Sensored: The Quantified Self, Self-Tracking, and the Limits of Digital Transparency

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ABSTRACT

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The idea that daily life overflows with data has entered our common sense. Digital sensors placed in phones, clothing, or household appliances to track how we walk, how much we sleep, or where we travel have heightened the sense that everything about our lives is rapidly being translated into data. Theorists writing about data overload have largely converged around questions of privacy and agency, focusing on the feelings of impotence produced by large quantities of data that now let corporations effortlessly monitor and regulate people's lives.

By contrast, I am interested in moments of friction. Scholars point to real issues, but they overstate the efficacy of data gathering and discount the professional dynamics that motivate the proliferation of data. As I evaluate how data discourse operates and builds, I concentrate on the experiences of those involved in the business of self-tracking, and mainly on the work of U.S.-based developers of wearable computing and the technology professionals who participate in the international forum for data enthusiasts called the Quantified Self. As I analyze how digital entrepreneurialism configures notions of data and transforms digital self-monitoring into meaningful work, I examine how the relationship of technology professionals to data opens onto wider debates about the politics of digital representation. Ultimately, by applying an anthropological lens to explore how the practices, beliefs, and views of marketers, engineers, and developers of self-tracking tools shape digital knowledge, this research challenges accounts of data based purely on transparency, anxiety, and fear and reveals just how precarious the control exerted by digital companies and self-monitoring tools really is.

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A joke had been making rounds at dinner tables of Soviet émigrés in the early 1990s. It told of a family who hatched a plan for covertly communicating with the kin they left at home once they reach America. “Let ‘aching feet’ be our code for happiness,” they agreed before parting. “If we write that our feet hurt, you will know that we like it in America and that you should follow us there.” After some time, the Soviet family receives mail from abroad. Eager to discover how their blood has fared, the patriarch scans the message for signs of foreign bliss. True to form, the letter begins: “Dear all, we have finally made it to America and have started to settle in. What we do most here is walk, but from all of this walking our feet have started to really hurt. In America, one has to do an awful lot of walking. America is like a treadmill. Once you get on, you can never get off. We have walked so much that our feet began to ache nonstop.” Forgetting the code, the father drops his head, despondent. “If they are in so much pain in America, why are we in such a rush to leave Russia?” The anecdote points to what only a family that has gone through immigration can appreciate: the discouraging sacrifices the process requires of its participants turns a coded “pain” to real pain and endurance; it turns misrecognition to fact.

My sister and I were not told that we were leaving until the last possible moment, though clues pointing to special developments in our family affairs slowly filled the apartment. When our grandmother spoke by phone to our uncle, the first of the family to immigrate overseas, her raised and anxious voice already announced that an exchange was taking place with somewhere important and far away. As she danced across the bedroom, to which she uselessly retreated for privacy, she would yell into the phone as though trying to reach him on the other side through

sheer vocal power. Our curiosity was only piqued by our mother's foreboding looks and threats to keep quiet. All this even before the suitcases that were placed behind our parent's bed appeared without explanation.

Every now and again, when we'd lock ourselves in our parents' bedroom to jump on the bed like a trampoline, my sister and I would catch glimpses of these gray leather trunks that promised a world of adventure by their very presence. When our parents were not looking, or were too busy to notice, we dragged the trunks over to the closet and prepared each one for departure, lining the inside with neatly folded shirts and pants, dresses and socks, linens and towels. We pushed the brimming luggage down the hall and into our bedroom. There, sitting on the bright green rug that covered the floor – one that I always imagined was like a green pasture — we embarked on our travels. Hours later, exhausted but satisfied, we would abandon our baggage on the bedroom floor. When she'd discover our secret getaway, our mother would force us to put everything back as neatly as we found it before going to bed. There was little I dreaded more than the injunction to unpack.

When relatives came to visit, adults were frequently ensconced in the kitchen, leaving the kids huddled by the door to listen for terms of grave importance. Noticing the play of shadows at the door, our father always appeared in the threshold to disarm our covert operations. "Where is America?" we'd sheepishly probe. He'd smile, but sternly warned that some conversations were for adults only. One day, an English teacher arrived without prior warning and my sister and I were made to endlessly pronounce the imperceptible differences between "sheep" and "ship," "thin" and "tin."

Under vows of silence from our friends, we confessed that we had relatives abroad, in America, a country to which we started to feel a metonymic connection. "What is it like?" they

wanted to know. I could only imagine it as a green lawn. Then there were real trips. Twice to Moscow, which bolstered our bragging rights at school for having flown in a plane. And one on which our father left alone and brought back two expensive coats for my mother and himself. Slowly, the dusty suitcases in the bedroom started filling up with things: linens and sheets and clothes that no one was asked to put back. When our parents finally stated the obvious, the bags were full.

To ameliorate the shock of the announcement, they pointed to the new clothes that we had accumulated, more of which, they promised, were to come in America. Never mind the clothes — we looked forward to a ride on an international plane. We only later learned that to finance the trip, our parents had to sell practically everything we owned. Crossing the ocean, we passed the time by imagining our new life abroad, distracted from the sight of our father crying in the window seat by a cool can of Coca-Cola. Imbibing that sacred liquid for the first time felt like consuming the American Dream.

After a long journey, our uncle rushed to greet us at the busy JFK airport. Short and bald, he was hardly the man of mystery we imagined huddled on the other side of that international connection. Once we claimed the luggage, the family piled into his beat-up station wagon. Eager to impress us, he forced a detour on the way to our new home in Queens and drove us through the expensive Forest Hills Gardens, lined with century-old mansions and luscious, brimming green lawns. For a moment, it seemed that somehow my vision proved true, America really was green and beautiful, just as I had imagined. Then, he got back on the highway and continued to our new home, a simple second floor walk-up on an urban street. We got out of the car, stretched our legs, and finally took in that long-awaited sight. Our feet ached a bit from being confined inside for so long. There was not a green lawn in sight.

This formative experience, one that has shaped the trajectory of my life in painful and beautiful ways, is the first thing that I would like to acknowledge. This dissertation would not have been possible without it. Crossing that cultural and physical terrain laid a path for a life lived in a comparative perspective. It also helped make anthropology feel like home.

