

# ***EXPERIENCE***

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**ARTS**  
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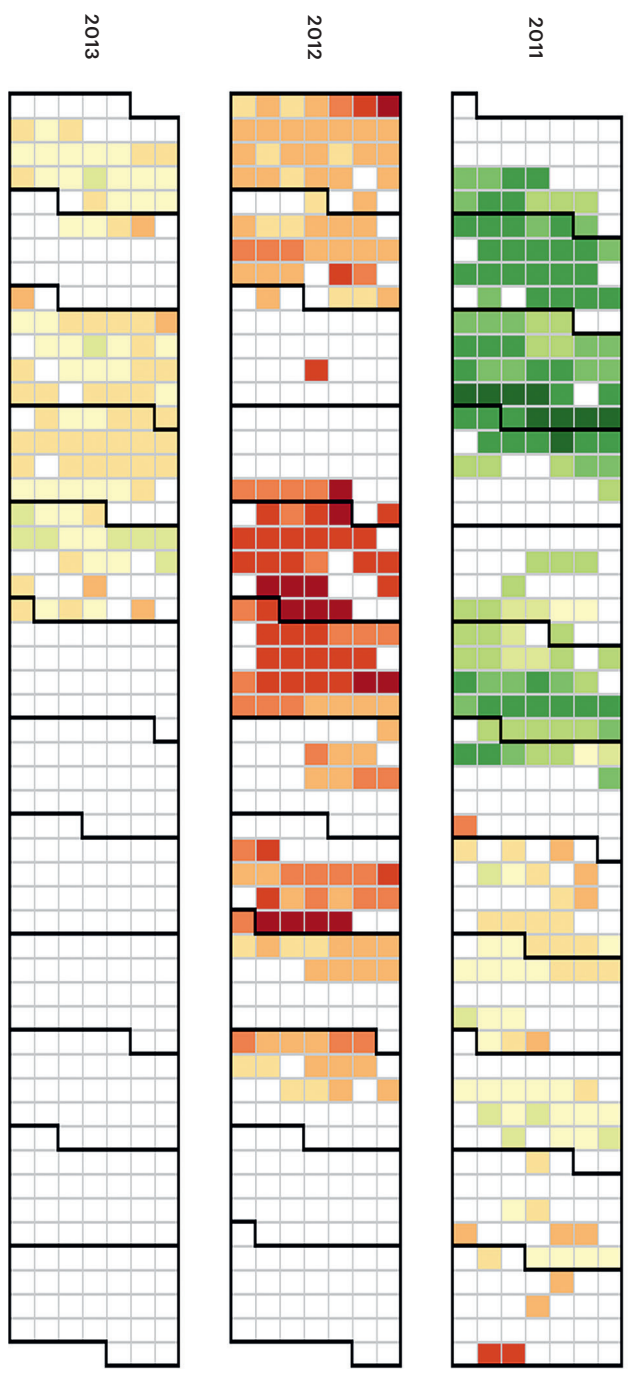


FIG. 1



# TRACKING

Natasha Schüll

In this short Life  
That only lasts an hour  
How much—how little—  
Is Within our power  
— Emily Dickinson

In 1990, just as digital information and communication technologies were coming into widespread use, the French philosopher Gilles Deleuze suggested that the architectural enclosures, institutional arrangements, and postural rules of disciplinary societies were giving way to the networked technologies of “control societies,” involving continuous coding, assessment, and modulation.<sup>1</sup> The latter scenario bears an uncanny resemblance to the tracking-intensive world of today, in which the bodies, movements, and choices of citizens and consumers are ever more seamlessly monitored and mined by governments and corporations. Heated public debate has arisen over how such tracking might undermine personal identity, liberty, and privacy.

Yet even as this discussion on surveillant monitoring unfolds, the public has embraced practices and products of *self-tracking*, applying sensor-laden patches, wristbands, and pendants to their bodies. The contemporary world is characterized by “an intimacy of surveillance encompassing patterns of data generation we impose on ourselves,” writes anthropologist Joshua Berson.<sup>2</sup> As prescient as Deleuze’s vision of the future was, Berson notes that the philosopher did not anticipate the degree to which the tracking and coding of bodies and acts would be drawn into the ethical project of self-formation and self-care. What Michel Foucault called *technologies of the self*—means through which individuals perform “operations on their own bodies and souls, thoughts, conduct, and way of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection, or immortality”<sup>3</sup>—take an actual technological shape in the assemblages of wire, chips, and batteries that constitute contemporary self-tracking devices.

