

# Mundane data: The routines, contingencies and accomplishments of digital living

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## Abstract

This article develops and mobilises the concept of ‘mundane data’ as an analytical entry point for understanding Big Data. We call for in-depth investigation of the human experiences, routines, improvisations and accomplishments which implicate digital data in the flow of the everyday. We demonstrate the value of this approach through a discussion of our ethnographic research with self-tracking cycling commuters. We argue that such investigations are crucial in informing our understandings of how digital data become meaningful in mundane contexts of everyday life for two reasons: first because there is a gap in our understanding of the contingencies and specificities through which big digital data sets are produced, and second because designers and policy makers often seek to make interventions for change in everyday contexts through the presentation of mundane data to consumers but with little understanding of how people produce, experience and engage with these data.

## Keywords

Digital living, ethnography, improvisation, mundane data, routine, self-tracking

## Introduction

In this article we develop and mobilise a concept of ‘mundane data’. We call for attention to the mundane, usually unnoticed and below the surface everyday routines, contingencies and accomplishments that both shape and emerge through our engagements with digital data. It is, we argue, crucial to account for this for three reasons: the mundane is a domain of creativity and improvisation as well as a site of these everyday routines, contingencies and accomplishments; it is an inseparable and undeniable part of the digital–material environment in which we live; and it is one of the key sites through which Big Data is generated. Developing a deep understanding of how digital technologies and their capacities for generating, visualising and sharing data are becoming part of our quotidian worlds is an essential step for contemporary social science. It is needed to inform both how we theorise processes of change and intervention in contemporary everyday life, and to contextualise and situate the massive digital

data sets that academics, governments and organisations increasingly hope will explain current and predict future societal change and contribute to economic and social development. We propose that the concept of mundane data offers an analytical entry point into this field of research and we call for focused and in-depth investigation into the human experiences, routines, improvisations and accomplishments (and the configurations of things and processes they assemble with) which implicate digital data in the flow of the everyday. We examine this with reference to our digital-sensory video ethnographies with self-tracking cycling commuters, through a focus on the everyday

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micro-routines through which people engage with, make sense of, improvise with and use the digital data they generate about their cycle trips.

Previous research on self-tracking has focused on what people do with the personal data they generate (e.g., Nafus, 2014; Ruckenstein, 2014). This was one focus of our research, but here we attend to the details of how people collected this data: the devices and software they used, and how they fitted with other everyday life routines. Such investigations are crucial in informing our understandings of how data becomes meaningful in mundane contexts of everyday life for at least two reasons. First, as argued elsewhere:

[T]he emergence of Big Data as a field of data analytics and of knowledge about the world also indicates a glaring gap which researchers have not yet developed ways to account for fully: for all the opportunities that Big Data offers us to view the world differently to the way it was statistically rendered in the past, its meanings are always relational to the contingencies and the specificities through which it is produced. (Pink et al., 2016b)

Second, because it is often through routine activity that designers and policy makers seek to create digital interventions in everyday life contexts: relating, for example, to energy demand reduction (e.g., Pink et al., 2016a and [www.energyanddigitaliving.com](http://www.energyanddigitaliving.com)) or promoting health (e.g., Swan, 2012), through the presentation of data about their everyday practices and bodies to consumers. Psychology-based design paradigms that seek to develop individual or personal ‘behaviour change’ have increasingly focused on engaging digital technologies and data to support their agendas in these fields (Purpura et al., 2011). Yet sociological and anthropological critiques have shown that behaviour change as a concept is often mistakenly focused on creating individual responsibility for changing situations that are in fact contingent on the actions of a wide number of social, cultural, institutional and circumstance-specific arrangements (e.g., Shove, 2010). Moreover, empirical research about the role of digital technologies in these agendas shows that such interfaces do not necessarily have their intended effects. For example, smart energy use meters are frequently disregarded (Strengers, 2013); and ‘an American market research survey found that half of fitness tracker owners had given up using them; a third of owners had done so within six months of acquiring their device’.<sup>1</sup> To comprehend personal digital data’s change-making potential and limits we clearly need better and deeper understandings of how they become meaningful, how they are felt/sensed and how they are produced in, and as part of, the everyday. We develop this point in the conclusion to this article, as

consequence of the arguments presented in the following sections.

In developing the concept of mundane data, we also respond to and advance recent discussions of data, society and everyday life initiated in *Big Data and Society*, whereby ‘emerging cultures of data collection deserve to be examined in a way that foregrounds the agency and reflexivity of individual actors as well as the variable ways in which power and participation are constructed and enacted’ (Couldry and Powell, 2014: 1). In the field of critical data studies, researchers have begun to call for ethnographic, or at least qualitative, approaches to understandings of the social impact and understandings of code and digital data (e.g., Boellstorff et al., 2015; Dodge and Kitchin 2009; Kitchin and Dodge, 2011). Given the liveliness of digital data, or their capacity to be constantly generated, to possess their own social lives, to have an impact on people’s lives and livelihoods (Lupton, 2016), better understandings of how people make sense of data and incorporate them into their practices and concepts of selfhood and embodiment are required (Michael and Lupton, 2016).

