communication, collective sense-making, and interpretation with both peers and trainers. Communication with the personal trainer enhances the sense of accomplishment materialized by the technologies. Lone uses digital self-tracking through an app provided by her fitness center, which communicates her progress to her trainer. She, like other users, relies on her relationship with him, and his willingness to look at her

records, to counterbalance any demotivating and disappointing numbers, and to prevent her from dropping out. Ditte, on the other hand, finds that the apps she tried did not offer her the flexibility to integrate instructions from and communicate with her trainer; rather, she prefers analog tracking with a notebook which her trainer checks to see whether he needs to adjust her training in order to comply with her goals. She combines her analog data with video recordings, and uses this combination, in her words, to “optimize” her training.

Posting on social media is another way trackers create a sense of sharable accomplishment. Lone shares her progress on Facebook and Instagram, which gives her a sense of having “witnesses” to her efforts in the gym. Nadja supplements her data with videos that allow her to observe developments in her technique and posts these on Instagram. She can see that in her lifting she has “become much more stable” within a year of her initial posts, which affords feelings of accomplishment and pleasure that she shares with others. Although users regard their notebooks as personal, we observed that they left them openly around the gym and looked at each others’. This enables a physical co-presence and mutual engagement with each other’s data (Weiner et al 2020), and anchors training in a social community that offers encouragement from peers supported by expert knowledge from the trainers. In other words, the non-human objects (notebooks) enable the capacities of humans (such as trainers) to perform caring interventions. This aligns with Weiner and Will’s (2018) findings on the importance of the physical properties of tracking devices – such as the small, portable blood pressure device – which accommodates communication and shared acts of interpretation, also by allowing it to be placed on surfaces that are appropriate for shared or collective tracking and interpretation (Will et al. 2020).



Figure 1: Notebooks laid out for collective viewing

The data work of documentation, performed by an arrangement of trainee, peer(s), personal trainer, and tracking technologies (both analog and/or digital) serves to demonstrate and share progress, which enables a sense of accomplishment, which then loops back into a motivation to keep working out and continuing to track progress. Analog technologies afford flexible and personalized modalities of recording and communicating, and facilitate sociality and solidarity – particularly in the gym space, between peers and between the trainer and trainee – while digital technologies offer visualizations and built-in competences for interpretation, which can also be shared and interpreted collectively. Documentation thus allows fitness trainees to feel embedded in an atmosphere of care, which is afforded by an arrangement of human and non-human actors that work together in tandem, providing depth and meaning to the data documented through self-tracking practices. The personal trainer often plays a crucial role in enabling motivation, while counterbalancing possible harmful effects.

Steering and counterbalancing harm

Self-tracking offers different types of data as tools that enable the user to “steer” towards fitness and other health goals. With digital technologies, the algorithms and interface guide users to track their training in specific ways, frequently associated with a program based on metrics. The responsibility as well as the capacities to steer towards one’s goals are then distributed in a way that includes the device. Lotte, for instance, does cardio training to regulate her weight, using a watch that measures steps and calories:

I need to know how many calories I have burned to know when I have reached my goal. ... Right now I have to burn 333 calories each workout. I do cardio 4 times a week. I look at the app to know when I have reached my goal and then I stop.

Lotte steers herself with a “program” – a flow of exercises – that sets the agenda for her daily training. Such programs, as well as attainable goals, are often set in collaboration with a personal trainer. Lotte feels responsible towards her trainer - he’s a “whip” who motivates her. The trainer’s involvement also allows her to experience the gym as a “free zone,” a space to train without worrying about taking full responsibility for workout choices, as they are dictated by the program. Documenting and steering are often entwined: documentation affords the metrics that then facilitate – even automate – further decision-making regarding fitness regimens. Poul uses an app to document his speed and progress when he is cycling, and argues that the metrics provide the objective evidence he needs to continue his regimen, even when it “feels” like he has not made enough progress - thereby allowing datafied sensemaking to provide a corrective to his bodily experience.