While people have long used simple, analog devices to record, reflect upon, and regulate their bodily processes, use of time, moods, and even moral states (here we can list mirrors, diaries, scales, wristwatches, thermometers, or the lowly mood ring), the

FIGURE 1

Mette Dyhrberg, “2.5 Years of My Weight,” image posted in the visualization gallery of *quantifiedself.com*, September 2014. “I gained a lot of insights from this heat map,” writes Dyhrberg.

This text draws material from Natasha Schüll, “Data for Life: Wearable Technology and the Design of Self-Care,” *BioSocieties* 11, no. 1 (March 2016).

<sup>1</sup> Gilles Deleuze, “Postscript on the Societies of Control,” *October* 59 (1992): 3–7.

<sup>2</sup> Joshua Berson, *Computable Bodies: Instrumented Life and the Human Somatic Niche* (London: Bloomsbury, 2015), 40.

<sup>3</sup> Michel Foucault, “Technologies of the Self,” in *Technologies of the Self: A Seminar with Michel Foucault*, ed. Luther H. Martin, Huck Gutman, and Patrick H. Hutton (Amherst: University of Massachusetts Press, 1988), 18.



4

Gary Wolf, "QS15: What Happened?"  
<http://quantifiedself.com/2015/06/qs15-what-happened/>.

5

Gary Wolf, "The Data-Driven Life,"  
*New York Times Sunday Magazine*,  
 April 28, 2010, online at [www.nytimes.com](http://www.nytimes.com).

6

Ibid.

7

Ibid.

past five years have seen a dramatic efflorescence in the use of digital technology for self-tracking. As mobile technology spreads, as electronic sensors become more accurate, portable, and affordable, and as analytical software becomes more powerful and nuanced, consumers are offered an ever-expanding array of gadgets equipped to gather real-time information from their bodies and lives, convert this information into electrical signals, and run it through algorithms programmed to reveal insights and inform interventions into future behavior.

The recent rise of self-tracking is epitomized by the practices of the Quantified Self (QS) community, an international collective of individuals—as of summer 2015, there were more than 45,000 members in 40 countries—who ascribe to the quest for “self-knowledge through numbers.”<sup>4</sup> In online forums and in meetings around the world, quantified selfers share their attempts to experiment with diet and meditation, monitor drug side effects, correlate hormone levels with mood fluctuations and relationship dynamics, or even evaluate semantic content in daily email correspondence for clues to stress and unhappiness. In large volumes of numerical self-data, rendered in spreadsheets, pie charts, graphs, and other visual media, they seek to detect patterns and uncover habit pathways. (FIG. 1)

Started in 2009 by Gary Wolf and Kevin Kelly, two former editors at *Wired* magazine, QS made its public debut when “The Data-Driven Life,” authored by Wolf, appeared on the cover of April’s *New York Times Sunday Magazine* in 2010.<sup>5</sup> In the piece, Wolf proposes that data can serve not only as a means of inspecting others’ lives (as an actuary, policy maker, or welfare officer might) but as a tool for introspection—a kind of digital mirror in which to see and learn new things about ourselves. “Humans have blind spots in our field of vision and gaps in our stream of attention,” writes Wolf; “We are forced to steer by guesswork. We go with our gut. That is, some of us do. Others use data.”<sup>6</sup> In heart rate spikes or mood dips charted over time, he argues, we can grasp how we are affected by seemingly trivial habits or circumstances. “If you want to replace the vagaries of intuition with something more reliable, you first need to gather data. Once you know the facts, you can live by them.” Automated sensors and statistical correlation become tools for the good life.