To say that I am grateful for the intellectual life Columbia University has made it possible for me to build, is an understatement. The years I have spent in the Department of Anthropology have enriched my thinking in innumerable ways. I am especially thankful for the thoughtful guidance of my advisor Marilyn Ivy. Your mentorship throughout my time in the department and your rigorous critique of my work has allowed me to continue to challenge myself as a scholar and to grow as a writer. I am also thankful for the support and the constructive feedback of Brian Larkin and Nadia Abu El Haj, my committee members. Brian, I appreciate that your door was always open for a rich conversation. Your thorough commentary opened up new ways of thinking and reenergized my writing each time. Nadia, your pointed questions and direction helped me find the right words to articulate my thoughts. The generous feedback of my external readers, Matthew Jones and Dennis Tenen, likewise had an important impact on this project. My work has been strengthened by your timely and rich advice.

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Dedication

To my kids, Clara and Robert

Introduction

On a frosty January night in New York City, Chris and I lined up outside of the McKittrick Hotel for the premier of the new Showtime documentary series *Dark Net*. Although it was only six o'clock, it was already pitch-dark outside, and the wintry streets were sparsely peopled. As we waited, I stole a sidelong glance at my phone to check that the invitation Chris had sent to me was still in my Inbox. A delicate, androgynous face set with plump lips, eyes covered by an electronic circuit board as though it were a mask, spread across my screen (Figure 1). The tagline running across the forehead of the person pictured on the image read, "Dangerous. Seductive. Illuminating," sealing the promise for a night of technophilic mystery.

Figure 1: Poster for Dark Net

The premise echoed in the show's scheduling. Slated to run on Showtime at 11:00 in the evening, the marketing evoked associations with the scopophilic pleasure of *Showtime After Hours* that turned the cable station into a pop-culture phenomenon during the 1990s and early 2000s.

The burlesque qualities of the promotional materials seemed mirrored in the venue chosen for the premier. The show *Sleep No More*, described by one reviewer as "synonymous with intrigue," plays at the McKittrick hotel most nights. During the performance, the audience walks about the set as they uncover important clues, becoming part of the act. Although the McKittrick Hotel is billed as an original, dating to the 1930s, it was constructed for the show on the site of a former warehouse. The feigned authenticity of the hotel contributed to the sense of mystery and discovery the audience was meant to experience during the theatrical performance. Located on 27th Street, the setting was also just to the side of the main thoroughfare of eateries and buildings that now border the expansive Manhattan High Line, where voyeurism has become the area's main calling card. Once dominated by abandoned factory buildings and auto shops, the neighborhood – now that the High Line, formerly a subway line, has been reclaimed as a designer park – boasts rows of high-end glass-house condominiums that tower all along its prolonged stretch. Walking the distance of nearly three dozen blocks from Gansevoort Street to 34th Street, the thrill of seeing inside private windows placed all too close to the former tracks, and being seen walking down its present stylish rows, constitute the main pleasures of the park's experience.

The motif of a titillating exposé on my mind, I looked over at Chris. Chris shuffled his feet. He seemed anxious. A day earlier we met with several of my out-of-town acquaintances from the Quantified Self group for a round of drinks at a local lounge. Knowing Chris would be in town, I invited him to come along, and we walked to the venue after having dinner together first. But the evening did not go as planned. While chatty and relaxed with me at dinner, during drinks Chris was tense, even defensive. I felt that he arrived already on edge. We stumbled

through small-talk for several hours before disbanding. I left feeling puzzled and somehow caught in the middle.

Still visibly upset, Chris confronted me about the previous night as we waited for the doors to open and the premier to begin. “Do you feel that I was being judged?” he put the question to me point blank. Rubbing my hands together for warmth, I searched for words to dispel the tension. I was glad to finally address the elephant in the room, but I still struggled to understand how the evening had turned. “I’m not sure,” I muttered, trying a soft approach. Chris immediately waved away my equivocation. In any case, he blurted out more to himself than to me, he had already analyzed the voice recording of the conversation from the night before for tone and had made up his mind. He had been judged; he had the data to prove it. I shifted in my shoes, feeling a little uneasy. What did the data show? I wondered. How did they derive intention from tone? And what would they say about our conversation now? To Chris, there seemed no ambiguity. The data spoke. Their message appeared clear.

The exchange stayed with me, though it had not come as a great surprise. It was this very faith in data that had brought Chris – and me – out to tonight’s event. The episode to be screened that evening, called “Upgraded,” starred Chris, documenting his embrace of sensor-derived information. This dissertation is explicitly concerned with the forms of digital self-tracking that people like Chris entertain. I first encountered Chris’s story in an article and was equally fascinated by his apparent commitment to monitoring his life through data and with the voluminous digital archives that he strives to create, as with the publicity his self-monitoring has received. First “discovered” at Amber Case’s Cyborg Camp in 2012, he had since achieved a fair bit of notoriety for employing what he claims are as many as seven hundred sensors and devices

to document his life.[1] Regularly appearing in the press and in film, he has become widely known as "The Most Connected Man on Earth."[2]

Although popular media outlets, like the Showtime's series *Dark Net,* often paint Chris's preoccupation with data as both rare and extreme, Chris's digital self-tracking is not unique, and not only because his interest in data has several historical precedents.[3] In many ways, his personal investment in digital data reflects realities quickly becoming mainstream. Until recently, credit card use, online browsing patterns, government census, and medical records have been the main sources of consumer, citizen, and patient information; archives that have largely been kept in specialty hands. Today, the growing availability of computerized sensors has massively widened the scope of information that a non-specialist public is able to collect. Biosensors embedded in a range of devices shaped as rings, bracelets, patches, or articles of clothing that collect blood or glucose levels and monitor stress, mood, or exertion have become widely commercially available.[4] Supplementing these are the sensors placed in objects of everyday use like refrigerators, coffee makers, mattresses, showers, or cars that collect data about one's whereabouts, habits, and patterns of use.[5] As this dissertation will examine, what has

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[1] Cyborg Camp is a set of conferences organized by Amber Case, aimed at bringing technology producers into a conversation about the future possibilities and social consequences of emerging tech. The conferences began organizing in 2008. A more detailed treatment of the Cyborg Camp and Chris's role in it follows in the opening interlude to Part I.

[2] This expression has circulated widely in journalistic accounts. See, for example, Samantha Murphy, "Meet the 'Most Connected Man' in the world," *Mashable,* March 13, 2014, https://mashable.com/2014/03/13/most-connected-man-in-world-chris-dancy/#reoQdf2MWqq9

[3] Rebecca Lemov, "Archives-of-the-Self: The Vicissitudes of Time and Self in a Technologically Determinist Future," in *Science in the Archives: Past, Presents, Futures,* ed. Lorraine Daston (Chicago: University of Chicago Press, 2017).

[4] This set of technologies is commonly described as wearables, or wearable technology, WT for short.