Analog documentation can also enable steering. The notebook has the capacity to capture one’s detailed training history, as noted by Mikael, who consults previous repetitions, kilos, exercises, and bodily sensations, to program and “optimize” his training:

I would never be able to recall it all if I had not noted it down [scrolling in the book]. Here I have noted if I have been weight lifting and had a sore shoulder; well, then I align closer to the body. You can also notice the recurrence of an earlier problem, so I can go back and ask, “Well what did I do?” ... It may well be that an old bad habit has reemerged.

In the use of a notebook, the work of steering is dependent on the humans' capacity to interpret the information recorded. To Mikael, the use of the notebook plays a pivotal role as it enables a flexible collection of personal goals, observations of numbers and achievements, physical exercises, and bodily infirmities, which allows comparison between the recorded variables and broader tracking of bodily and mental states. His sense of self-improvement is based on this personalized, rather than standardized, understanding and his practice of self-tracking has definitely, as he phrases it "optimized his wellbeing." The notebook allows him to perform what Weiner et al. (2020) call "discerning work," which in turn affords a motivated emotional state; as he observes, "It makes me feel proud and happy when I can say 'I have set these goals. Now I want to increase my weight, I want to try these weights, can I do it?' I build up and see where I can maximize."

Steering evolves in the self-caring relationship that emerges between Mikael and his use of the notebook, a human-object assemblage. In many cases, peers and trainers are also called to add their interpretive capacities and help shape the steering of a fitness program. The different types of technologies complement each other in enabling the user to derive care. The steering mechanism of using a feedback loop for motivation, however, can also easily become demotivating when the numbers go "the wrong way", followed by states of frustration and powerlessness, or an unhealthy obsession with numbers, which sometimes leads to users quitting their tracking practices. Torben, for example, qualifies his relations with apps as "bad". As he describes, "I was once obsessed with counting every calorie and every gram of protein, even if it didn't matter in the long run. ... It became a burden to write everything down, so I agreed with myself that I would stop doing it."

The personal trainers become particularly prominent when they are called upon to mitigate the possible negative effects of the metrics and perform caring data work. Their expert knowledge provides an intervention that makes the metrics and feedback loops usable, echoing findings in the literature related to healthcare professionals' "repairing" self-tracking data and making the algorithms "work" (e.g., Schwennesen 2019) for the users. This is exemplified by trainer Søren, who notes that many users buy various apps in the hope that one might "steer [them] to a better lifestyle," which may result in disappointment. He says, "I use [apps] with clients, but I am there as well, to hold their hands. They might be alone for a month, but I am still there to look over their shoulder, by looking at their data, or by saying, 'Hey, what's the matter now?'" Søren thus performs

care by complementing the functioning of the app, and asking about his clients' well-being – which his clients appreciate, with one client referring to him as her “security blanket.”

In these examples we see that data work involves different types of self-tracking technologies and human actors in leading to the organization and optimization of care. Marie has a fitness routine that consists of the hybrid use of digital and analog self-tracking technologies, peers, and her partner. She tracks and monitors her food intake and training in a spreadsheet, which she then shares weekly with her personal trainer. She also uses an app provided by her fitness center, which awards her a trophy when she trains continually. Marie easily gets demotivated when she checks the numbers and discovers she has not lost as much weight as she had planned, so she counterbalances possible negative effects by delegating some of her steering to her trainer.

[My trainer] assesses [my data] weekly and gives me feedback; he looks at my plan and might [prescribe changes]. He checks whether my weight has increased, and where my pitfalls are. If I write I eat a cheeseburger every Wednesday, he says, “Okay, we need to make room for that,” so that I can eat that. ... He evaluates whether I should go full speed with training, or whether we need to increase my intake of protein or carbs.

This arrangement of technologies and human actors affords personalized care by steering Marie's work-out and food regimens. The trainer provides intimate care by performing an “agentic cut” (Barad 2007; Schwennesen 2019): adjusting her data to other variables in her life, allowing her some space to go “off script” with her diet, and counterbalancing her demotivation when the numbers “go wrong” or when Marie interprets them incorrectly. The data work of the trainer prevents Marie's steering from becoming too extreme and counterbalances the rigidity of the numbers.