“The idea that our mental life is affected by hidden causes is a mainstay of psychology,” notes Wolf. And yet, “the contrast to the traditional therapeutic notion of personal development is striking.” He explains:

When we quantify ourselves, there isn’t the imperative to see through our daily existence into a truth buried at a deeper level. Instead, the self of our most trivial thoughts and actions, the self that, without technical help, we might barely notice or recall, is understood as the self we ought to get to know.<sup>7</sup>





Longtime self-tracker Eric Boyd, a mechanical engineer who runs Toronto's Quantified Self meetup, believes that the tools and practices of self-quantification are less about numbers than self-discovery. "The reason you begin tracking your data is that you have some uncertainty about yourself that you believe the data can illuminate," he said in 2013. "It's about introspection, reflection, seeing patterns, and arriving at realizations about who you are and how you might change." And yet this intimate journey commences not with a turn inward but with a move outward to the streaming data of a device: an extraction of information, a quantification, a visualization. Self-tracking, following Boyd, renders "an *exoself*, or a digital mirror; it lets you look at things you otherwise couldn't see using just your own eyes, and see yourself more honestly."<sup>8</sup>

For his company Sensebridge, Boyd designs a variety of devices intended to produce these digital mirrors of the self. The Heart Spark pendant, for instance, flashes in time with one's heartbeat, externalizing the body's affective rhythms. (FIG. 2) Sound Spark flashes along with the cadence of one's voice; a compass anklet vibrates to augment one's sense of direction. As experience feeds into data streams, so data streams feed back into experience, becoming a vital aspect of sentience and self-knowledge.

Like Wolf, Boyd distinguishes data-driven modes of self-discovery from those of talk-based therapy: "Quantified self is not a linguistic exploration like psychoanalysis—it's more of a digital exploration, and the stuff you're exploring is made up of many little bits and moments." One arrives at insights not through language unfolding in time, he elaborates, but through tracking these bits and moments *over* time. "You may not gain any knowledge in a week or even a month, but maybe with a year of data you might see something significant about yourself; you need a view that's longer than whatever moment you're in." In the interview prompting this verbal rumination on the "exoself," Boyd shifted the plane of existential significance and the possibility of self-knowing from the fleeting temporality of single events to the longitudinal temporality of accretion:

In our physical world we're actually quite small creatures—our powers only extend a few meters. But in the *temporal* dimension we're actually extremely effective. The trouble for us is that it's difficult for us to see the amount of power we have in time because our sense of time is so limited. We go through life one minute at a time—but we're actually going to live a billion moments or something like that.

Digital tracking and time-series analysis allow us to take stock of these billion moments; "they give a longer view of our power in time" by showing how our habits—"the things we're doing over and over"—add up to affect our lives in positive and negative ways. "Without good time calibration," notes Wolf, "it is much harder to

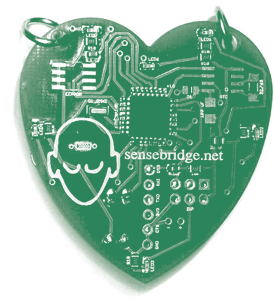


FIGURE 2

The Heart Spark pendant flashes in time with wearers' heartbeats, broadcasting their emotions.

8

Eric Boyd, interview with the author, July 2013, Toronto, spoken emphasis. (All subsequent quotations from Boyd in this text are taken from this interview.)



see the consequences of your actions.” Thus tracking tools become ethical tools, technologies of the self; in self-tracking Boyd finds a pathway from self-knowledge to self-transformation. Tracking has allowed him to regard himself as a “time-series self,” which he finds both liberating and empowering.

Over the last five years, the practice, ethos, and technology of self-tracking has migrated out of the “geeky,” rarefied domain of QS and hacker conventions to capture the attention of venture capitalists, technology startups, established electronics companies, and mass-market consumers. The aisles of Best Buy and Walmart are abundantly stocked with gadgets designed to record personal metrics, the Internet rife with downloadable smartphone apps that can monitor behavior, and suggest, as Boyd commented, “how you might change.” Data-tracking gadgetry includes earbuds that adjust their musical output to keep wearers’ heart rates at certain levels of calm or energy, electronic skin patches that monitor blood flow, smart toothbrushes that help people brush their teeth correctly and long enough, and an impressive collection of wristbands packed with sensors that log footsteps, heart rate, sleep phases, and more.