[5] This set of technologies is collectively referred to as the Internet of Things, or IoT. It is a more contemporary and consumer-facing reiteration of older terminology that described how machines connect with one another. This is occasionally still referred to as M2M or Machine-to-Machine interaction, although IoT technologies are seen as ones that can potentially connect an infinite range of devices and sensors, whereas M2M solutions were understood to connect only a limited cluster of sensors.

become known as the Quantified Self "community" has also coalesced in response to a growing popular interest in these types of tools. In considering the data-collecting practices of people like Chris and their relationship to groups like the Quantified Self, this project explores how collecting copious digital records has become meaningful work.

I use the word "work" advisedly. Pundits and entrepreneurs often see the work of self-tracking as related to the process of generating and managing growing quantities of data that new digital devices increasingly produce; work that they tend to posit through the lens of technological determinism: as a natural outcome of advances in technology that offer solutions to age-old problems, like the timeless interest in personal record-making. At one event I attended that brought together journalists, developers, and investors to discuss the future of wearable tools, the host of the evening passed around a miniature digital sensor that was half the size of a dime. As the tiny instrument made its way around the room and the audience took turns gingerly balancing it in their hands, the speaker – a developer of wearable tools – energized the crowd by promoting the portability and the pliability of this technology that he claimed was now small enough to fit virtually anywhere, with the capacity to collect information about practically anything. Similarly, programs like Showtime present digital tools as archiving mechanisms that have simply been "Upgraded" – per the title of Chris's episode – for the digital age. The term "upgraded" resonates as a double entendre in this context, indicating that the perceptual faculties of both the person and the device have been improved by new digital technology.

This popular and entrepreneurial discourse has heightened the sense that sensor-embedded devices work by translating our lives and actions into data at a previously unprecedented scale. As digital sensors have been incorporated into phones, clothing, or household appliances to track how we walk, how much we sleep, or where we travel, media

outlets and technology professionals have dramatized the idea that everything we do is fast becoming data and that precious little now escapes the digital gaze, for better or for worse. These sentiments were articulated especially well in the documentary film *The Human Face of Big Data,* which aired on PBS in January 2016 and featured commentary from today's leading technology executives, including those working at premier data-generating companies like Google, Amazon, and 23andMe.[6] As the film opens onto a lush forest scene, a male baritone intones while dramatic music builds in the background:

> In the near future, every object on earth will be generating data, including our homes, our cars, even our bodies. Almost *everything* we do today leaves a trail of digital exhaust, a perpetual stream of text, location data, and other information that will live on well after each of us is long gone.

Created by Rick Sloman, a former photographer for the *National Geographic,* this film presents data as an organic phenomenon that has become as inevitable as the changing of the seasons. People like Chris or the participants of the Quantified Self, who claim an affinity for digital data, frequently operate in journalistic accounts as emblems of this future, as those who simply operate on the leading edge of coming digital trends.

Yet, I argue, data do not regulate or reveal absolutely. Neither is it obvious that improved technological capacities alone account for ways data now permeate and document our lives. This dissertation takes up the growing digital abundance to ask a contiguous set of questions: (1) What social mechanism motivate people like Chris to collect digital data about their lives? (2) How are notions of the self and the body configured through this digital encounter? (3) How is digital self-tracking mobilizing a new vision of the "good life"? And centrally, (4) what forms of labor and capital organize contemporary investments in self-monitoring technology?

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[6] Rick Smolan and Jennifer Erwitt, "The human face of big data," *PBS,* January 21, 2016, www.pbs.org/show/human-face-big-data/, emphasis, mine.

The questions I ask focus attention on the custodians of self-tracking tools, not simply their end users. They ask about the work and influence of people who introduce technology into the social sphere, not just their social effects. To answer these questions, my ethnographic research has concentrated on the work of technology professionals, and mainly on the U.S.-based developers of sensor-enabled devices. In using the word "custodians" I follow communications scholar Tarleton Gillespie. In his 2018 book, *Custodians of the Internet,* Gillespie uses the term to categorize the supervisory role of social media platforms and platform mediators that set the rules for engagement on the internet.[7] Their often-invisible labor as guardians and caretakers sustains our online experience. The people that I have worked with are custodians of self-tracking tools in a compounded sense as well. They are professionals who create the technological ecosystems that support contemporary data gathering. They are also more than the makers and distributors of wearable and sensor-embedded tools. Their beliefs about data, social views, self-tracking practices, and their professional ambitions and anxieties affect how this technology becomes embedded in everyday life – and the types of bodies, selves, and subjectivities these tools both make possible and preclude. This dissertation examines the way technology professionals shape bodies through the sensor-enabled tools they produce as much as it is about the bodily work and forms of desire of professionals that shape the business of self-tracking.

Interface Ethnography: Situating the Digital Field

[7] Tarleton Gillespie, *Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions that Shape Social Media* (New Haven, CT & London: Yale University Press, 2018).

Places where technology is made are neither narrowly circumscribed nor completely diffuse and everywhere identical. Technology is produced in specific locations, but these environments are not isolated nodes. They form a wide network of ideas and practices that shape how devices are disseminated into everyday life. Although geographically most of my interactions were concentrated in and around the New York City area, a growing technological hotbed now known as "Silicon Alley" to signify its relationship to Silicon Valley (the latter still viewed as the cultural steward of all things technological), following the trail of personal data and the professional networks where self-monitoring devices, data, and data discourse are produced took me to a broad range of lay and commercial locations.

Researching the work of technology producers is also notoriously difficult. Not only does it involve "studying up," but it also often requires the researcher to navigate professional spaces protective of proprietary ideas and therefore wary of outsiders.[8] That does not mean that the discourse on data proceeds in hermetically sealed spaces. Sherry Ortner, for example, advocates for what she calls "interface ethnography" as a solution to studying elite and ethnographically elusive sites. Interface ethnography involves attending events where the "closed institution presents itself to 'the public.'"[9] My research has similarly been enriched by my participation in public forums where the technological imagination shaping the data-driven future was regularly placed on display.

The organizing efforts of the Quantified Self, an international forum for professionals of self-tracking technology, has been foundational to this research. Since 2013, I have attended

[8] Laura Nader, "Up the anthropologist: Perspectives gained from studying up," in *Reinventing Anthropology*, ed. D. Hymes (New York: Vintage Books,1974 [1969]).
[9] Sherry B. Ortner, "Access: Reflections on studying up in Hollywood," *Ethnography* 11, no. 2 (June 2010): 211–233.

every meeting held in New York City by the Quantified Self, and participated in events organized in Boston and Washington, DC since 2015. Over the course of my research, I was also involved in three large conferences put on by the Quantified Self: The European Quantified Self Conferences (May 2014), the Global Quantified Self Conference (June 2015), and the Quantified Self Public Health Conference (May 2016). Many of the Quantified Self participants that I have met have additionally sat down with me for personal, one-on-one interviews on numerous occasions.

