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Digital Traces and Personal Analytics: iTime, Self-Tracking, and the Temporalities of Practice

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This article examines digital traces related to the use of self-tracking devices in the context of digitally mediated iTime. These devices enable the continual production, representation, interpretation, and negotiation of varied traces of physical activity, time use, and temporal coordination. We focus on temporalities, exploring how the "tendencies" of iTime are being differentially produced, encountered, interpreted, and acted on in daily life. In-depth interviews with 25 individuals between 18 and 24 years of age are used to examine the contexts of trace production and analysis as they take place within different configurations of ordinary practice. First, we examine whether continuously self-tracked data alters people's sense of the temporal possibilities of self-transformation. Second, we ask whether people's encounters with, and analytics of, their traces alter how their daily life is temporally sequenced, coordinated, and experienced. Third, we consider if and in what ways quantified and visualized self-tracked data change the temporal meaning and value of media-related practices for those undertaking them. We show how digital traces are produced within, and become concrete elements of, the temporalities of practices.

Keywords: iTime, digital traces, personal analytics, self-tracking, practices, temporality, datafication, self

As many scholars have observed, it is all but impossible to engage in daily life without producing digital traces of that life (Beer & Burrows, 2013; Bowker, 2005; Couldry & Hepp, 2017; Featherstone, 2000; Hand, 2014). These might be e-mails, texts, tweets, and tags visible in social media but also obscured locational, transactional, and temporal metadata. As mobile digital devices are woven into multiple practices—from shopping to sport, eating to parenting—the textual, visual, transactional, and

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locational detail of those practices becomes available for examination by a variety of institutional and individual agents (Bowker, 2013; Couldry & Hepp, 2017; Hoskins, 2013; Marres & Weltevrede, 2013; Ruppert, 2013). Digital traces, particularly those visible in social media, are exponentially increasing in volume and have several novel qualities (not necessarily essential), including potential for unlimited algorithmic classification, malleability, transience, and potential persistence over space and time (Chun, 2011; Hand, 2012; Mayer-Schonberger, 2009). In terms of temporality, traces of the past are difficult to erase, given their rapid circulation through multiple systems beyond individual control. They are often a routine, unavoidable, and unconscious by-product of things that people do, but are individually reworked and repurposed and aggregated by others. Traces make aspects of social practices visible to ourselves and others, perhaps offering unprecedented "access" to social life as an interconnected diagram of interaction (Venturini & Latour, 2010). On the one hand, this latter point seems compelling in relation to visual social media, as people often "share" what they are doing. On the other hand, we should be wary of treating digital traces as simply transparent or naturalistic, providing a neat fit between trace and meaning, between transactional record and situated practice. We approach traces as always mediated, partial, constructed, and interested accounts of interaction.

In this article, we aim to contextualize digital traces in terms of how they are linked to routine practices, examining how traces get made, stabilized, encountered, analyzed, and acted on in the first instance by those using smartphones and other self-tracking devices. In seeking to understand some of the routines and practices developing around "lively" data (Lupton, 2016), we focus on emerging temporalities of personal analytics. We begin by discussing how self-tracking raises significant questions around temporality, subsequently exploring three key dimensions of this through an empirical study. First, we examine the degree to which continuously self-tracked data alter people's sense of the temporal possibilities of self-transformation. Second, we ask whether people's encounters with, and analytics of, their traces alter how their daily life is temporally sequenced, coordinated, and experienced. Third, we consider if and in what ways quantified and visualized self-tracked data changes the temporal meaning and value of media-related practices for those undertaking them.