Fitbit, currently the best known of these devices, is the undisputed market leader in wearable fitness. The company makes a wearable movement-tracker that syncs with users’ personal computers, mobile phones, and now smart watches to continuously monitor steps taken, hours slept, and other data they might choose to track. The stated purpose is to bring about “a healthier you.” In a video advertisement, close-up shots of different body parts in motion elaborate on this aspiration, as the voiceover celebrates the arrival of a sensor that keeps track of routine activities. “Every step you take, every goal you set, every choice you make to be active” will be recorded—either by the band slipped over the wrist or the pendant clipped to the waist. A male runner strides in slow motion with concentric circles radiating out from his feet as they strike the pavement, illustrating the technical achievement of accurate, consumer-grade signal processing and prompting potential users to attend to the rippling consequences of their every movement. Next a woman plays with her family in their backyard, segueing to her home office where crisp imaginary lines extend from her blurry form in the window to the smartphone and laptop on her desk. The sequence suggests to prospective users that they can trust the device to capture any and all information, even when they are absorbed in quality time with family. Data generated as they move through their days—calories burned, distance covered, duration of activity, fluctuation in weight—will be synchronized in real time, across all screens, creating exo-selves they can tap into on any device.

Partway through the Fitbit video advertisement, a man pauses at the turnstile of a subway entrance, then slowly turns to face the camera as a digital overlay indicates the choice before him: Monorail versus WALK. With a smile he rejects the train and sets off on an



illuminated footpath to realize the “potential 2,000 steps” he would thereby add to his daily count. At the press of a button on his mobile smartphone, he broadcasts his choice to a group of friends, his new step-count advancing him on the leaderboard of life. From running to childrearing to commuting—every quotidian activity has potential for transformation, via Fitbit. The advertisement closes on the figure of a woman sleeping, an expression of contentment on her face, her exposed arm revealing the band that promises to optimize “even inactivity” as she slumbers.

Fitbit competitor Jawbone’s “idle alert” also addresses inactivity, vibrating when wearers are still for too long. Some wearables focus entirely on bodily stillness—tracking it, preventing it, helping users maintain proper posture during it. A simple gadget called the Rise sits in one’s pocket and records time sat throughout the day. The Lumo Lift posture device fastens upon one’s lapel or brassiere strap, whence it records and corrects posture with subtle (or not-so-subtle) vibration. “Through the app, you can control when you’re buzzed, how you’re buzzed, and even how intensely it buzzes,” informs the product literature. While the technology performs standard activity tracking, its primary purpose is to monitor and regulate the stationary states of sitting or standing. A promotional ad for the Lift closes with images of a corporate meeting in which the wearer briefly pauses to lift her head and bring her shoulders back, seemingly unprovoked, and allows a triumphal smile to play across her face. “Small changes can be empowering,” the ad exults. As Boyd confirmed, power in time lies with the plasticity of habit; small changes mark the site where the exoself is molded.

Few habits are more intimate and entrenched than those involving food, and it is no surprise that designers of digital tracking technology have created products that focus exclusively on eating. Recalling the dystopian feeding machine in Charlie Chaplin’s film *Modern Times*, the HAPIfork is a smart utensil designed to help people eat more mindfully—and eat less. The fork intervenes in the habit of feeding by monitoring and recording the length of each meal, the number of fork-servings per meal, and the time between each of these servings; if shorter than ten seconds, the fork will oscillate so that the eater knows to slow down—an effect achieved via proprietary “slow control” technology. “You are advised to take about 10–20 chews,” reads the user manual. “If you trigger the HAPIfork’s alarm [by eating too fast], don’t panic. Set the fork down at the side of the plate and wait until the light turns green again, signaling that it is safe to take another bite.” The device, which turns something as routine as a single bite of food into a matter of potential danger, is presented as an “everyday technology” that helps users “take control” of their consumption. The company recommends keeping smartphones in view so users can see their data as it is collected in real time; as they feed themselves, their data is “fed” back to them. “Every bite is a potential teaching experience,” noted

Ryan Lawler, "In Defense of the HAPIfork," *TechCrunch* (January 12, 2013), online at [www.techcrunch.com](http://www.techcrunch.com).

Clynes and Kline coined the term *cyborg* while writing in 1960 about how to equip astronauts for space. "For the exogenously extended organizational complex functioning as an integrated homeostatic system unconsciously," they wrote, "we propose the term *cyborg*." Manfred E. Clynes and Nathan S. Kline, "Cyborgs and Space," *Astronautics* (September 1960): 27. See also Auguste Villiers de L'Isle-Adam, *L'Eve Future* (Paris: M. De Brunhoff, 1886); Terry Castle, *The Female Thermometer: Eighteenth-Century Culture and the Invention of the Uncanny* (New York: Oxford University Press, 1995); Donna Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late 20th Century" (1985), reprinted in *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 149–81.