These moves urge us to investigate everyday living with data from the inside. Part of what interests us is how the extraordinary or unfamiliar (in the case of our self-tracking and cycling project, new digital technologies and the data they are capable of generating) become familiar, less strange and habituated – in other words, mundane. The next step is a theoretical-ethnographic dialogue that unites understandings of digital technologies, data, the mundane everyday, and human experience and perception. In what follows, we lay out a framework for such an understanding and show how it can play out through a discussion of our ethnographic work.

### Sites of the mundane, sites for mundane data

The mundane has been an enduring theme in the social sciences and humanities, seen sometimes as representing an interest in ‘rendering the invisible visible and exposing the mundane’ (Galloway, 2004: 385). Media and cultural studies scholars have emphasised how digital and mobile technologies have rapidly become part of mundane life (Baym, 2015). This approach has a history in research that has investigated the practices of appropriation and domestication of material objects, including media and technologies, into people’s everyday lives (Hartmann, 2013). This involves making what are often perceived as ‘strange’ or ‘alien’ new technologies or media more familiar. Within these fields, the notion of the mundane has been often mobilised, but infrequently clearly defined. In earlier scholarship it

was defined oppositionally. For example, in cultural studies the mundane was defined in contrast to the sacred (e.g., Fiske, 1992) and in anthropology the mundane was treated as something other than the spectacular (e.g., Palmer and Janoviak, 1996). Based on the long-term fieldwork techniques of traditional anthropology, ethnographers conventionally based their understanding in their analysis of both mundane and public (spectacular) aspects of life.

This tension between the spectacular and the mundane endures in anthropological work about digital technologies, along with an argument that situates digital technologies in the mundane. Miller and Horst suggest that

the key to digital anthropology and perhaps to the future of anthropology itself, is, in part, the study of how things become rapidly mundane. What we experience is not a technology *per se* but an immediately culturally inflected genre of usage. (2012: 29)

An example is Dourish and Bell's (2011: 187) work on digital futures, where they comment on 'ubicomputing [ubiquitous computing] as a mundane element of everyday life' rather than technology representing a world separate from the mundane. Likewise, Boellstorff (2008: 73) has argued: 'Ethnographers are not oblivious to the newsworthy or the extraordinary, but find that culture is lived out in the mundane and the ordinary', and emphasises the 'banality' and 'mundane' elements of his ethnography in *Second Life* (2008: 239). The notion of the mundane is therefore often mobilised to signify a site of 'ordinary' or everyday activity, characterised to suit the particular disciplinary interests being advanced. For example, as the location where politics and power relations come to bear on elements of life that go on in the 'background', as in the context of the cultural studies interest in the politics of the everyday '[i]t is at the level of the mundane that political interests ultimately land' (Gregg, 2004: 379); or as sites into which 'new' technologies become embedded in such a way that they take on characteristics of these sites, that is they become 'ordinary' themselves and can be studied (as above).

Acknowledging this existing scholarship concerning the mundane as the landing site where phenomena such as technology and power can be studied, we direct our attention slightly differently in order to focus particularly on the mundane as a generative site, where people deal with contingency, improvise in the face of uncertainty, adapt and move forward through the world. Following design anthropology research (which brings together the ethnographic and theoretical sensibilities of anthropology and the future-oriented and intervention capacities of design), influenced by

phenomenological anthropology, we see the mundane as a site for everyday forms of making (e.g., Gunn and Donovan, 2012; Ingold, 2013). Thus we conceptualise the everyday as a location where we as researchers need to be fully engaged in order to comprehend how digital technologies (and data) are implicated in and by the lives of ordinary people.

Our definition of data is relational to our specific interest in self-tracking data, both as personal data collected and used by the people who generate this information and as potentially contributing to Big Data when they are aggregated with other self-trackers' data. As Kitchin and McArdle (2016) have reminded us there are 'multiple forms of Big Data', although across these different forms the most prevalent characteristics are its velocity and exhaustivity. Such reports however (Kitchin, 2014; Kitchin and McArdle, 2016) focus on the observable and measurable aspects of Big Data, rather than the personal, experiential and non-representational ways it both emerges from and is implicated in everyday life. Lupton (2016) has, in contrast, developed concepts of visceral data and lively data, which respectively acknowledge how data are felt and experienced and how they are relational to other things. These concepts help us to consider data in two complementary ways: from the perspective of the user of data, that is our research participants; and by decentring the human. Personal data, we argue, is thus constituted and experienced between human and digital/algorithmic devices and processes, but always in relation to how these are situated in everyday environments, with other things and processes, such as the weather, the road surface, traffic and other humans in the case of self-tracking cyclists.