Questioning: disruptions that call for care

When the output provided by graphs and visualization do not correspond to users' knowledge, felt experience, or deviation from standards, a possible outcome is that the user asserts agency by questioning the precision and functioning of the technology. Jesper questions the calculative capacities of the treadmill, which he thinks is not capable of accounting for the messy reality of bodily differences. “The problem with [the treadmill] and tracking calories,” he says, “is that it is

really imprecise. A treadmill does not take into consideration how heavy you are, whether you are male or female or your age. Combustion can also vary, even within two different individuals with the same body composition.”

Apps can also disrupt the care arrangement by creating noise, sometimes in the literal sense by sending notifications, but also due to the way they may make the fitness experience sour and restrictive by demonstrating that the user has not achieved her/his intended outcomes. Ditte observes,

I think [the body trackers] induce bad feelings. ... I heard some female CrossFitters one day, and CrossFit is a strenuous activity ... they sit down after having entered the body tracker, and say, “I haven’t lost weight and my fat percentage is the same and I have been training for three months.” Moments before, they had been happy about the training session they had just completed. ... I kept thinking, “Don’t go into the machine.”

A possible outcome of questioning is resistance towards self-tracking, especially digital practices. Ditte, for instance, rejects the body tracker and instead participates in a group called “Non-scale victories”, where they focus on how “you are getting stronger and you can lift heavier, ... you can do an exercise you haven’t done before”. Even though the feedback loop can offer motivation when it provides a positive visualization, Ditte chooses not to pursue it.

In other cases, the technology may fail to provide meaningful feedback loops, which may lead to questioning. Marie uses a pedometer, which, despite an accounting of everyday movement it provides (Carter et al. 2018), she takes with a grain of salt. “My son might play with it, dance or something – and then it counts too. Now while I’m sitting here it has counted 22 steps ... it also counts if you ride a bike. It says that I ran yesterday, which is not the case [laughs]. Now I can see that it stopped tracking for some reason.” She also observes that just by checking into the gym, her app registers her as having burned 350 calories. She moreover complains that the body scan at her fitness center is inaccurate, although observing that, if used on a regular basis, it provides a comparison point. She has learned that menstruating can also affect her scan due to fluid retention, so when she sends her data to her personal trainer, she adds this piece of information. She combines her own accumulated knowledge and bodily gaze with her trainers’ interpretive capacity to question

and make sense of the information provided by apps and machines, meaning that her care and fitness regimen emerges out of this questioning and recalibration process that involves herself, her body, her trainer, and the technologies. We see that, rather than relying solely on the pedometer or other tracking devices to orient her towards particular forms of activity (Carter et al. 2018); Marie combines socially and technologically mediated sensemaking with her bodily senses to interpret her performance (see also Lupton & Maslen 2018; Mopas & Huybregts 2020) and steer her activities. Her trainer also provides intimate care, and co-enables this hybrid form of sensing.

Lone, meanwhile, went through a period of failing to meet her weight-loss goals, and the app displayed a result that she could not interpret. For example, according to her app, Lone burned more calories than she ate. However, she was not losing weight as expected, which made her question the app:

Some numbers come out wrong. Perhaps I didn't log my food properly or it has counted too many calories, right? ... The only thing I could see was that my weight had not changed. But I could also see if the numbers from last week and this week were correct, the weight ought to have decreased. ... So, I cannot trust [the app]. Then why should I use [money and] energy on it if I cannot trust the numbers I get?

The affordances of the device are disrupted when the metrics and visual outputs fail to resonate with the user's experience. Instead of assisting in weight loss, the device detracts from the user's care regimen, instigating a non-trusting relationship between the user and the device. The trainer or other actors, in such situations, become crucial in their capacity to recognize and tame (Carter et al. 2018) the "unruliness" (Mol 2008) of both bodies and technologies, stepping in to mend this disruption of care. As Lone experiences, "the device is black and white ... It is different with a personal relationship. On bad days my trainer reminds me of my [past] successes; my app cannot do that." The trainer provides a reparative bridge in the device's gaps by offering interpretative and emotional support, filling a gap of care that the device is unable to perform. The trainer also reenables the user to continue with her regimen of fitness and tracking despite her distrust in the technology.