To some social commentators and critical data scholars it may likely seem peculiar that I equate the Quantified Self primarily with entrepreneurial activity. Participants, pundits, and social critics all generally regard the Quantified Self as a forum for private enthusiasts of digital self-tracking; they see the Quantified Self only as a "community" that took shape around a shared personal interest in digital monitoring tools. For example, a widely cited distinctions made by sociologist Whitney Erin Boesel encourages writers of all stripe to take care to differentiate between the two common uses of the expression "quantified self."[10] Boesel clarifies that the expression is often used indiscriminately, as though it referred both to the work of the companies developing data-monitoring gadgets, the so-called "quantapreneurs," as well as to the device users who convene on a regular basis to share their experiences with self-tracking tools. To avoid the confusion between these two groups of people, she advises to mark their differences by writing the former in lowercase letters, and the latter using the title case. Others, like sociologists Deborah Lupton, have proposed to broaden the phrase "quantified self" to designate all people who digitally track and not only people who participate in the activities organized

[10] See, Whitney Erin Boesel, "What is the Quantified Self now," *Cyborgology*, https://thesocietypages.org/cyborgology/2013/05/22/what-is-the-quantified-self-now/

under the banner of the Quantified Self.[11] That the term excludes professionals developing wearable and sensor-enabled technology, in Lupton's writing, is intentional. Lupton uses the expression in this expanded sense as a provocation. Instead of a label that describes a specific category of tools produced by entrepreneurs of wearable technology, "quantified self" emerges in her writing as a sinister label. It is one that people generating data increasingly wear, whether it is as a badge of honor or as a mark of shame, and it includes but also exceeds the people who participate in any formal events organized by the Quantified Self. In contrast to the agentive language of "membership" that participants of the Quantified Self employ to qualify their relationship to group activities, the "quantified self" emerges in Lupton's work as a significantly more passive identity for "users" interpolated by an expanding number of "quantapreneurs" developing self-monitoring tools.

Gary Wolf and Kevin Kelly, the two people who first coined the expression as a headline in 2008 when they were developing a story for *Wired* magazine where they both worked as editors, and who have since built the Quantified Self into an organized network of meetings, conferences, and online discussion forums, readily invite and even set the tone for these associations, particularly in establishing the understanding of the Quantified Self as a forum primarily indented for tool users rather than tool producers. When we spoke, Wolf explained that originally, creating the term was part of a standard "journalistic practice …Very often when you're talking about an idea for a story, you do ask, well, what's the headline like? You try and understand, what is the label that makes this relevant to what people are thinking about now?"[12] And what they observed was a burgeoning tech scene: "geolocation, individualized social media,

[11] Deborah Lupton, *The Quantified Self* (Cambridge: Polity Press, 2016).
[12] Gary Wolf, interview with the author, June 2016.

analytics, the availability of processing capacity, and really small packages that people could use personally." As Wolf tells it, the Quantified Self transformed from a story and into a "community" when he and Kelly decided to get a few people together for a conversation in Kelly's Pasadena, California home.

That first gathering quickly exceeded the two journalists' plan for a magazine article, and arrangements were made to meet again in the Bay Area. Steven Dean, who was in town from New York City, also suggested to start a similar conversation on the East Coast. By now, speaking about how the Quantified Self went from a single meeting convened in Kevin Kelly's house to a "community" of more than a hundred chapters that regularly organize events in as many cities across the United States and abroad, has become a familiar part of the Quantified Self story, one often recounted for new participants during organized events. The narrative presents the Quantified Self as an expression that has helped name and flame an interest in digital data that has rapidly become mainstream. When Boesel published her blog entry in an academic sociology blog discussing the difference between the "quantapreneurs" and the Quantified Self "members," it felt fitting that Wolf later also republished her entry as a key news feature on the website quantifiedself.com, the website dedicated to personal stories with digital self-tracking as well as important "community" announcements and news.

In my research, by resituating the Quantified Self as a site for professional networking and relationship-building, I argue that these popular and critical considerations misrepresent the locus of the Quantified Self as a social gathering as well as the significance the label "community" has taken on in this context. I found that the people participating in the Quantified Self as "enthusiasts" could not so easily be separated from their roles as data professionals. In my research, the Quantified Self has thus provided an important gateway into some of the key

dynamics shaping the data market and data practices today. The conversations taking place at the Quantified Self events and digital forums, and the discussions I have had with participants, all offered valuable insight to the larger language of data shared by technology professionals and entrepreneurs.

The Quantified Self is among the more successful and popular technology forums. However, I supplemented my interaction with participants of the Quantified Self with engagement with technology professionals at other venues. From May 2014 to May 2016, I attended dozens of seminars, evenings, and workshops organized for developers of self-monitoring tools in New York City, events often promoted through event-organizing websites like Meetup.com or Eventbrite.com that increasingly alleviate the work of bringing people together for in-person conversation. Initially, typing keywords like "wearables," "Internet of Things," "data," and even "quantified self" into the search windows of these web portals put me in touch with an expanding number of events staged around these themes. I met many of my interlocutors in forums like these and particularly the following New York–based Meetup groups: Data Driven NYC; IoT Central; Personal Data NYC; Hardwired NYC; Wearable Tech NYC; Bots and Brains Machine Learning NYC; Volumetric Society of NYC – Immersion, Biometrics, Sensors, Consciousness Hacking NYC; NYC Open Data; Data Skeptics; NYC Women in Machine Learning & Data Science; Women Who Code NYC; and Girl Develop It NYC.

In addition, I attended several industry conferences along the East and West Coasts centered on wearable computing or personal data, including: Strata Hadoop NYC 2014 and 2015; Wearables and Things 2014, Wearables Tech Expo 2015; Wearables 2.0; KDD 2014 (Knowledge Discovery and Data); Consumer Electronics Show 2015 and 2016; and the

Microsoft Hardware Workshop 2016. These experiences yielded connections that led to the opportunity to spend several weeks in the office of a small New York City start-up working on developing a wearable device and to collaborate on a small project with another team working on a wearable prototype. These interactions were complemented by in-depth interviews with staff members – communication directors, developers, and marketing leads – of several other start-up firms.