Here we place this digital materiality of the mundane at the centre of the analysis, to bring to the surface aspects of the experience of data that are usually unaccounted for. Digital materiality as conceptualised by Pink et al. (2016c: 10–11) bypasses the possibility of 'an a priori definition about what is digital and what is material', in favour of conceptualising 'digital materiality as a process, and as emergent, not as an end product or finished object'. Our perspective on digital data similarly positions them as processual and material, part of assemblages of humans–technologies–software–data. This perspective recognises that both mundane everyday life and data are emergent from continually shifting digital–material configurations of things and processes. Ontologically, digital materiality is a process and a 'thing', not ever a completed or finished 'object', following the understanding that 'things are alive because they leak' (Ingold, 2008: 10; Pink et al., 2016c: 10–11). Thus, both digital materiality and mundane data are always incomplete, they are ongoing, open 'leaky' 'things'. While mundane data

are often encountered as representations, in the form of data visualisation, they are not a representational phenomenon per se.

The Big Data phenomenon is often represented as novel, spectacular, disruptive or revolutionary. In our focus on the mundane elements of personal digital data, we approach Big Data from a completely different angle. For our purposes here, we attribute a set of qualities to the digital–material mundane which have particular implications for understanding mundane data. This creates a platform from which to understand the roles played by configurations of humans, digital technologies and data in the constitution and maintenance of the flow of everyday life.

First, the mundane is ‘quiet’ (Pink and Morgan, 2013) rather than blatant, but it is continuous, necessary and a site of improvisation. It draws in other processes and things, making them part of the ‘quiet’ flow of the everyday. It is a site for research which accounts for those things, processes, activities, perceptions and feelings that people engage with that are relatively inconspicuous and taken for granted.

Second, the mundane does not need to be conceptualised as part of a binary that is necessarily opposed to the spectacular or extraordinary. Rather it is relational to both (and to other similarly publicly oriented concepts). Relationality is key to understanding the configurations of things and processes that combine to constitute sites of the mundane, which might co-constitute with things considered extraordinary.

Third, the mundane is a site that ‘things’ and ‘processes’ seep into. The things that co-constitute such sites of the mundane cannot be discrete or complete objects, insulated against the intrusions of others. Rather they become incorporated in the site or configuration of things that constitutes the mundane as ‘open’ and ‘leaky’. As described below, this explains how data emerges from within, and has impacts on, the mundane.

Fourth, the mundane is a generative site where routines, improvisation and accomplishments are in progress and never complete. It is not simply a site where we might study the effects of the spectacular – in the form of new technologies or configurations of power and politics. Existing research often assumes the mundane is the recipient of the more extraordinary flows of power or technological innovation, and that it renders them ordinary through their incorporation into life routines. We reinvigorate the category of the mundane as the site that constitutes the affective, sensory and practical infrastructures required for public aspects of life – like new technology development or bike racing – and makes them possible. Within this site, data play an increasingly relevant role. The mundane is a site where data are lively, and where humans are not just recipients of data, but rather they generate, give sense to,

ingest and emit data (Lupton, 2016), navigate, imagine and improvise with data through everyday routines, improvisation and accomplishments.

Subsequently an ethnographic focus on mundane data offers insights into how people can articulate, represent and make visible to themselves and others the details of the everyday from which affective and imaginative states are emergent. By revealing and explaining the routines, contingencies and accomplishments of everyday life as they unfold, we can examine why mundane data matter in their very ordinariness.

## Researching mundane data

There is a growing body of work concerned with the problematic of researching the ‘flow’ of mundane everyday life, focusing on routines, practices and habits (Martens et al., 2014). This forms a background to our use of video as a route into the heterogeneous moving worlds that we and our research participants inhabited. We undertook team ethnography with two researchers based in both Melbourne and Canberra, Australia. We recruited 18 participants, all of whom cycle commuted and used self-tracking technologies, starting with personal contacts and then recommendations from these, by posting on social media and workplace-based cycling group emails. There were 10 participants in Melbourne and eight in Canberra, 10 men and eight women, aged between late 20s to mid-50s. They cycled between 10 and 70 km per commuting day using technologies ranging from simple bicycle computers linked to a wheel-mounted sensor that measured speed, time and distance covered, to on-bike computers with GPS ability and locational data that could be uploaded to a web-based application (usually Strava), power metres in the main crankshaft that recorded output (sometimes combined with separate heart rate monitors) and smartphone-based GPS tracking applications carried in pockets or bags, or mounted on their handlebars (see figures 1–3 for examples).