Personal Analytics, iTime, and Temporal Datafication

Personal analytics is one of several terms that describes self-monitoring practices related to the body or self, plus diary keeping, calendar scheduling, planning, and so on. As one specific example of this, the uses of self-tracking devices (e.g., Fitbit) and applications (e.g., MyFitnessPal) produces myriad digital traces, many of which will be subject to personal analytics. These traces are produced in different ways, within different temporalities of practice. Some are automatically and continuously sensed (heart rate, physical activity, calories burned, sleep patterns), whereas others are actively input at specific times (calorie and water intake). On the one hand, such traces "compose users," which appear as "selves" held together by platforms (Bratton, 2015). On the other hand, users actively navigate device settings, synchronize devices with many platforms, compete with friends, set personal goals, and select different visualizations and representations of data to be momentarily reflected upon. In this sense, self-tracked traces of activity are infrastructural constructions that also enable diverse personal analytic practices at the level of individuals. We suggest that these constructions and practices are often directed toward reconfiguring temporality, and have significant implications for our understanding of contemporary

temporalities, but this has not been an explicit focus of research on self-tracking (see Crawford, Lingel, & Karppi, 2015; Lupton 2015; Schüll, 2016).

There has been considerable research on time and temporality in the context of digitization, and we suggest here that the "tendencies" of iTime (Agger, 2011) indicate several ways in which self-tracking and personal analytics might be reconfiguring the organization, experience, and management of time. First, at the broadest level, new media devices and information infrastructures have altered the temporal boundaries established in modernity through networking, acceleration, connectivity, and compression (Castells, 2010; Gregg, 2011; Hassan, 2007; Rosa, 2005, 2013; Sharma, 2014; Urry, 2000; Wajcman, 2015). This is exemplified in the concept of iTime: the "compressed, elastic time of people who are constantly plugged in" (Agger, 2012, p. 8). Those who use smartphones and wearables are now inescapably tied to media that challenge existing "boundaries between public and private, day and night, work and leisure, space and time" (Agger, 2011, p. 119). iTime is thus a "generalized temporality" that "oozes everywhere, driving out downtime" as the "latest way of co-opting, coordinating and commodifying human activity" (Agger, 2011, p. 122; Fuchs, 2014). This might include self-tracked "exercise activity" (Till, 2014) and even sleep (Williams, Coveney, & Meadows, 2015). Couldry and Hepp (2017) articulate the implications of this boundary dissolution in terms of experiencing a "dramatic temporal dislocation: a world in which the demands of work and system, reliant on mediated systems of communication, spill out far beyond the normal boundaries on which everyday habits seem to be built" (p. 107). Accordingly, we need to ask how people understand, negotiate, and perhaps reconstitute temporal distinctions and boundaries.

Second, in terms of the subjective experience of time, as these devices are carried (or worn) on the person they become anchored within and anchor the daily rhythms and routines that constitute everyday life, meaning that having an "unmediated perception of subjective time has become almost impossible" (Rosa & Hassan, 2014, p. 3). The personal experience of iTime is thought to be one of "compulsive connectivity," of an "eternal present that has no depth" (Agger, 2013, p. 87) in which one must be "constantly available." Such expectations about immediacy encourage a "fragmented everydayness"—or an "extended present" (Nowotny, 1994)—where increasingly discrete temporal moments are inserted into 24-hour periods without a coherent narrative structure. In this sense, we might ask whether continuous data about activities in time invites reflexive awareness of increasingly specific temporal categories, sequences, and practices, and their coordination.

Third, the elasticity of iTime—its mobility and density—implicates individuals in the control of "their time." Personal analytics is premised on the idea that what bodies do over time can be better measured, analyzed, and improved. These metrics are temporal, from counting steps in 24 hours to recording numbers of "active minutes." This is evident in the normative expectations of specific apps—the functions, capabilities, and language in their design and marketing—that point individuals toward the continual monitoring, uploading, and "optimization" of data and self (Jarrahi, 2015) as part of a societal imperative to engage in "constant information body monitoring" (Viseu & Suchman, 2010, p. 173). This produces affective dimensions in the face of complex temporal demands: anxiety, a will to be "always on," productive, and organized across all spheres of everyday life, pushing people to take individual responsibility for scheduling and coordinating increasing numbers of "de-synchronized" activities

(Southerton, 2009). In this sense, at the level of the individual we might ask whether self-tracking simultaneously contributes to this desynchronization and its potential control and use.