As I consider how data discourse operates and builds, I situate my research at the intersection of the Quantified Self and this wider network of technology producers. Moved by the perceived separation between entrepreneurial activity and the personal commitments of the Quantified Self, some participants of the forum bristle at the opportunistic way Chris promotes his self-tracking and the way he has transformed his dedication to data into a professional identity. By contrast, when Chris is heralded as a representative of the Quantified Self in the popular press, and especially when he is viewed as the Quantified Self's most impassioned member, the articles mostly highlight his avid device use, not his engagement with the "community" as a technology developer. In my research, I approach people like Chris neither as opportunistic eccentrics nor as people ahead of their time who simply stage the digital future in utero for the rest of us. Situating Chris's experience alongside the stories of other device developers with whom I researched and spoke, I examine how the relationship of technology professionals to data opens onto wider debates about the politics of digital representation as they shed light onto the transformations in digital entrepreneurialism that are shaping self-tracking practices, and the forms of embodiment that become productive of the digital economy.

Critical Data Scholarship and Its Discontents

As I analyze how digital entrepreneurialism is configuring notions of data and transforming digital self-monitoring into meaningful work, my research intervenes in several key debates within critical data studies. The growing proliferation of data has drawn enormous scholarly interest. Much of it, however, has been driven by the fear that we are moving toward a society of total transparency and control. While legal scholars have called attention to the manipulative nature of "black box" algorithms, media scholars and sociologists of data have connected digital monitoring with the rise of new biopolitical and surveillance regimes.

One crucial vector of this critique, and the one to have receive the lion's share of media consideration, is scholarship addressing questions of privacy. In these studies, Jeremy Bentham's figure of the panopticon looms large. Bentham's design called for prison cells to be arranged around an observation tower to create the sense that the actions of prisoners were perpetually under surveillance whether a guard was present in the tower or not. Theorists concerned about privacy in the digital "age" use this image to suggest that most of us now occupy the position of the prisoner; our actions are similarly perpetually at risk of scrutiny. David Lyon, the premier scholar of surveillance studies, has warned as early as 1995 that increased computing capacities have drastically amplified mechanisms of surveillance. "Precise details of our personal lives are collected, stored, retrieved, and processed every day within huge computer databases belonging to big corporations and governments," he wrote in the aptly titled book, *Electronic Eye: The Rise of Surveillance Society*.[13] The questions Lyon raised more than two decades ago at the dawn of personal computing have in many ways only intensified in recent years with the spread of

[13] David Lyon, *Electronic Eye: The Rise of Surveillance Society* (Cambridge: Polity Press, 1994), p. 3.

personal bio-computing.[14] Under the premise that someone – or something – could always be watching virtually every action of every day, theorists have raised alarm at the way improved computing and processing power has produced capabilities for people to be monitored with growing precision and continuity, and on a vastly enlarged scale. Media scholars Finn Bruton and Helen Nissenbaum have thus proposed that strategies of "obfuscation" now remain as the only options of refuge for people living under these conditions today.[15] Given that most of these tools are developed by private companies and not government entities, legal scholars have also expressed concern that the mechanisms powering social surveillance are shifting further away from civic discourse or scrutiny.[16]

The uses to which powerful corporate conglomerates or government entities increasingly put personal data of ordinary, and especially of vulnerable, citizens are necessary to think about. This is particular so as my research unfolded in the wake of Edward Snowden's 2013 dramatic revelations of NSA's extensive surveillance program. The discovery in early 2018 that British firm Cambridge Analytica sourced personal data from Facebook accounts and covertly directed political messages to people based on this information during the 2016 U.S. presidential campaign has resurfaced concerns about the safety and security of personal data aggregated by large corporate entities like Facebook. However, by presenting people as amenable to total digital capture, privacy critique obscures vital questions of mediation, producing (the desire for)

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[14] For a sample of recent debates around issues of data surveillance and privacy, see: David Beer, *The Data Gaze: Capitalism, Power and Perceptio*n (Sage Publication: Los Angeles, London, Washington DC, New Delhi: 2018); Nigel M. Richards and Jonathan H. King, "Three paradoxes of big data," *Stanford Law Review* Online 41 (September 3, 2013); Jose Van Dijck, "Datafication, dataism, and datavalance: Big data between scientific paradigm and ideology," *Surveillance and Society* 12, no. 2 (2014): 197–208.

[15] Finn Brunton and Helen Nissenbaum, *Obfuscation: A User's Guide for Privacy and Protest* (Cambridge, MA: MIT Press, 2015).

16 Frank Pasquale, *The Black Box Society: The Secret Algorithms That Control Money and Information* (Cambridge, MA: Harvard University Press, 2015).

the liberal and "transparent" body previously rendered palpable by medical imaging.[17] Katherine Hayles, in her now classic work, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*, has posited that cybernetic theory, which served as the foundation for modern computing, has in part "imperiled" liberal subjectivity by reconfiguring the world as an information system that can be shaped and reshaped into an arrangement that exceeds the bounded confines of the liberal self-same body.[18] By contrast, the "transparent" imaginary of privacy critique largely articulates with the liberal conception of personhood and the body as singular and discrete. To privacy critics, the body thus often appears only as an "archive-of-the-self," a self that can be fastidiously externalized and compiled.[19]

In contrast to theorists of privacy, media scholars and sociologists writing about digitization from a biopolitical lens offer a more pointed critique of the reductive effects of data technologies. In particular, as these scholars examine how digital monitoring produces new distributed forms of power that operate on people at the population level and at a distance, their analysis addresses the way these devices curtail individual agency as they engender new ways of sorting people into normative categories. For example, digital studies scholar John Cheney-Lippold has examined how computer algorithms do not just reveal user identity online, but structure it. He argues that algorithms recognize and categorize people through their browsing behavior at the same time as they create the conditions of possibility for digital recognition by defining "the meaning of gender, class, or race themselves."[20]

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[17] Jose Van Dijck, *The Transparent Body: A Cultural Analysis of Medical Imaging* (Seattle: University of Washington Press, 2005).
[18] Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago: Chicago University Press, 1999), p. 84.
[19] Lemov, "Archives-of-the-Self."
[20] John Cheney-Lippold, "A New Algorithmic Identity: Soft Biopolitics and the Modulation of Control," *Theory, Culture & Society 2011*, 28, no. 6: 164–181, p. 165.