Anthony Giddens, *Modernity and Self-Identity: Self and Society in the Late Modern Age* (Stanford, CA: Stanford University Press, 1991); Nikolas Rose, *The Politics of Life Itself: Biomedicine, Power, and Subjectivity in the Twenty-First Century* (Princeton, NJ: Princeton University Press, 2007); Alan Hunt, "Risk and Moralization in Everyday Life," in *Risk and Morality*, ed. Aaron Doyle and Richard V. Ericson (Toronto: University of Toronto Press, 2003), 165–92.

a user in a *TechCrunch* review.<sup>9</sup> Like all technologies of the self, the HAPIfork is an instrument of entrainment, serving to bring one's daily habits into alignment with the conduct to which one aspires.

The habit of hydration, another mundane yet vital human action, is the focus of the H2O-Pal monitoring device, a small wireless scale that one attaches to the bottom of any water bottle where it keeps track (using built-in flash memory and a weight measuring sensor and accelerometer) of how much liquid is consumed from it, conveying this information to users' smartphones where a corresponding application is programmed to alert those who have not hydrated enough. Similarly, BluFit's "passive hydration tracking" bottle uses built-in sensors to measure how much has been drunk, automatically adjusting daily goals based on temperature and humidity, and providing feedback in the form of flashing lights. Yet another smart water bottle, the llumi, changes color from red, to yellow, to green throughout the day to signal users' proximity or distance to their preset hydration goals. As with the HAPIfork, these devices transfer the burden of vigilance—and even, to a degree, behavior change—from selves to the sensors and computational algorithms of wearable technology.

Wearable vigilance extends from the outward-in acts of eating and hydration to the intimate, self-generated act of breathing—arguably the most elemental and vital unit of existence in and through time. The measure of breath, coupled to heartbeat, is the metric that constitutes seconds, accumulating into minutes, aggregating into hours—much as data itself aggregates into the time-series self. A small wearable device called the Spire helps people to regulate their breath—and, by extension, their stress levels—by alerting them when their respiration becomes shallow or erratic. The product website suggests that users review graphs of their breathing during activities such as meditating, reading, and working on a computer as a way to enhance their self-awareness. (FIG. 3) The idea is that by wearing the Spire, receiving its prompts, and reflecting on its data, users will be able to cultivate better breathing habits. Another device concerned with entraining new patterns of breath and focus is the Muse, a seven-sensor, mobile EEG headset designed to give users a window into—and, over time, a handle on—the intimate signals of their brain data via real-time audio feedback and dynamic onscreen visualizations. The ad speaks with the voice of a personal coach: "See and hear your brain activity. Test how well you can manage stress. Learn how to calm your busy mind." Giving a cyborgian twist to centuries of analog meditation devices of the visual (mandalas) and acoustic (chants) sort, the Muse tunes into internal brainwaves to offer an external read-out; it is a real-time informatic instrument designed to help individuals achieve mindfulness as they move through their days. "I'm really interested in figuring out what is actually possible in terms of mental augmentation with this new digital mirror that we have," comments Boyd of this and other

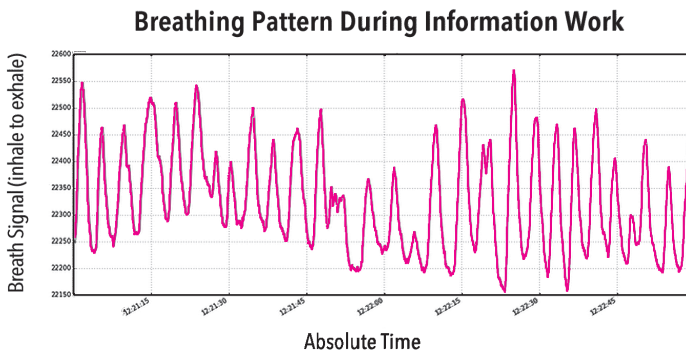


FIGURE 3

Breathing during information work is more erratic and less deep than breathing during meditation or reading, according to the commercial website for the Spire feedback device, in a blog posting from August 4, 2014.

emerging “brainware” devices. “In a sense you could call it a cyborg, because it lets you look at things you couldn’t look at using just your own eyes.”