We had three meetings with most participants. First, to brief them and give them a GoPro camera to attach to their bike helmets to video record their rides home, as well as their preparation and arrival where possible. We met them again to return the equipment. Then we viewed and edited the video into the shorter sections of their rides we wanted to discuss with them. Finally we video-interviewed participants in their homes, a university or cafe (as appropriate), viewing this footage together and exploring how they prepared for rides and used the technology. We asked them to explain: what they were shown doing before, during and after their rides; how they felt at moments along the ride characterised by changes in terrain, traffic or effort, where they may be explicitly contemplating their

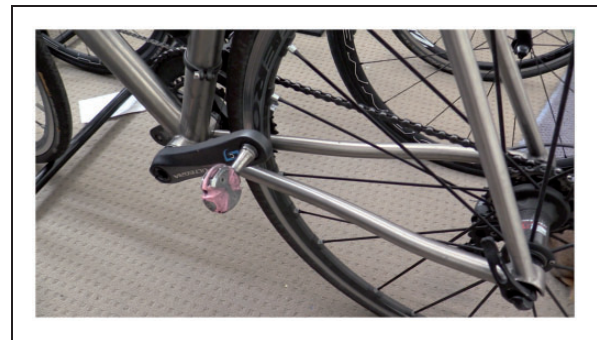
route and making decisions; and how self-tracking impacted on their rides, by showing video examples of this, discussing their responses to technological problems and interrogating how they knew it recorded their activities accurately. We also videoed them showing us how they set up the technology on the bicycles and what specific devices they used.

This research encounter has aspects in common with a video-elicitation interview (Pink, 2013) but has further layered uses of video, in seeking to generate forms of empathetic imagining throughout the research and analytical process. In understanding participants' experiences of self-tracking, data and cycle commuting we were interested in the sensory, affective, habitual and often unspoken dimensions of their rides. While self-tracking was at the centre of our research agenda, in the research process we decentred it, to research it as situated within the experiential flow of the ride, participants' activities before and after, and the routines, habits and improvisations that formed part of these. Both the GoPro videos and video interviews and enactments focused on participants' mundane routines, activities and decision making which they had not always explicitly thought about before. These research encounters thus sought to understand not simply what mundane data *is* but what it feels like, sensorially and emotionally to experience mundane activities of which data are an integral element. A sensory ethnography approach 'entails taking a series of conceptual and practical steps that allow the researcher to re-think both established and new participatory and collaborative ethnographic research techniques in terms of sensory perception, categories, meanings and values, ways of knowing and practices' (Pink, 2015a: 7). For the benefit of the interdisciplinary readership of *Big Data and Society*, while we do not go into these methodological differences in detail we also note that a sensory ethnography approach differs from approaches to the senses such as those that emphasise multimodality (Dicks et al., 2006) or cultural representations (e.g., Howes, 2003) (see Pink, 2011, 2015b for a discussion of this). In taking human activity as its focus, sensory ethnography skews away from the symbolic, the representational and the cognitive and focuses on the embodied and experiential (see Pink, 2015a: 48), and in this sense also differs from ethnomethodological and symbolic interactionist approaches.

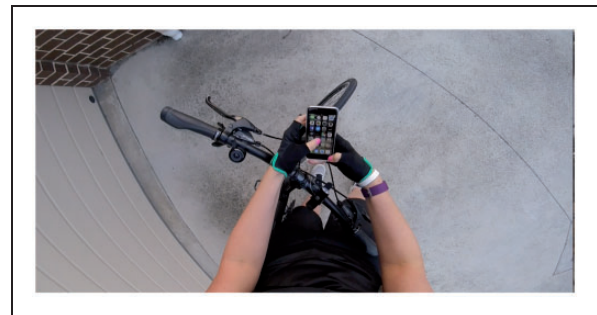
The research encounter therefore made mundane experiences that matter apparent by creating a context where they could be attended to and accounted for in ways that went beyond verbal or observational research. We sought to accompany participants into sites of their mundane to research and understand them, rather than standing at the edge through an interview or survey. An anthropological ethnography of



**Figure 1.** A handlebar-mounted Garmin computer.



**Figure 2.** A crankshaft with integrated power metre.



**Figure 3.** A smartphone with the Strava app carried in the participant's bag.

doing research *with* people offers routes to mundane moments they would not usually share because it would be unnecessary or boring to do so, or due to low levels of recall in, for instance, survey research. Yet when the circumstances of the research encounter make them acceptable to show, discuss or otherwise share with researchers, these practices emerge as integral to the experience of the everyday. The mundane is not necessarily dull or unimportant: these experiences matter to people and for research.

## Routines, contingencies and accomplishments

Analytical categories in the social sciences often delineate ongoing activity into a concrete object of analysis, which cannot adequately stand for the open processes by which people and things move through the world together. Here we treat the categories of routines, contingencies and accomplishments as a set of processual concepts that are inevitably bound up with the changing sensory and affective ways that people feel in the environments they are part of. Below we define these concepts in tandem with our ethnographic investigation of sites of the mundane and how data are situated in these.