In thinking about the form of biopower algorithmic systems constitute, Cheney-Lippold demonstrates that algorithmic sorting expands and modifies traditional mechanisms of biopower. Michel Foucault had articulated biopower as a regulatory force which worked through static and intermittent population surveys.[21] Contemporary tools create more granular and flexible forms of control, laying the ground for the formation of what Cheney-Lippold has called "algorithmic identity." Unlike the population census or medical records, Cheney-Lippold emphasizes that online, classifications remain perpetually shaped and reshaped by algorithmic systems. Using the example of gender, he discusses how, when gender is assigned and monitored by inanimate code, it exceeds the narrow confines of more conventional gender-identification surveys. Gender becomes something that is perpetually articulated through changing online performance. A person who clicks on an online advertising banner may first become identified as male by the computer program, but further online action may change the way that person is classified by the information system. Algorithms thus treat gender as a fluid category, one that companies refine and reformulate as people's online browsing habits change and produce new information. Following Lawrence Lessing, Cheney-Lippold notes that code continues to act as law, but the application of this law is dynamic rather than affirmative.

Despite this seeming fluidity of gender identity, algorithmically defined gender remains decisively normative. Unlike digital privacy critics who worry about the manner in which a person's life may become increasingly visible to purveyors of technology, Cheney-Lippold argues that the algorithmic identity that becomes "revealed" through internet or device use remains wedded to existing social categories like gender, categories that shape the way marketers and tool makers classify online interactions of users from the start. In other words, even as digital

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[21] Michelle Foucault, *Discipline and Punish: Birth of the Prison* (New York: Vintage Books, 1979).

technology purports to destabilize static conceptions of gender, it also multiplies mechanisms that set the conditions for insertion of persons into delimited social categories. Cheney-Lippold's scholarship exposes that data monitoring remains, at root, a regulatory technology that proliferate and entrenches normative identities. New studies have started to address additional forms of social bias, like racial prejudices, that information systems inevitably bolster and entrench.[22]

In contrast to scholarship that analyzes data monitoring as a matter of surveillance or biopolitics, both of which highlight the deleterious effect digital tools exert on personal agency, sociologists and media theorist who situate data within a neoliberal frame often call attention to the way digital devices have instead shifted the burden of choice and action further onto individual hands. This critique is particularly well-developed within the context of healthcare. Scholars of contemporary neoliberalism point out that against the background of a crumbling welfare state and skyrocketing healthcare costs, digital monitoring tools that make it possible for private individuals and not only medical professionals to keep track of biometrics and healthy patterns of behavior, like measuring heart rate, steps walked, or foods eaten, only help expand the modes of "responsibilization" that neoliberalism calls for.[23] These scholars worry that at the same time as digital tools help produce calculating, rational, and self-sufficient subjects, they also distract attention and resources away from more systemic solutions to healthcare concerns.

The organizing activities of the Quantified Self are most frequently situated by social critics within these dynamics. At times, the Quantified Self is framed by observes as a

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[22] Noble, U. Safiya, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: New York University Press, 2018).

[23] Deborah Lupton, "The Digitally Engaged Patient: Self-Monitoring and Self-Care in the Digital Health Era," *Social Theory and Health* 11, no. 3: 256–270 (2013a); Deborah Lupton, "Understanding the Human Machine," *IEEE Technnol. Soc. Mag* 32: 25–30 (2013b); Tamar Sharon and Dorien Zandbergen, "From Data Fetishism to Quantifying Selves: Self-Tracking Practices and the Other Values of Data," *New Media & Society*, March 9, 2016; Luke Dormeh, *The Formula: How Algorithms Solve All Our Problems … and Create More* (New York: Penguin, 2014).

"community" comprised of people who have wholeheartedly (and naively) embraced the neoliberal model of the self-choosing and responsible subject.[24] At others times, the Quantified Self is defined as a group that has coalesced in the spaces opened up by neoliberal policies, particularly in the gap left open in medical care. In the case of the latter, the Quantified Self is interpreted as a social initiative, even at times hailed as a "movement" of a kind with other forums like Patients Like Me, which helps to organize patient advocates, tinkerers, and motivated individuals who have taken their health and wellbeing into their own hands.

Historians and cultural theorists have also situated self-tracking within a wider history of the responsible and self-choosing subject. For example, scholars have connected the modes of self-scrutiny contemporary digital practices promote with the confessional journals that turn-of-the-nineteenth-century Puritans kept, or aligned digital techniques with the emergence of book-keeping and record-making practices of both bureaucrats and gentleman scientists.[25] The specifically American character of these archiving methods, and their connection with notions of self-sufficiency and the American ideal of the self-made man, often converge in the figure of Benjamin Franklin. In fact, historian of science Rebecca Lemov has drawn a red thread between notational customs of personages like Benjamin Franklin – an American polymath who often symbolizes the liberal, religious, economic, and scientific concept of the self-made and self-regulating man and who memorialized his pen-and-paper self-tracking habit in his autobiography – and the data collecting of contemporary characters like Chris.[26] In line with this genealogy,

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[24] Deborah Lupton, *The Quantified Self* (Cambridge: Polity Press, 2016); Evgeny Morozov, *To Save Everything* Click Here (London: Allen Lane, 2013).

[25] For example, see: Stefan Danter, Ulfried Reichardt, and Regina Schober, "Theorizing the Quantified Self and Posthumanist Agency: Self-Knowledge and Posthumanist Agency in Contemporary US-American Literature," *Digital Culture and Society,* 2, no. 1 (2016).

[26] Lemov, "Archives-of-the-Self."

anthropologist Natasha Schüll sees self-tracking devices as extending capacities for self-analysis, calling digital monitoring tools an essential "vehicle for self-fashioning."[27] These connections establish genealogical affiliations between historical and contemporary data practices as they help practitioners legitimize the activity of data gathering by entering it into the familiar discourse of history, science, and self-making. During my research, my interlocutors routinely connected contemporary digital data gathering with the hand-and-paper techniques of earlier data collectors like Benjamin Franklin. Some even referred to Benjamin Franklin as the "original self-tracker."

While critics of neoliberalism examine how data and self-monitoring tools amplify the burden of self-care, Natasha Schüll argues that this critique also disregards how digital tools are simultaneously offered as a salve against decision-making by developers and designers themselves. In the article "Data for Life: Wearable Technology and the Design of Self-Car," Schüll presents a fork fitted with a digital sensor to collect data on its users' eating patterns so as to signal to the people using it how much to eat and how long to chew to achieve proper digestion and a healthy life, as a central example. While speaking in the language of agency and choice she points out that these devices effectively undermine decision-making and action. Rather than "choosing subjects," Schüll counters these tools construct "nudgeable subjects."[28] The nudgeable subject does not neatly map onto a neoliberal self-regulatory model, for it presupposes a person who is both self-choosing in that she takes the initiative to solicit a better life vis-à-vis these tools and also an actor who needs help making suitable decision.