Some personal trainers share users' reservations towards and questioning of digital self-tracking, noting the restrictive and demotivating potentiality of these devices despite the intentions of health-attainment that are scripted into them. As Jens, a personal trainer says, "The numbers ... make people lose a sense of feeling hunger, people lose a sense of how they move. They have no idea whether they are relaxed or tense. We completely lose our connection with our own bodies." Jens advises his clients not to become too dependent on digital technologies, which he and other trainers see as rigid or insufficient, and encourages them to connect with their bodily feelings. This is sometimes based on their own experiences of brokenness, and their desire to protect clients from such encounters. For example, Torben, the personal trainer we referred to earlier, recounts that using a smart watch and an activity tracker for counting calories and developing a training program "got out of hand" when he did not manage to follow the program, and left him on the verge of an eating disorder.

I don't use [digital technologies] anymore, because what is displayed on the watch... should not be the measurement of whether I had a good training. That's also why I don't recommend it to my clients because they look at their watches afterwards, have I burned more calories than I did last time? Or close? And then they rely on this to determine whether they had a good workout or not. It is better to look inward and reflect on the workout.

For Torben and Jens, as well as some other participants, digital trackers fail to stabilize and become "domesticated" (Langstrup 2013; Carter et al. 2018). Some participants prefer to use only analog, which protects them from entering disruptive feedback loops or other distractions, as in the earlier example of Mikael, who enjoys the control and singularization of data that analog tracking affords. To Mikael as well as others, analog methods facilitate a more fine-tuned and personalized approach to collecting and interpreting data, as opposed to the apps that pose algorithmic constraints, and which require additional work or expertise to calibrate - a point we return to in the following section on tinkering. We interpret analog data collection as an inherent questioning of pre-set scripts and standards that may "take over" the steering of the health and body. While they echo the concerns about algorithms becoming authoritative, these findings indicate that the participants draw upon the affordances of analog technology to assist them in questioning or even rejecting the mode of governance that technologies may be pushing upon them. When steering becomes too authoritative,

data work allows them to elicit the affordances that are required to push back, often accompanied by a trainer or other actors in their capacity to intervene and mend this disruption of care.

Tinkering: Calibrating for Care

Our findings confer that humans are not unquestioning recipients of data, but they actively generate and make sense of data (Bossen et al. 2018; Pantzar and Ruckenstein 2017; Pink et al. 2017), which may lead them not only to question but also to implement small yet significant modifications in how they engage with their technologies and the other actors relevant to their fitness work - a practice we refer to as tinkering (Mol et al. 2010). Users often find ways to alter or appropriate (Wienroth et al 2020) the outputs from their tracking devices to personalize them for their bodies and “optimize” what the devices and data can do for them. This is sometimes accomplished with the aid of a personal trainer, who prescribes a course of action for the user, while other times users insert their own knowledge and expertise into the tinkering process. For example, Lone possesses knowledge that brings forth a capacity to recalibrate the machine’s output, which then allows her to continue to use it:

Fitbit measures the calories I burn based on a generalized algorithm. I have a dietary education, so I know how to make precise calculations. ... I entered a fictional weight to correct for my overweight [because] if you have a BMI over 30 then that number starts to skew.

The capacity of the device to offer weight management assistance is not solely dependent on the built-in algorithmic affordances, but rather emerges when Lone exerts her capacity to alter the calculations made by the algorithms. The algorithms are designed to “work” within the confines of certain body types, yet Lone’s data work allows her to elicit care and personalize her weight management. Lotte also uses metrics to steer her fitness agenda, but she tinkers with the documentation process so that she does not lose motivation:

I’m part of a project where I weigh myself at least twice a week and I find it really annoying. ... Sometimes you put on a kilo overnight, it’s just fluid but it’s hugely demotivating. ... So sometimes I cover the display to avoid seeing my weight. ... The app

still registers the weight, but it's not up front in my head [especially] on days where I have sinned.