*Mundane routines and habits* contribute to how we inhabit and sense our everyday worlds. This encompasses how we live with and experience the data that is part of these environments. There are a number of discipline-specific literatures concerning routines and habits. We do not address all of these here, rather we focus on those developed in anthropology and geography that are coherent with the theoretical focus of the sensory ethnography methodology outlined above. Therefore, while existing research about routines in organisational sociology draws on Actor Network Theory to understand action within routines (e.g., Pentland and Hærem, 2015), here we emphasise how, following Ingold ‘the world is not an assemblage of bits and pieces but a tangle of threads and pathways’. This is the difference between what Ingold calls a ‘meshwork’ and a ‘network’, and by which he argues that ‘action is not the result of an agency that is distributed around the network, but rather emerges from the interplay of forces that are conducted along the lines of the meshwork’ (2010: 91). Existing ethnographic research in these fields shows how the digital mundane is indeed entangled in everyday life, as digital technologies are embedded in everyday domestic routines (Pink and Leder Mackley, 2013), social media routines and ‘checking’ (Postill and Pink, 2012). Cycling is similarly ‘an everyday context of changing bodily routines and habits’ (Larsen, 2014: 63). Larsen (2014: 59) stresses that: ‘Everyday mobility is an embodied, affective and emotional practice involving specific, societal body techniques. . . . Most journeys are not extraordinary or special but form part of our familiar worlds and often unreflexive, habitual practices of everyday life’.

For the self-tracking cyclists who participated in our research, collecting and interpreting data about their bodies and cycling trips was part of quotidian life. Recording and uploading data about their commuting rides was integral to everyday routines that were habitual and usually unreflexive, but important to them and had affective affordances. Quotidian routines of

gathering lights, water bottles, headphones, backpacks, clothing, makeup and food, worked out and refined over time, meant participants feel they had everything they ‘needed’ before leaving their homes or workplaces to cycle commute. Routines included recording, uploading and sharing data, through devices that they rarely forgot and routines that ensured their data was saved online. For example, Craig had a 12–18 minute commute to and from work in Canberra, but was careful to record every journey. There was a powerful affective dimension to this, as he described how he was ‘devo’ [devastated] if a software glitch or other unforeseen problem prevented him from recording or uploading his ride data. He uploaded his data from his Garmin ride computer as soon as he got home from work and expressed a sense of vulnerability of the data until this step of recording it online was completed.

Craig showed us how he attached his Garmin to the computer, the beeping noise that signalled it was downloading rather than recording, how he checked it had linked to the Garmin online app and then transferred the data to his Strava account. He said he usually went through this process immediately upon getting home in order to ensure the data was uploaded, adding that his engagement with Strava was ‘competitive’ because ‘there are these challenges each month that you can join’ that measure total distance or elevation completed. His mundane routines took him into a public domain since he checked the leader table regularly to see how his data compared with other people’s and he had clear and particular goals in mind as he was doing this. Craig’s mundane data routines were part of what he saw as a continuing and cumulative process of physical improvement and competition with others. Enacting these routines with every ride was essential to meeting specific riding goals – hence his feelings of devastation if data ever got lost or corrupted.

Similar to Craig, the first thing Mark did on arriving home was downloading his cycling data, plugging the Garmin into the computer in the kitchen and uploading it while having dinner. He explained that:

It’s a bit of a ritual, as soon as I get home, the first I do is I plug in the Garmin, and upload it probably while I’m having my dinner . . . so it’s my centre of attention, which may not be the best and [laughs]. I feel the sooner I get it up the sooner I can see how it compares with previous rides.

Mark had been cycle commuting for about six years, becoming more regular over that time. He commuted about 25 km, which took from an hour and ten minutes to an hour and a half depending on a range of contingencies, including how full his bags were and how tired

or energetic he was feeling. Mark trained and competed in cycling races and had self-tracked these rides and his commutes using a GPS-based Garmin H500, for about three years. Before this he used an iPhone with a self-tracking map-based app, and he uploaded this older data onto Strava when he switched a few years ago. Thus, his cycling data history went back four or five years, before using the current self-tracking technology.

The location of the PC in Mark's kitchen meant he would not forget to take the Garmin with him on a ride, and on the mornings he cycled to work, he explained that 'Generally I'll remember it', although 'the final reminder is hopping on the bike and seeing its not there, so I'll run in, that way I won't forget'. However, Mark also explained that when he loaded his bike into the car on the way to work, a couple of times a week, he might forget to attach the Garmin. If this or something else, such as having difficulty finding the satellite, happened he would use his Strava smartphone app as a backup so he could still record everything. Remembering (or not) to attach his Garmin to his bike was part of a complex routine of leaving the house that was recorded in Mark's GoPro video. It included locating and putting on gloves and sunglasses, packing two panniers, returning to the house from the garage to say goodbye to the family, finding and putting on a heart monitor and cycling shoes, changing his podcast and putting on his helmet.