Fourth, as individuals become tied to digital modes of knowing and acting (Lupton, 2014a, 2014c) "a powerful aspect of self-tracking tools is their ability to mediate the reimagining of the present" (Ruckenstein, 2014, p. 81), wherein discrete activities can be examined together, revalued, and reordered. This continual mediation and potential quantification of activity then produces visual traces of temporally sequenced minutiae. As part of datafication (Crawford et al., 2015; Gitelman & Jackson, 2013; Mayer-Schonberger & Cukier, 2013; van Dijck, 2014), self-tracking devices have been marketed as helping to provide "a continuous, informatic mode of perception" (Schüll, 2016, p. 9). The personal analytics of self-tracked traces has been construed as enabling individuals to "see" who they "really are," what they "actually" do, producing a type of selfhood that changes in relation to multiple data sets (Lupton, 2014b). In this sense, temporal datafication might have considerable implications for how people value time and reflexively orient themselves in time.

However, if digital traces are derived from "disparate kinds of data that are generated by our practices in a digital media environment" (Couldry & Hepp, 2017, p. 162), we suggest it is imperative to understand how data are generated by individuals, and what the relations between everyday practices, devices, and data are. We know little about how self-trackers understand their data, whether and in what circumstances they consider it accurate, how it is valued by users, and whether encounters with self-tracked data is reproducing or perhaps intensifying these tendencies toward temporal structuring, experience, coordination, and orientation to the present.

Accordingly, we suggest a practice-orientated approach to placing digital traces in context regarding the temporalities of personal analytics. This emphasizes how what people "do with media" becomes routine, forming a framework for the everyday (Silverstone, 2007). We follow Reckwitz's (2002) relational account of practice as a dynamic "arrangement" of elements. Reckwitz defines practice as follows:

> A "practice" (*Praktik*) is a routinized type of behaviour which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, "things" and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge. (p. 249)

Self-tracking devices have become folded into more domains of daily life, such that they "have become highly personalized experiences that are embedded in our daily lives, routines and interpersonal relationships" (Pink et al., 2016, p. 44). From a practice-orientated approach, in recognition of the many orientations and enactments of iTime, this does not mean that they have continuous effects across different practices or are embedded in the same types of practices in uniform ways. In contrast, it is precisely the ways in which media-related practices become coordinated (or not) with a range of other practices that forms our object of inquiry. As Couldry (2012) argues "The articulation of our media-related practices with other practices into larger combinations (our 'routine,' 'schedule,' 'lifestyle') is part of whatever order we find and rely upon in the world" (p. 33).

In this sense, we explore the temporal relationships between devices, people, and data in ordinary conduct along two broad dimensions. First, we examine how these devices become embedded in daily routines among individuals who do not identify with Quantified Self (QS) communities, providing some empirical detail on the enactment of "everyday analytics" (Pantzar & Ruckenstein, 2015). The emphasis is on how media technologies are articulated during mundane activities that are already temporally structured and organized. Second, we examine individual engagements with the digital traces produced as a result: how people produce, encounter, interpret, and act (or not) on those traces that are about time, occur in time, and potentially reconfigure time. An increasing range of ordinary activities are available for temporal visualization, measurement, and analysis, but we have little understanding of how users interpret this information, whether it intervenes in other practices and contributes to a reimagining of the present in ways suggested so far.

Data and Method

The data used in this article focuses on the personal analytic practices of young people ages 18 to 24 years, as part of a larger research program employing mixed qualitative methods to identify significant sociodemographic differences in how people understand, organize, and experience time in digitally mediated society. This more specific element aims to understand emerging practices of self-tracking in relation to the production of temporal data about the self. For this article, we used data from 25 in-depth interviews, between one and two hours in length, with undergraduates. Students from a midsized university in Ontario, Canada, were recruited via campus advertising. In-depth, semistructured, and conversational interviews were conducted in which participants discussed their adoption and uses of self-tracking devices and applications. In this sample, 21 participants were women and four were men, reflecting the female-dominated consumer market for Fitbit. Twenty-three of 25 were living independently of parents. All participants possessed at least one smartphone, a self-tracking device, or application and were regularly "connected." The students in this sample have comparable sociodemographic backgrounds, forming a relatively homogenous group.