Per tinkers with documentation, noting that measuring on different days at different times can give different results, and recommends taking measurements when the outputs are more favorable, such as Saturday morning before eating any food at all. Similarly, Anders uses his pedometer selectively, and to highlight his achievements and generate positive affect:

The only time I look at it is if I know that I have walked a lot in one day and am wondering how much I have actually walked. ... If I have walked home from here, walked back, walked to football, walked back, then I am up to 25,000 steps a day. It is like this moment of, "Wow, I walked 20 km today!"

Anders likes to compare his numbers with his girlfriend, who sometimes feels disinclined to share, especially when she feels she has not walked enough. Anders might then take her phone to check her step count and encourage her to walk more, inserting himself into her care arrangement in a way that is similar to the "caring practices" of couples who track and interpret readings together (Will et al 2020). In other cases, professional trainers provide guidance: Personal trainer Søren talks about how he "[walks] around the fitness center, like an ambassador," teaching people how their apps work, sometimes instructing them on how they should calibrate numbers they enter into their devices, or how they should modulate their breathing for better results.

In sum, users often do not experience technologies as objective tools, but approach them critically and appropriate or adapt them or, when they can, adapt their engagement with, and responses to, their data. By selectively using or tinkering with tracking technologies, participants reflexively engage with their emotions and bodily experiences, and employ the services of other actors - such as their trainers and partners - and objects (such as their notebooks) in order to optimize what the data and technologies can do for them. Tinkering is a way to assert oneself in their arrangement of care and make sure that the care process continues to "work." Even when devices seem to be failing, actors within the care assemblage, or complementary sources of data – as exemplified in the usage of analog technologies for detailed histories – might afford the capacities that make it

possible to personalize and salvage the tracking technologies as well as keep the users motivated to continue their fitness regimens.

Conclusion

Our study identifies four types of data work – documenting, steering, questioning, and tinkering – that allows fitness trackers to produce, make sense of, and act upon the data outputs of analog and digital self-tracking practices, that take place within an arrangement of human and non-human elements that involves, in addition to their digital devices, their personal trainers, fellow gym-goers, family members, social media contacts, and analog data. We find that tracking practices and data outputs “work” better when they are qualified through the interpretive and agentic capacities and caring interventions of other elements. Rather than merely “optimizing” performance to burn more calories, build more muscle, or lose weight quickly, the emergent relational affordances and the sociality of tracking and data serve to ensure that the fitness practitioners’ bodily and emotional well-being are not broken, while supporting the trackers in attaining their fitness/body goals. Our findings thus provide nuance to promotional claims by the self-tracking technology market regarding “optimization,” and also to critiques that construe the technologies as tools of individualistic, neoliberal self-governance, showing that making fitness, as well as tracking, work is often contingent upon one’s enrolment into a sociality of data work.

We find that digital technologies can enable and invite the user to document, control, and manage their performance, as in the case of the data practices we have termed documentation and steering, where responsibility is seemingly delegated to the self-tracking technology whose algorithms and interfaces allow the user to track in specific ways. However, the increased flexibility offered by the complementary affordances of analog technologies, such as hand-written records, diminishes steering, thus co-enabling care. Moreover, in the practice of questioning, we see the emergence of reflexive capacities, wherein users critically evaluate and question the technologies, doubt the visual outputs they provide, or reject the constraining qualities of visual outputs and numbers altogether. We argue that this self-reflexivity is supported by the usage of analog and digital tracking along with bodily sensing and social engagements. Closer attention to bodily senses is co-enabled by the caring interventions of other human actors - especially personal trainers - which in turn shield the user from harm. Users also demonstrate reflexivity and assert agency through

tinkering in which – capacitated by knowledge and supportive actors – they decide whether to rely on the devices for steering or find ways to use the technology in a personalized arrangement, thereby also allowing for finer connections and attunement with bodily feelings, and enabling care. Through tinkering with the numbers, the standards that are built into the technology are negotiated and remolded.