Mark's daily activities demonstrate the entanglement of the material and the digital, with the mundane micro-routines of preparing to ride, self-tracking his commutes and uploading his data. His broader, but still ordinary, engagement with data included live radio broadcasts from the other side of the world and the other digital technologies he encountered in his commuting environment: his heart monitor, traffic lights, automated pedestrian crossings and phone calls on his smartphone, for example. Mark's mundane data was created and recorded through these 'quiet', routine and ongoing activities that made up the quotidian 'doing' of his commute to work.

Participants' everyday mundane routines therefore ensured that they could produce data and involved them then using the data personally and socially. Our research encounters brought the sensory and affective dimensions of these experiences to the surface: these mundane routines around data in everyday life specifically enable such feelings but simultaneously make it unnecessary for people to usually reflect on, or speak about them.

*Contingency and improvisation* are integral to mundane routines and habits and to how they are constantly in processes of flux, and were emergent within participants' routes. The idea that improvisation and forms of ongoing creativity are embedded in how

people 'make' their worlds as everyday designers (e.g., Hallam and Ingold, 2007; Ingold, 2013) inform the design anthropology approach that we return to in the conclusion to this article when discussing possibilities for engaging data in social change and intervention. Considering contingency and improvisation with attention to routines and habits also offers a specific site through which to investigate change. This issue has been taken up in recent discussions that understand change as emergent, whereby 'habits while seeming to endure are always also being modified (improvising) through interaction with the environment' (including the non-human) which 'can lead to a change in habits, a transition' (Roe and Greenhough, 2014: 46), and 'habitual practices...are formed with a background animated by the material and sensory (as well as cognitive) capacities of human bodies and the liveliness, affordances and recalcitrance of nonhuman agency' (Roe and Greenhough, 2014: 54). Data is similarly 'lively' (Lupton, 2016), having impacts on people's lives, their decisions and actions and the ongoing ways of improvising in mundane habits, or routines, are inseparable from how they are produced, experienced and understood. Our ethnography illuminated two related modes of change within routines: the occurrence of everyday contingencies that visibly disturb the patterns but that might not change a routine in a visibly enduring way; and adaptations that might continue to be applied over time, and thus signify a different way of doing something, or way of knowing about something.

For example, the commuting rides of Lyn, a woman participant living about 5 km from her workplace in central Melbourne, infrequently varied, except when she diverted to the supermarket or the butcher. In these cases, the data on the distance she travelled, as recorded by the monitor attached to her bike, would not reflect her usual commute. She would instead check the distance to find out how long far it was to the butcher, how much this added to her total distance travelled (which accumulated over the life of the trip computer) and how long these additional segments of her journey took. She was pleased when the data told her rides had been longer or faster. We could say simply that when Lyn went to the shop, her cycling routine changed. However, it would be more accurate to say that her data routines changed, since her priority was not so much to accomplish the routine of going to the shop, but to maintain her habit of ensuring her data was configured in a particular way.

Our focus on micro-routines showed the contingent and improvisatory moments in the making of everyday data. It also showed how other everyday contingencies and changes were accommodated by how participants understood their data. For example, during one commute to work that Damon recorded, a spoke on his

bike broke. The footage showed him looking down, a clicking noise alerted him to the problem, he slowed the bike and moved onto the footpath. For several minutes, Damon fiddled with the spoke, experimenting with different angles as he tried to wrap it around the other spokes so that it did not impair the movement of the wheel. He finally secured it, remounted his bike and cycled the rest of the way to work. When asked about the effect of this on his self-tracking data, Damon was sanguine:

The watch is still going, but, you know, you can't really do much about it, so it doesn't overly matter in terms of timing myself. I don't really care about the overall time I take to get to work, I kind of care about individual segments, um, there are certain timed segments where you want to go quick, the overall commute to work doesn't really matter to me, the overall time.

Thus, despite the interruption to Damon's ride, the unusual event of a spoke failing, and the time he took to improvise a running repair that allowed him to continue his ride, this improvisation could be accommodated by the self-tracking data, even though it would initially appear to have disrupted it.

Other adaptations were more enduring and became incorporated into new ways of understanding or using mundane data. For example, Alistair had been cycle commuting for about 10 years. Alistair's routines and ways of recording his self-tracking data changed in relation to the technology available, his desire to track and how much he was riding. He did not self-track for the first two years, but bought a simple bike computer when he started getting more into cycling. Alistair developed his own system, using a spreadsheet to manually record the date, which bike he used, how far he had ridden and any other exercise. He did this for about three years adding up the kilometres, to work out how much he used each of his bikes and how long part of rides lasted. While Alistair's routines of collecting and analysing data adapted, his interest in mundane data itself endured, and did so with an acknowledgement that his engagements with it were contingent and would shift over time:

I do like data and looking at that... when I get back into cycling properly, it would be helpful, but at the moment, there's a baseline I guess... I do it all the time with work [as a road engineer for a local council], we get data and we're not really sure what use it for at the moment. Its there down the track if you need it.