Fantasies of the body measured by thermometers and controlled by feedback devices exist from the European Enlightenment to mid-20th-century cyborg imaginaries in which human self-regulatory controls would be enhanced and extended via feedback loops with machinic controls, creating powerful “artifact-organism systems.”<sup>10</sup> Although such systems were fueled by a desire to enhance human capacities beyond animal limits, they also heightened anxiety over these limits, introducing a new pressure for technological supplementation.

The wearable tech industry plays on this anxiety and pressure, addressing a market of consumers who “fly blind” through their daily routines, unsure whether to trust their own senses, desires, and intuitions as they make mundane yet vital choices—when, what, and how much to eat, drink, move, or rest. Denizens of so-called risk society are expected to shape their lives through choice in the manner of savvy, vigilant entrepreneurs—and yet, more often than not, they lack the knowledge, foresight, or resources to navigate the abundance of potential choices they face.<sup>11</sup> When equipped with devices that transcend the myopic vantage of real-time experience, these subjects are released from the burden of vigilance; they don’t have to look at the water bottle or check their thirst because digital tracking products and applications do it for them. The technology promises to fill in the blind spots and take the guesswork out of everyday living, supplementing users’ shortsighted perspective with a continuous, informatic gaze—a big data gaze—able to compute how small choices become consequential through repetition. Personal sensor technologies are offered by their producers as digital compasses to help people make, as Fitbit puts it, the “small daily decisions” that can add up to “BIG RESULTS.” (FIG. 4) This is an epistemological mode in which correlation holds sway over causation, cumulative data over immediate experience, and future over present.

“You can build a profile or picture of what it is you’re doing, and this lets you see and understand the choices you’re making



**FIGURE 4**  
Still image from a promotional video for the Fitbit Zip from 2012.

on a daily basis,” said Scott Kozicki, a representative of Verizon’s Health Care Management group in praise of self-tracking technology, “which is really who you *are*: the choices that you make all day long, whether to take the stairs or the elevator, what you will eat or not eat.”<sup>12</sup> It is important, Kozicki continued, that one remain in constant touch with one’s data profile—one’s *exoself*, to use Boyd’s term—in order “to see how your choices are impacting you *now*—see how the gauges are moving *as* you make choices.” The novel insight into one’s habits that sensor data affords, he suggested, could function as a sort of “sixth sense.” Traditionally a phrase to describe uncanny insights that seem to come from some ethereal, “extra-sensory” domain, the sixth sense is, in the case of tracking devices, a cyborgian affordance that supplements human sentience with electro-mechanical sensors and data-processing software sensitive enough to detect otherwise imperceptible patterns of being.<sup>13</sup>

The science and technology pundit Melanie Swan uses a similar metaphor to describe this supplemental insight into being, suggesting that the transposition of big-data epistemologies to the scale of the individual affords “a sort of fourth-person perspective” on the self and, ultimately, a new kind of truth—one that is “not possible with ordinary senses” in that it does not correspond to a phenomenological self (temporally and spatially located) but to a self whose truth lies in scattered points, associations, and dynamic accretions.<sup>14</sup> Wearable sensor technology invites us to view ourselves as longitudinal databases constantly accruing new content: “You are your data” is the frequent refrain.

The fourth-person self thus joins the exoself and the time-series self as a new entity complicating the presumed unified subject, the biological human. The “body” here is a data-generating device that must be coupled to data-monitoring systems; together they inform a new episteme that devotees find empowering. As the electronics company Samsung asks in a recent video promoting its health and fitness system, “*What if you could ask your body questions and listen to the answers, every minute of every day? You could adjust your habits according to your body’s advice. Imagine the insights gained, the mysteries unlocked; it would change your life.*”<sup>15</sup> In this scenario, sensing happens not only in or through the body, but also in and through sensor technology; one’s own “data exhaust” (contemporary parlance for the traces given off by citizens of the networked world), tracked and filtered through analytic algorithms, becomes a trustworthy guide through the uncertainty of human experience and perception.