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[27] Natasha Dow Schüll, "Abiding Chance: Online Poker and the Software of Self-Discipline," *Public Culture*, 28, no. 3 (2016): 563-592.
[28] Schüll, "Data for Life," p. 8.

While critics often worry that these technologies transform agency into a burden, Schüll points out that the nudgeable subject is marked by the same abdication of agency and insertion into regulatory regimes that characterize the subjects of biopolitical control. In this way, the nudgeable subject corresponds to Cheney-Lippold's "algorithmic identity." In both instances control is exerted by degrees through incremental prods and prompts issued by the devices one uses. However, devices that construct nudgeable subject promote the resignation of agency as pleasurable and even as desirable, as a welcome respite from the imperative to act and to choose. Schüll thus concludes with a forward-looking vision: "One imagines a future iteration of the Fitbit advertisement in which the protagonist who gives herself over to carefree backyard play will not only trust her suite of devices and software to remotely track her, but also to keep her on track, interrupting the flow of her experience to prompt her – when an algorithmic analysis of her own real-time data deems it necessary – to eat, drink, or rest."[29]

Writing Against the Grain

Against the grain of most scholarship in critical data studies, I argue that data entrepreneurialism produces more than statistical and algorithmically regulated subjects. I share many of the concerns over privacy and agency raised by this literature. However, the approaches I reviewed also tend to conceive of digital technology as working without breakdown. As tends to be the case in the larger social imaginary of technological systems produced within the United States, these studies present data and digital technologies as though they are capable of capturing, interpolating, and regulating people seamlessly and absolutely.[30] Inadvertently, this

[29] Schüll, "Data for Life," p. 13.
[30] Stephen Graham and Simon Marvin write about the perception that technological systems, particularly in developed economies like the United States, are marked by images of efficiency and progress. See *Splintering*

critical response acts as a foil to the more optimistic endorsements of the documentary capacities and the regulatory powers of data which often issue from technological settings, while it disregards the practical volatility of entrepreneurial activity. As a consequence, technology professionals are often represented in these studies as epistemic naïfs or straightforward scientific positivists whose work can be denounced only as expressions of Silicon Valley "techno-utopianism," "Californian ideology," "technological solutionism," or even purely "evil" motives.[31] By contrast, my ethnography of the harried and anxious entrepreneurial sociality of those involved in the business of self-monitoring evaluates how entrepreneurial work is also marked by uncertainty, anxiety, and failure and reveals just how precarious the control exerted by digital companies and self-monitoring tools really is.

My research examines two broad domains. First, I consider the practices of technology start-up companies and individuals busily innovating new devices for the purposes of self-tracking. The language that technology professionals employ when talking about data does initially appear to sustain the view that entrepreneurs share only a liberal and cognitive understanding of bodies. This is echoed, for example, in the way marketing materials and professional literature creates an equivalence between images of naked bodies and data-driven subjects, but also in the ideas of data "interoperability" and "openness" device developers

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Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition (New York and London: Routledge, 2001).

[31] Lutpton writes about "techno-utopian enhancement in digital health discourse" in "Quantifying the Body: Monitoring and Measuring Health in the Age of mHealth Technologies," *Critical Public Health*, 23, no. 4 (2013): 393–403. For a discussion of "California Ideology," see Richard Barbrook and Andy Cameron, "The Californian Ideology," *Science as Culture* 6, no. 1 (1995): 44–72; Evgeny Morozov discusses "technological solutionism" in *To Save Everything Click Here: The Folly of Technological Solutionism* (New York: Public Affairs, 2014). A series commissioned for the Society for Social Studies of Sciences discusses the notion that infrastructure and technology can be "evil": Christopher Kelty, "'Evil Infrastructures,' Theorizing the Contemporary," *Cultural Anthropology* website, April 28, 2017, https://culanth.org/fieldsights/1117-evil-infrastructures

promote.[32] Nudity and the values of openness are used in this discourse to symbolize the way data unmask information about the private lives of users, information that is otherwise understood as hard to see because it seems dissembled by people's actions as much as by their clothes. Professionals thus discuss data derived by sensors placed on bare skin – the wrist, the chest, the back – as something that can help uncover these typically "hidden" patterns. This entrepreneurial discourse constructs the sense that people's bodies are mere containers that house data and often speaks as though, given sufficient data points and the proper technology, it may be technically possible to create a complete digital duplicate of a person's life. Much like the work of legal and media scholars that expresses concern about privacy, the professional rhetoric thus presents data as thing-like, as singular – something that is reflected even in the common use of the term "data" as a singular noun. Data are treated as the basic building blocks of more complete information chains.

At the start, I take this professional discourse seriously to examine how it constructs data-driven bodies. I argue that it operates in a similar way to the language of "containment" that shaped the development of early computer technology. Historian Paul N. Edwards has analyzed how the political talk of "containment," which focused on managing the threat of communism posed by the Soviet Union, and which permeated United States foreign policy during the Cold War years, simultaneously resonated in the way engineers saw the work of computers. For people working on developing early computers, "containment," Edwards noted, produced an image of a "closed world … [where] the globe itself was seen as a closed whole, as a single scene" that could be technologically surveilled.[8] Paradoxically, conceiving of the world as a closed system was the very thing that made the world appear "open" to computerized

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[32] Andrew L. Russell, *Open Standards and the Digital Age* (New York: Cambridge University Press, 2014).

monitoring. In the same way, my research examines how the reductive discourse of interoperable data sets and open humans that entrepreneurs use makes bodies seem "open" to digital discovery only following their discursive closure as units that are individuated and discreet.

My research, however, looks beyond this discourse of data as *second skin,* as I refer to the Silicon Valley-style hype around the capacities of machines to create digital replicas of people's lives, to examine the practical gap between aspiration and practice. I thus consider the image of naked skin supplied by technicians not only as a metaphor for the bared knowledge produced by digital technology but as a metaphor of resistance to the idea that digitization leaves the truth about people's lives uncovered and in plain sight. If skin has become an "interface," as developers at times explained to me, then I consider how, much like the computer interface, skin does not just display information to be picked up by digital sensors placed on the body's surfaces; it also acts as a boundary and as a medium for knowledge that both deflects and constructs information in a variety of ways.[33] After all, to get to the data, technology professionals have to go through the device, the skin, the body. My research examines how the idiosyncrasies of bodies and machines inevitably resist the idea that data can produce clear knowledge.