To situate the use of self-tracking devices and the production, interpretation, and management of digital traces, participants were asked to reflect on how they use devices and engage with data during daily activities and schedules. This includes the maintenance of friendships and relationships, schoolwork, leisure, scheduling and planning, domestic labor, and so on. Participants were asked to talk us through their media use by showing, describing, and reflecting on the data produced through their devices and discussing the detail of their typical daily, weekly, and monthly practices over the last two years. In this sense, our data are primarily of accounts of practices and how interviewees feel that their practices may or may not have changed. In addition to this, "talking through" their data with them allowed us to understand how their accounts related to the data or, in other words, how their analytics related to their traces. Interviews were digitally recorded, transcribed, and manually coded. All names are pseudonyms. The analysis focused on the acquisition and use of self-tracking devices in conjunction with related applications in the context of many practices (e.g. eating, running, cycling, and so on), to understand how the potential of differentiated digital traces is understood and negotiated in the analytics of personal life.

Temporalities of Personal Analytics

Survey research suggests that a growing number of people want to monitor their activities in more detail to improve a specific aspect of their health and fitness (Fox & Duggan, 2013). Much of this assumes that people acquire relevant devices and applications as the result of personal motivation for change that is then more or less realized over time. Beyond general trends, we can identify different trajectories in how people articulate and negotiate their use of devices and interact with, and reflect on, the digital traces produced through practices. In what follows, we present three trajectories we see emerging in our sample. There are, of course, other possibilities, but we argue that those identified here provide significant insight into how the temporalities of personal analytics are being configured on the ground. We have characterized temporalities of personal analytics as primarily organized around (1) syncing, intensification, and balance; (2) elasticity, disruption, and regimentation; and (3) flexible attachment and ambivalence.

Syncing, Intensification, and Balance

The adoption and use of self-tracking devices is, for some, relatively unproblematic and unremarkable. For some of our participants, the Fitbit or Smart Watch is described as a necessary or simply logical addition to an existing range of technologies and applications where "it was more like a convenience thing, but it did get integrated very quickly into my general life" (Claire, 19), or "I feel like it will probably just become a part of my daily life so much that sometimes I probably won't even know that it's there" (Nicole, 21). In this sense, it has not been a particularly disruptive device, as they feel confident about integrating or folding it into the temporal structures of their existing practices. The self-tracked data being generated does not produce anxieties about those practices ("Am I being productive?") as they feel well-equipped to manage their responses to it, partly because the data itself is considered largely unproblematic. It can be understood through existing temporal categories (e.g., real time), and is most often deployed to intensify a specific activity.

For some people, the desire is to fully integrate the device (into the skin) so that it becomes barely noticeable—tracking their sleep, heart rate, active minutes, and reminders—in ways that they take to be accurate. The "syncing" of the device with other technologies such as smartphones, applications such as MyFitnessPal, and across practices was common for these participants. In this way, they conform to Agger's (2013) image of those fully immersed in iTime who "accept the world for what it is" (p. 87). Those participants embrace the notion of syncing in relation to the "labor" of exercise:

> But the watch actually over time it learns from you, I'm not sure how, but it, after a couple of weeks of walking around, it knows you much better and how much you burn at a given rate, and it's much more accurate. (David, 18)

Although the idea that the device "learns from you" was thought to be significant, it is important to stress that none of this shifted the temporal structure of practices or their sequencing in any substantial way. Devices allow for thinking about exercise differently, but to reproduce and maintain an existing temporal regime that constitutes *self* and *health* rather than to actively transform it. For example, in

David's case, the smartwatch enabled him to intensify his existing practices, especially cycling by providing live data during cycles, allowing him to make minor adjustments, and to slightly increase the number of times he exercises. He explains how the device prompts him to act, to do more of what he is already doing:

> I was doing a lot of them [fitness practices]; however, with this, now I look at it and I'm like "Wow, I haven't moved all day," and now I know it's like okay, it's made me do it a lot more. . . . like it makes you want to do that because you can see when you're falling behind and not getting your goals. (David, 18)

Our respondents in this group are relatively confident about current food, exercise, and health—in their sense of self more generally—and this seems directly linked to the ways in which they describe the organization of their time. While they indicated that they are busy and that this requires considerable scheduling and coordination, this did not appear to be stressful or beyond their individual control. There was much recognition of the individualization of temporal coordination discussed above, but without an accompanying sense of anxiety or feelings of being overwhelmed:

> For evenings, I'm free and I'm around and I'm in control of my time in that way, so I don't have a lot of external factors at the moment that are in control of my time. . . . Next year, when am managing [at work], I will have like a lot of scheduled work time, but other than that, again, it's me in control of the rest of my time. (Lily, 17)

In fact, in discussion about time, they expressed a confidence in their ability to control and manage it in ways that will reproduce the temporal structure of daily life, but with their self-tracking enabling a newly measured balance between "mobile" and "immobile" practices (e.g., running vs. video gaming). In this sense, by analyzing their self-tracked data in relation to prior (often color coded) classifications of work and leisure, they could *see* their successful temporal allocation of practices. The commonality among participants here is a coherent conceptualization of what they call a *healthy lifestyle*. This is a vague term, but seems to involve the successful balancing of sedentary and nonsedentary practices sequentially over the day and week, and a similar temporal coordination of eating, drinking, working, and socializing. This is important as it suggests the ability to maintain temporal distinctions and boundaries despite the presence of "wearable" devices and the continual production of data. Finally, some visual data such as run routes (now "mapping") may be shared through Instagram, but steps, calories, sleep, and so on are kept private. The liveliness of self-tracked data appears contingent on the stability of existing routines.

Elasticity, Disruption, and Regimentation

The marketing of self-tracking devices and applications invites individuals to rethink and reorient themselves in relation to data. In line with these promises, a second trajectory involves a far more self-conscious effort to transform the temporal structure of practices and sense of self through the continual production and analytics of digital traces. It is important to stress that descriptions of temporal experience are mostly articulated in relation to another project, such as greater productivity in schoolwork, higher

grades, better health, and so on. We can locate anxieties about "constant connectivity" or time "deepening" (Couldry & Hepp, 2017, p. 112) as participants talk about their need to become more organized and how self-tracking might contribute to that temporal reordering. For example, some participants said that they need the new device to disrupt their existing practices and to "create motivation" for self-transformation through temporal reorganization. For many participants, this is described as the need to produce an "identifiable structure" for their day or week, a strong sense of the need for "regimentation," as they put it, and reorganization. This seems directly analogous to the boundary dissolution associated with iTime discussed earlier and among these participants extends well beyond the imposition of digital devices and toward a sense of dislocation and an inability to effectively structure and manage the wider environment. This notion of structure implicates the successful organization of time with tangible ways of identifying health. As Ruth explains:

> It [Fitbit] alters everything the same way my other apps have, so it's more of a structured way of how to think about being healthy, I guess. It gives me like that tangible to think about. But, yeah, I guess it alters how far I walk. I'll go on an extra walk that day or go and play with my sister, like I said, that kind of thing . . . . I think the main thing is just that for some reason it makes me happy and it gives me that goal to achieve, and if I don't achieve anything else that day, at least I got my Fitbit goal and I can say I'm healthy. (Ruth, 20)

For some such as Ruth, Sarah, and Hayley, this seems related to high levels of anxiety about what they describe as a "lack of productivity," a problem that involves fitness and exercise but also the organization of their schoolwork, and the "successful" regimentation of leisure. Sarah (23) feels that "it's harder to find those big chunks of time" and that "I can't get things like sleep in." For others, such as Rebecca (24), the Fitbit is the key device for temporal ordering as "I'm very neurotic with time and I always like to know what time it is so this [Fitbit] does everything in one." New modes of television viewing that are also "elastic" were identified as a corrosive force in "making you sedentary." The twin dangers of digital distraction and binge-watching were to be combatted by notifications of failed Fitbit goals:

> I can watch how many steps they [friends] are getting, and I get these really annoying notifications like "Jody leapt right past her goal, her step holding didn't see it coming" and I'm, like, still in bed that day. (Ruth, 20)

> I didn't end up being very active this summer at all; I wound up, like, binge-watching Netflix. So, by the end of the summer I was like, okay, this isn't feeling so good. I want to, like, switch up the way I'm doing things and try to get more active. (Sarah, 23)