Mundane data, and the routines and improvisations and adaptations that surround and define it, also underpinned *a sense of accomplishment* that was crucial

to the actions and experiences our participants associated with self-tracking. That mundane data enabled this sense of accomplishment for all of the participants in our study is unsurprising given that existing research has shown how the accomplishment of mundane routines often means people feel 'right' and able to move on to other activities (e.g., Pink and Leder Mackley, 2013), achieving a sense of what Giddens (1991) called 'ontological security'. Theoretically we understand accomplishment as processual rather than an objective achievement. However, in the context of how mundane data is produced, visualised and consumed, for participants the objectification of their data was important in the processes through which accomplishments and the affective states associated with them could be felt. Our participants all explained their self-tracking through a *quantified* sense of accomplishment, which meant knowing that they had completed or accomplished a goal. However simultaneously the accomplishment of data routines, including uploading/downloading, and posting intervened in the flow of everyday life.

The routine activities of tracking, uploading and sharing the cycling data not only made their achievements meaningful for participants, but it actually materialised the riding activity in participants' (online) social worlds, and generated affective states. Events and actions that would otherwise remain unrecorded and therefore ephemeral (and perhaps less memorable) were rendered into visual formats for the self-trackers to peruse later and possibly share. Yet simultaneously, this process of 'freezing' these lively data (Lupton, 2016) created moments of objectification. For instance, when participants were using the cycle-tracking app and platform Strava, the data-visualisation affordances of these technologies created a data object which would become the focus and the representation of an accomplishment. For participants, this created a sense of accomplishment that was related to but distinct from that felt after completing a challenging ride or meeting goals to cycle a certain number of days a week.

For example, Danielle echoed others' views (Lupton, 2016) when she explained that 'If it isn't on Strava it didn't happen'. She felt her rides were only fully accomplished when she had recorded and shared them with others online. She thought of Strava as a tool embedded in her everyday life that helped her 'to see how I'm progressing with my fitness... a lot of it is my confidence as well... it just makes me feel better, I was very cautious with cycling when I started'. Danielle's feelings about her self-tracking technology extended beyond a quantified measure of time or distance travelled to feelings of confidence and assurance about her competence as a rider. Even though she knew she was



getting fitter by how her body felt without reference to self-tracking data, she continued to self-track because ‘it’s just a little bit of external validation . . . it’s there in the numbers’. Here, mundane data was central to the sense of accomplishment and validation that were an important part of Danielle’s cycle commuting and her fitness goals and affective states that this activity helped her reach. The practices of collecting then reviewing the data helped her to feel comfortable about her cycling and feel that she was improving. The data from her rides operated as part of making the unfamiliar less strange and confronting (in Danielle’s case, taking up cycling commuting as well as using digital devices to track her progress).

Furthermore, Danielle’s feelings of accomplishment and competence were reinforced by the online social recognition that uploading her self-tracking data enabled. This included data from her FitBit wearable wristband which tracked elements of her movements and physical state (e.g., sleep, steps and distance). Danielle’s feelings of accomplishment were embedded in a wider network of other people who shared their data – mundane data is a social experience as it seeps out of the site of the mundane into a public domain. She shared personal FitBit and Strava data and photos from her rides with her friends. She derived encouragement and praise from this and ensured online exchanges are all positive by blocking strangers from her material: ‘All my friends are very encouraging and I’m encouraging of them, particularly when they’re getting into cycling’. Danielle maintained a sense of accomplishment by keeping her mundane data within a restricted locality once it became public.

This relationship between self-tracking, routine and accomplishment was common to all participants, but took different forms depending on their levels of fitness, and commitment to cycling as a competitive (online and offline) sport. For some downloading and looking at self-tracking data was a regular accomplishment that was an important part of the inevitable routine of getting home. For example, Damon described this in terms of a feeling of urgency to download and check his data:

I’m kind of obsessed, I get in trouble, that’s kind of the first thing I do when I get home is download my ride to and from work . . . the first thing I do is download that data and see if I got any course records or things like that. I’m kind of obsessed with going for local course records or testing myself on certain courses.

Like Craig, above, Damon was very interested in his performance over particular segments of the ride, and so tried to go faster along certain, limited stretches of his commute in order to improve his sense of accomplishment in relation to other riders and his own

previous times. But accomplishment was also embedded in the routine of uploading and checking his data, and he would risk ‘getting in trouble’ with his partner or children for attending to this as a priority when he arrived home.

Within these regimes of accomplishing routines of producing and sharing data, and the regular accomplishments of particular data representations that signify an achievement, mundane data take on an object status for participants. Moments of completion and feelings of well-being derived from this punctuate the everyday as data visualisations, or other alerts that a certain data status has been achieved invite feelings of achievement, confidence, motivation to continue and everyday well-being. That is, digital data and their affordances are embedded not only in a quantifiable world but are part of the affective states that emerge from how humans engage with technological, physical and human environments and become assemblages with these environments. Numbers and graphs become invested with personal meaning and affective status.