Countering the cheerful boosterism of digital tracking pundits, some worry that the rhetoric of “you are your data” introduces a gap between the “you” of the dataset and the epistemologies by which that dataset is amassed, studied, and made meaningful. “This is a body that is continually emitting signs, albeit in forms inaccessible to the self that might act to maintain it,” note anthropologists



Ana Viseu and Lucy Suchman.<sup>16</sup> These scholars are troubled by the potential disempowerment that the discourse of wearable computing produces, in which technology is the only way to bridge the “epistemological lacuna” that divides “the modern body and the knowing and acting self” and the sole means of bringing “physiological fact into the grasp of the experiencing subject.”<sup>17</sup>

Whether or not technology serves to empower or disempower “the knowing and acting self” is a point of debate among tracking enthusiasts. This debate came to the fore during a panel on self-tracking held at the 2012 Consumer Electronics Show in Las Vegas, when an audience member raised his hand and asked:

I'd like to be able to create an avatar of myself who drinks regular [not diet] coke and takes the elevator [not the stairs] and eats no vegetables, and then drag that avatar across a timeline into the future and show myself how I'm getting fatter, getting older, getting diabetes, and by age 65 my tombstone rises up? I want something that can communicate to me what the decisions I make *now* mean over time.<sup>18</sup>

Panelists responded that tracking technology could do more than give people self-knowledge and perspective on choices—it could help *guide* those choices, “in the fashion of a thermostat.” Such technology would not only track wearers—it would keep them “on track,” interrupting the flow of experience to prompt them to eat, drink, meditate, or rest as needed (or even, in the case of the app RunPee, meant for moviegoers, TV watchers, and computer users, to get up and go urinate). “We’re on the brink of really exciting things—devices that monitor things and then give you actionable updates before you even need to ask,” said panelist Leslie Zeliger, a technology designer and longtime self-tracker who welcomes the opportunity to outsource the labor of self-regulation.

Yet technology that entrains as it tracks, acting as a kind of advanced human cattle prod, is where Wolf, Boyd, and other QS protagonists draw the line. Across it, the quantified self becomes the infantilized self and the ethical project recedes. These self-trackers insist on the core humanism of their enterprise: rather than compromising or degrading human subjectivity and free will, technology such as Boyd’s suite of Sensebridge electronics or longitudinal graphs of automatically tracked data can enhance it by enabling new awareness of one’s being in the world and in time, and lending new tools to the project of self-care and the good life. The novel ethical mandate of the digitally self-tracking subject is not simply to “know thyself” but to let digital sensors and big-data analytics share in the knowing.<sup>19</sup> Tracking, on this account, reveals new truths about who we are—and who we might become.

12

Scott Kozicki of Verizon’s Health Care Management Markets group, speaker on the panel “Is Mobile Making Us Healthier?” Consumer Electronics Show in Las Vegas on February 5, 2012.

13

Jerry Kang and Dana Cuff argue that microcomputational sensing amounts to a new sense organ: “It is as if human beings are granted an additional ‘sense’ in addition to sight, hearing, taste, smell, and touch—a sort of sixth sense, a datasense.” See Jerry Kang and Dana Cuff, “Pervasive Computing: Embedding the Public Square,” *Washington and Lee Law Review* 62, no. 1 (2005): 110. These microsensors are not simply prosthetic, writes Mark Hansen, for they alter the very conditions of human sensing and perception, allowing us to “forge connections with microtemporal processes, that, despite evading the grasp of our conscious reflection and sense perception,” we can “feed forward” into our future actions. See Mark Hansen, *Feed-Forward: On the Future of Twenty-First-Century Media* (Chicago: University Of Chicago Press, 2014), 38.

14

Melanie Swan, “The Quantified Self: Fundamental Disruption in Big Data Science and Biological Discovery,” *Big Data* 1, no. 2 (2013): 85–99.

15

The Samsung video can be found online at: <https://vimeo.com/96135620>.

16

Ana Viseu and Lucy Suchman, “Wearable Augmentations: Imaginaries of the Informed Body,” in *Technologized Images, Technologized Bodies*, ed. Jeanette Edwards, Penelope Harvey, and Peter Wade (New York: Berghahn Books, 2010), 161–84. Quote from page 175.

17

*Ibid.*, 175.

18

Audience member comment during the panel “Is Mobile Making Us Healthier?” Consumer Electronics Show in Las Vegas on February 5, 2012, <https://www.youtube.com/watch?v=vF8tPruZqOw>.

19

Along these lines, Hansen (2014) argues that we should view humans, in their relationship with sensing and tracking technology, as *modulators* of their experience rather than transcendent agents.

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