The self as articulated among these participants is one that cannot be relied on—for remembering things, for scheduling, for working out enough, for eating healthily, and so on. There is considerable temporal anxiety here, connected to the "compulsive checking" and blurring of temporal boundaries discussed above. There is a strong sense here of their inability to live up to their own expectations. Self-tracked data about their time use and their activities in time takes on some "force" in the context of wider expectations, in which, as Sarah (23) states, "I can imagine that most people are more organized than

me." These expectations are derived from a variety of sources—social media, friends, parents—such that the device is becoming a "hopeful" tool in their efforts to reorganize daily life, but at the same time it reminds them of their "inadequacies" in meeting broad ideals and specific goals. Sometimes the self-tracked data combats a self-image of laziness exacerbated by the difficulties of keeping written records of schedules, and ever more complex plans and routines, where for Hayley (21), "I just gave up because I couldn't write down everything, and then I just got lazy."

These individuals are far more active in inputting data—for example, calorie data, water intake, exercise routines—and in constantly scrolling and checking inputs and outputs. They actively contribute to the liveliness of self-tracked data and are far more likely to respond to the device's suggestions. This is where we can see a connection between the temporal data produced, the personal analytics brought to bear on that ("I am being inefficient," "I am not meeting my step goals") and the reorganization of temporal routines. For example, if they have not met a step target, they will invent a reason to go for a walk by calling friends and organizing a social activity that will produce "steps." For these people, in line with the notion of a "continual informatic mode of perception" (Schüll, 2016, p. 9),the data input and seen on the device is transforming their sense of *what activity is*—walking is now stepping, playing games with friends produces steps, sleep is now problematic—where they talk about "not being able to see something unless its quantifiable." This relationship between seeing, temporality, and quantification is an important one, as it seems that the visualization of the temporal dimensions of practice, in terms of colored bar graphs, timelines, and so on, is often more important than the actual numbers.

Furthermore, in an extension of that relatively personalized liveliness, these participants are far more active in "persistent social sharing" (Wang, Weber, & Mitra, 2016) through step competitions with friends and parents and in Instagramming transformative images (e.g., before and after workout and diet images). Again, these seem to be ways of manufacturing temporal disruption to produce motivation, to reorganize their routines and habits, to reimagine the present and restructure the temporality of daily life.

Flexible Attachments and Ambivalence

A third emerging trajectory involves a more ambivalent and uncoordinated framing of personal analytics. As all our participants' have necessarily identified themselves as engaged in self-tracking, we would expect to find a mixture of more or less enthusiastic adopters of technologies. But what of those who feel less engaged in these practices, more "flexibly attached" to these devices (Johnson & Keane, 2015)? For this group of participants, the device is also disruptive, in that its continual generation of data prompts them to think about activities such as sitting and walking in a different way (e.g., as steps), but this is an often-unwelcome prompt that does not align with their sense of self, their expectations about being organized, or their feelings about constant connectivity more generally. As Kirsty (23) explains:

> Other times when I have these free-floating days, I don't have a deadline or I can have a longer lunch time or whatever, I will be like, "Ugh, I am not paying attention to this stuff because it's time-consuming," and I will take the Fitbit off and just not track anything and not do anything because it feels restricting.

For some among this group, the device (most commonly a Fitbit worn on the wrist) is described as a "threat." Like the first group, it is seen as another element in a media ecology of linked devices. But these are all seen as potentially problematic. For example, in their descriptions of other technologies, such as smartphones, they often articulate these as disrupting the temporal structure ("flow") of activities such as conversation and concentration. We get a clear sense here of a "stepping outside of iTime's compulsive connectivity" (Agger, 2013, p. 87), particularly an unwillingness to uncritically accept or engage with the imposed temporality of the smartphone and Fitbit.