Data, their visualisation and use are emergent from and within everyday routines that they simultaneously co-constitute with other things and processes. In some cases (as argued above, spectacular/mundane distinctions are not necessarily useful) self-tracking data emerges from and is used in everyday life. For cycling commuting, these practices and their data inevitably spill out into public and social digital–material environments: riding on public roads or paths to work, weekend racing, social media sharing and so forth. The mundane is not a closed site, and neither wholly private/domestic or public, but rather open and leaky. Likewise, data that is part of the mundane does not exist only within that sphere, but can become part of public narratives (such as self-tracking platforms or social media sites), and is constitutive of Big Data when aggregated with other people’s personal data. The mundane, here, is a generative site, that data is derived from and become part of. The mundane is where embodied, sensory and social activities are simultaneously routine and compelling because they contribute to how everyday life is lived out, to how its flow is maintained and to how people gain a sense of accomplishment, make changes to their bodies, achieve affective and sensory well-being and in some cases, establish and maintain social relationships.

## Conclusion: Data and/or change

In this article, we have investigated how the concept of mundane data creates an analytical entry point into understanding how everyday life is impacted by and how it impacts a world where the production, use and dissemination of personal digital data are increasingly

common. To do this we have focused on personal data generated from self-tracking cycle trips to examine the sites where this data becomes part of how human experiences, routines, improvisations and accomplishments are played out, how they shift and change and how and why they matter to people. To conclude, we reflect on the implications of these insights (into how people human produce, improvise with, use and move forward in life and the world with data), for the role of personal and other data in interventions for change.

As we have shown here, everyday routines, improvisation within them, and the accomplishments that go with them contribute to making affective and sensory forms of well-being – feeling ‘right’ with oneself and in one’s environment (Pink and Leder Mackley, 2012). By focusing our research attention on how participants prepared themselves for their cycling trips, undertook their rides and reviewed their data, we have identified how they appropriated self-tracking practices and devices into their cycling routines. The ways our participants lived with data were often part of processes through which they sought to feel comfortable, and data was produced, used and shared in processes that generated such affective states. It is via these practices, meanings and emotions that data becomes and is experienced as lively: both portraying and affecting life itself.

We propose that in interventions for change, these aspects of digital data practices might be usefully engaged. Larsen comes to similar conclusions about the place of affect in efforts to increase cycling. He writes that: ‘Getting people to cycle more and for longer is not only a question of bicycle friendly-design (no matter how important that is) but also of enhancing people’s affective capacity’ (2014: 69). In ‘affective capacity’, Larsen means people’s ability to take up cycling as a routine habit and deal with potentially challenging, threatening or hostile environments to do so, such as lack of confidence or fitness, heavy traffic or bad weather. We have shown that self-tracking cycling commutes and the data they generate can be part of developing this affective capacity for regular cycling. Self-tracking can enhance people’s affective engagement with cycling because it relates to the way that people are able to accomplish routines, and self-tracking can be a central enabler of these routines. Likewise mundane data creates and enables entanglements of complex relationalities between the digital and material worlds that draw together people, things, affects and temporalities that surpass existing and simplistic attempts to use data as an intervention to motivate behaviour change.

The concept of mundane data has enabled us to centre the analysis on the ordinary sites of everyday life where digital data is lively and leaky – that is

where data becomes part of and open to those constantly changing configurations of things and processes through which life continues, and through which affective meanings are emergent. In doing so, we have made two significant moves. The first is to depart from the idea of the mundane as a landing place for new technologies, power politics and other affordances of the spectacular: to reconceptualise it as a generative site. The second is to reinforce the idea of digital data as not simply products of routines, and as a comprising sets of frozen visualisations of activity, but as active constituents that both shape and are shaped by the processes from which everyday accomplishments and affect are emergent. Conceived as such, the concept of mundane data contests the idea that making data available to people will motivate them to change their behaviour. Instead, following an approach that is more typical of design anthropology (e.g., Gunn and Donovan, 2012; Ingold, 2013) our concept of mundane data suggests that any interventions for change that involve data need to always account for (1) how data becomes part of the generative processes of everyday life, and (2) how data is engaged in any particular context as affective technologies.

In this article, we have concentrated on advancing a perspective that shows how data practices and interpretations are active in everyday life. In doing so, we have been unable to follow up on a number of tangents implied by our discussion. For instance, questions relating to power, surveillance and privacy, and to the wider context of debates about the use of digital technologies and data as an intervention for programmes directed at social or personal change. We do not brush aside these important issues (and indeed will take these up in future accounts of our project findings), but we suggest that these are often contextual and would come into specific accounts in different ways. As a first move, we contend that placing a deep understanding of mundane data at centre of the analysis is a crucial step in furthering our understandings of how, *in any context*, digital data produced through human and environmental everyday processes and activities become active in shaping how life proceeds.

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## Note

1. See <http://quantifiedself.com/2015/01/state-wearables/> cited in Pink et al. (2016b).

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