The trainers have an expansive role in these data-powered fitness arrangements: they engage with user-generated analog and digital data in designing workouts and nutritional regimens; and they exercise their capacity to perform the agentic cuts (Barad 2007) required to transform the fitness activities into an arrangement of care: by producing or correcting personalized knowledge and norms related to motion, exercise, and bodily metrics, they are able to calibrate fitness regimens in ways that shield gym-goers from bodily or emotional harm.

This entanglement of gym-goers, technologies and personal trainers resonates with previously identified aspects of clinical self-tracking (Bossen et al. 2019), especially in terms of the sociality of data work, and the trainer’s capacity to mitigate multiple and sometimes conflicting types of data. We notice that the trainer is a figure vested with authority who can allay concerns but also make prescriptions for exercise or nutrition, not unlike the role of a medical professional. We also note that, aligned with Piras and Miele’s (2017) findings, users make their fitness regimens work better by reconfiguring their tracking practices - which we would term as enrolling other actors’ interpretive capacities into their care arrangements. In both types of tracking, we discern that users exert agency and willfulness in reconfiguring care standards and practices (see also Schwennesen 2017). We extend these contributions, by showing how users’ reflexivity to exert agency within their care arrangements is derived not only by being “educated” (Piras and Miele 2017) about tracking, but also through cultivating trackers’ “reflexive intentionality” (Verbeek 2011) - a capacity to be aware of the directionality of, and question the devices, and to tune in to one’s bodily senses. This capacity emerges relationally, within an arrangement of human and non-human actors, and evolves constantly, allowing trackers to constantly elicit better care from their socio-technical arrangements. In the context of fitness training, the data work performed by trainers can also capacitate the cultivation of this reflexivity.

We also find noteworthy divergences between clinical and fitness tracking. Clinical tracking is explicitly prescribed, and concerned with producing data and monitoring metrics related to a particular medical issue or treatment. It often requires rigorous and continuous use, while the kind of fitness tracking we examine involves a market-mediated and volitionally enrolled arrangement of actors and practices, undertaken by individuals who work out with regularity but who may intermittently opt out of or change up their tracking practices to preserve their wellbeing. The devices, professional services, and other materialities facilitating the fitness regimen - such as the gym, specialized clothing, style of workout, and tracking devices - are all voluntarily chosen and purchased within a marketplace. While any of these elements may be “pushed” or influenced by various social and organizational actors, this push operates at a different register than medical prescription.

Self-initiated fitness-tracking often tries to tread a balance between institutionalized forms of health and sports knowledge, with bodily and aesthetic conventions prevalent in popular culture (Sassatelli 2010) - a balancing work that is often also mediated, in part, by trainers through their care work. We thus also note that the market-mediation of fitness and tracking does not necessarily inscribe trainers’ (or other actors’) practices solely within a marketplace “logic of choice” (Mol 2008). Our findings re-emphasize the importance of understanding care as emergent in situ, and also beyond the dichotomy of warm care - cold technologies (Pols 2012) with an understanding that humans and market-mediated technologies co-evolve (Kristensen and Ruckenstein 2019) while enrolled in (sometimes market-mediated) arrangements in ways that allow the tracking practice to afford care.

Identifying the capacities of human-non-human arrangements to offer care also brings to fore the challenges and limitations faced by digitalization efforts in numerous contexts, including healthcare. We see that even in a context where tracking is taken up volitionally, making the data “work” requires considerable labor and specialized knowledge. Care is not a sum total of the affordances and labors of the individual actors and technologies but, rather, a complex outcome that is highly contextualized, and emerges through numerous entanglements and engagements – sometimes prolonged, sometimes momentary, resisted, or dropped – and negotiations within and amongst the different actors and objects. Future research should continue to attend to care as emergent in fields with potentially contradicting as well as overlapping medical, aesthetic, and

gendered norms, as well as the qualitative differences between the capacities and labors of human and non-human actors embedded within arrangements of care.

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