For others, there is a more considered and developed skepticism about both the temporal disruption intimated by the device and the data, especially (in direct contrast to our first group) the notion that automatic or real-time data generation is inherently accurate. For example, Melissa first expresses a broad concern about the imposition of the device where she says, "Yeah, you control your life; you don't want that device to control you" (Melissa, 19). She goes on to detail how there is a mismatch between the automatic and manually input data and how she feels:

> Yeah, um, like, at the end of each week Fitbit will just like e-mail you and, like, it tells you, "Okay, this is the best you've done throughout the week, this is like your worst," and then, like, "This is your median, you've slept this much throughout the week, this is the best night you have had," and I'm like, "Okay, Fitbit, thank you" . . . . I know at the end of the day Fitbit will tell me, "You have been eating less than what you should eat." But it's not true, because I feel like I don't feel hungry anymore, and why should I eat anymore. (Melissa, 19)

There is also some concern with temporal datafication in terms of representation. It is not that they feel unable to cope with the speed, amount, or continual mode of data generation, but that they do not wish to continually engage in analytics that will reveal inadequacies. For example, participants here might acknowledge that they have (in their terms) had a "bad day" of eating or lack of exercise, but do not wish to see this represented on the screen. In direct contrast to those concerned with self-transformation, there is often a tendency to try and disregard the device and its data within this group. Having said that, it will prompt them occasionally to take an extra walk; this is not seen as necessarily positive, but, if anything, rather unnerving or annoying.

The commonality between people here seems to be how they do not have a coherent scheme of practices organized over the course of a day or week into which devices and data can be inserted, and neither do they have a strong model of temporal self-transformation or self-reproduction to which the device can be reflexively orientated. At times they are simply more ambivalent about self, technology, and time in the terms offered by self-tracking and personal analytics. At other times, there is a real sense here of resistance to data-intensive personal analytics. This appears to be the case when activity is temporally quantified, when productivity is exclusively configured as temporally measured "movement":

> Yeah, I guess if I have a day that's low steps it might prompt me to maybe take an evening walk, maybe to take the long way between my classes the next day, but on the whole, I'm not very like fixated on the numbers where it's like, "Oh, I didn't reach my

> step goal, what a tragedy for today," or anything like that. So, it may prompt me to do, like, a little additional movement if I have time, but if it's been, like, a day of heavy studying, I'm not too anxious about that because I know I have been busy while being sedentary. (Jessica, 21)

In this sense, our participants in this group are more ambivalent about the broader temporal expectations in society as well as the specific classifications (steps) introduced by the self-tracking device. Their "flexible attachment" to the device and data is the outcome of their ambivalent acquisition in the first instance, and the inability to effectively appropriate it in practice.

iTimes and Configurations of Practice

Several of the key tendencies of iTime discussed earlier—boundary dissolution, elasticity, presentism, compulsive connectivity—have been explored here in relation to the specifics of self-tracking and personal analytic practices. We see that even within a relatively homogeneous group there are several different ways that the temporalities of personal analytics are being enacted. The trajectories described all involve an ongoing configuration of elements that compose personal analytics among our participants (see Shove, Pantzar, & Watson, 2012). The specific ways in which these elements are pulled together in practice produces the contexts for the production of digital traces and modes of self-reflection and transformation, ranging from the reproduction of existing practices and senses of self to their desired or unwanted disruption and transformation. In many ways, these can be considered "practices of adaptation" (Couldry, 2012) as people seek to "customize" media manifolds to negotiate and navigate contemporary experiences of temporality in ways that are coherent for them.

What are the implications for our understanding of temporality? First, our analysis confirms the idea that smartphones, Fitbits and the like, are "not general instruments but devices that operate in many networks of practices at once" (Glennie & Thrift, 2009, p. 73). In terms of those practices—some of which we have explored here—they do not produce a generalized temporality that reconfigures those practices accordingly. Precisely because of their portability and wearability, self-tracking devices of various kinds become inserted within and between multiple practices (Mowlabocus, 2016), becoming elements within pluralizing temporalities and making the possibilities of temporal coordination more complex (Couldry & Hepp, 2017).

Second, and more specifically, we see several ways in which temporal boundaries are dissolved but also constructed and enacted through the use of self-tracking devices. This suggests that, in line with Tomlinson (2007) and Vostal (2014), we need to modestly rethink the idea that iTime necessarily involves "fast temporality" and "inescapable" immediacy and that self-tracking either exemplifies or exacerbates this scenario. People embedded in iTime have been characterized as inhabiting a "frozen present" or being unable to theorize the past or contemplate the future (Agger, 2013). On the surface, the continuous production of data in self-tracking would appear to intensify this "presentism." But we find that while some accommodate continual trace production and analytics (syncing and balancing), others seek to use it to "hyperstructure" and provide regimentation, and some actively marginalize this immediate temporality. While self-tracking introduces novel interpretations and representations of productivity and sequence

(e.g., steps), it also enables personal analytics that can embrace, ignore, or rework these temporal regimes and measurements rather than only enact them. That said, for many, their time is being valued primarily in terms of productivity, commensurability, and measurement. For example, digital traces for our second group of participants are analyzed as indicators of laziness, stress, and the inability to successfully coordinate practices. Among all our participants, the reframing of walking as *steps* and the "flattening" of practices as they are represented on the screen is having subtle yet potentially profound effects on how digital traces enable a contextualized revaluing and reimagining of the present.

Third, a practice approach to iTime emphasizes "doings," and in this sense, the ways in which self-tracking devices are successfully allocated within the temporal rhythms of established practices (Southerton, 2009) shapes people's engagements with "lively" digital data (Lupton, 2016). For example, where devices reproduce existing temporal ordering, the traces produced are kept private as far as the individual is concerned. Their sense of the data is that it is theirs and does not need to be circulated. This means that the continual production and analysis of data is unproblematic, its liveliness is "contained." Where the device disrupts unsatisfactory temporal orders—to introduce new modes of scheduling, to regiment practices and their boundaries—traces are produced more frequently, are circulated, consciously reflected upon over several temporal periods (day, week, month), and interpreted in the intertextual context of other "self-optimizing" data (e.g., Instagram). In this way, for some, personal analytics of traces are indicating what they have been, are, and should be doing. They see themselves in terms of visualized patterned action. The liveliness of data is deliberately enacted and used as a dynamic resource for self-transformation. For others in our third trajectory, traces of activity are more skeptically engaged with, used as the rhetorical basis for discussion, but the embodied feelings of, say, eating and sleeping, are not translated into quantified representations. These self-tracked datafications—as elements in emerging "figurations of the self"—are explicitly resisted.

Conclusion: Digital Traces in Context

This article has aimed to contribute to debates about how to contextualize digital traces, and we now return to this broader debate. First, by detailing some very specific ways in which individuals enact personal analytics, we show that digital traces of daily life are anything but neutral, transparent windows on social practice. We deliberately focused on this specific kind of digital trace—rather than, say, transactional metadata—to show how accounts of individual motivation or the imposition of quantified measurement neglect the dynamics of mediation and negotiation occurring as devices become variably embedded in multiple practices.

Second, digital traces have also been conceptualized as dynamic elements within practices, rather than as digital objects that are simply automatic or neutral traces of practices. Digital traces are produced, stabilized, and acted on within the specifics of temporally structured practices. They make other elements of practice visible to individuals, but the degree to which they are reworked into the practice or disrupt the practice depends on the broader arrangement. This is not to suggest that the institutional extraction and aggregation of this data will not have considerable effects on individuals, in terms of how they are acted on by powerful institutional actors regardless of the meaning of such abstracted data. It may also be the case that, despite the different practices articulated here, there is real significance in a

more general embedding of personal analytics within devices and organizational structures (e.g., in the workplace) over the longer term, heightening the normalizing role of temporal datafication across larger populations in ways not seen here.

Finally, in terms of contextualization, we want to stress that engagements with personal analytics are taking place as elements within other practices that at first may appear unrelated. This does not involve the uniform temporal datafication of those practices. If we want to understand the meanings of digital traces—such as sleep patterns, eating habits, and physical activity—produced through devices, we need to know how they are interpreted by those producing them, as these interpretations have the capacity to work back into patterns of daily practice in nuanced ways. Everyday activities are indeed re-presented through temporal datafication, but that is only one aspect of mediatization (Hepp, 2009). We also need to know—in terms of the substantial transformation of the self—whether people uncritically accept these traces and engage in self-reflection and transformation based on those emerging figurations.

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