I also see skin-as-interface as a symbol of the everyday contestations, negotiations, and challenges of entrepreneurial activity that produce varying and at times competing accounts of data. While device developers often speak of data as though they were self-evident "things," my work shows that the meaning professionals derive from data and the diverse ways data are constructed for different constituents by technology professionals destabilize the notion that

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[33] Branden Hookeway theorizes the computer interface in this expanded sense in *Interface* (Cambridge, MA: MIT Press, 2014).

entrepreneurs see data or data-driven bodies only as discrete entities that are consistent or concrete. It is not only that data scientists at times disagree between themselves about the methodologies to use to process data and thus what to even count *as* data, as some anthropological work has already shown.[34] I argue that entrepreneurs also vary the way they talk about data depending on context, and in so doing undermine any direct or reductive relationship between people and the data they produce.

The shifting ways in which entrepreneurs relate to data becomes apparent in the way some wearable device developers talk about the wrist as "busy real-estate," as a result of which they often feel compelled to "invent new gestures" to digitally track, or in the way they change descriptions of digital data depending on their audience, for example presenting a device that senses "mood" as documenting specific bio-markers like skin conductance when speaking to engineers, and alternately as detecting more ambiguous outputs like "emotional sweat" when speaking to investors, regulatory bodies, or potential consumers. It also comes through in the way entrepreneurs proclaim enthusiasm for a future staged around absolute transparency during professional conferences, business meetings, or in marketing materials, but in private conversations speak more candidly about the role this rhetoric plays in the "theater of the pitch."

In my research, terminology like emotional sweating or talk of inventing new gestures demonstrates that device developers do not only view actions or sentiments as reducible to alienable substances amenable to specific detection, collection, and exchange. Likewise, the opposing way entrepreneurs speak about data during "pitch theater" versus in private conversations shows that the curtain obfuscating digital knowledge becomes lifted only as part of

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[34] Ian Lawrie, "Form and Friction in Data Science," presented in the Data Friction panel at the 2016 Annual Meeting of American Anthropological Association.

entrepreneurial spectacle and not simply as a matter of technological capacity. In contrast to the fears of scholars who situate data monitoring within strictly liberal or biopolitical frames and who worry that technology professionals construct subjects who are transparent, tightly regulated, or self-contained, my work reveals that entrepreneurs present the body as an interface that bares experience to be reduced to data, to one's digital *second skin,* only in certain professional and consumer settings. At other times, device developers conceive of data-driven subjects as blurry, shifting, and expandable.

My on-the-ground ethnographic engagement with data professionals thus shows that tool makers, and not only critical observers, produce a variegated understanding of the relationship between digitization and experience. However, I also argue that the aims of theoreticians and professionals drastically depart. Recent critical work has shown that "raw data is an oxymoron," as scholars unpack the various ways data are indeed social constructs rather than objective facts.[35] Anthropologists like Annemarie Mol and Joe Dummit have also argued against the coherence and the singularity of "the body" produced by medical tools as they direct attention to the practical variability and multiplicity of bodies medical imaging or scans in fact produce.[36] Similarly, scholars of virtuality, like Donna Haraway, have long embraced the figure of the cyborg – the creature composed of organic and synthetic parts – as the ultimate symbol of social fluidity and hybridity.[37] I contend that the somatic plasticity developers of wearable tools endorse when they discursively produce digitally shifting and variable subjects does not simply

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[35] Lisa Gitelman, *"Raw Data" Is an Oxymoron* (Cambridge, MA: MIT Press, 2013); Dawn Nafus, 2014. See also: Dawn Nafus, *Quantified: Biosensing Technologies in Everyday Life* (Cambridge, MA: MIT Press, 2016).
[36] Annemarie Mol, *The Body Multiple: Ontology in Medical Practice* (Durham, NC: Duke University Press, 2002); Joseph Dumit, *Picturing Personhood: Brain Scans and Biomedical Identity* (Princeton, NJ: Princeton University Press, 1994).
[37] See, Donna Haraway, *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991).

amount to an emancipatory project that can challenge cognitive or liberal conceptions of the body or self. Entrepreneurs destabilize and pluralize the relationship between people and their data when commercially necessary, legally expedient, or financially favorable; for instance, when entrepreneurs need to simplify technological language for consumers in order to project confidence to investors in still faulty technologies, or to seek legal refuge in semantic differences.

Moreover, my analysis does not simply challenge or dispute the entrepreneurial regard of data as digital *second skin.* On the contrary, I insist that companies – as well as their customers – continue to source legitimacy from the perception that digital tools produce hard facts and transparent bodies. However, my research demonstrates that this professional understanding of data takes shape against a background entrepreneurial discourse that simultaneously unfolds a more variegated understanding of the way devices represent and document people's experiences. Considering how the type of selfhood and corporeality reflected in the device platform – consistent, coherent, cumulative – contrasts with the more flexible relationship between people and their data that becomes enacted by platform designers is a central theme of my work. I take this apparent contradiction as purposeful rather than as incidental and rest my analysis in the tension these polarities enact. In evaluating how people who develop self-monitoring tools extract social, legal, and fiscal advantage from presenting data and the people to whom they refer as both malleable and concrete, I consider how entrepreneurs seek to function profitably within the gaps in knowledge, in the spaces between certainty and truth.

Second, my research examines the different ways digital monitoring is configured by professional desires, employment anxieties, and new forms of entrepreneurial sociality. Popular accounts often represent entrepreneurial activity as the work of solitary and industrious

inventors. Larger-than-life figures like Steve Jobs or Elon Musk appear to build impressive companies through their dedication and visionary qualities alone. Critical literature, particularly the work of sociologists examining dynamics of the scientific laboratory, has of course argued that the work of innovation and discovery is both more collective in nature than popular accounts suggest and that it is also largely shaped by more mundane preoccupations and personal motivations of the supporting staff.[38] Following in the footsteps of this work, I emphasize the practical realities of the entrepreneurial environment and the value of collective work to examine how the professionals working on monitoring devices galvanize the self-tracking market and sustain digital data gathering as a practice in ways that exceed questions of programmatic efficiency. Focusing on the challenges developers of digital technology face offers additional ways to appreciate how insecurity, and not only Silicon Valley grandstanding, shapes digital labor, and helps push accounts of digital labor in new directions.[39]

For example, I examine how the development of self-tracking tools takes place, today, in a social and entrepreneurial environment where Emily Martin's observations about the value of flexibility have come to maturity.[40] Digital entrepreneurialism unfolds in a business climate characterized by extreme job instability and constant movement between "gigs." The organization and management style of the start-ups with which I have spent time during this

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[38] See: Karin Knorr Cetina, *Epistemic Cultures: How the Sciences Make Knowledge* (Cambridge, MA: Harvard University Press, 1999); Bruno Latour, *Science in Action* (Cambridge, MA: Harvard University Press, 1988); Pierre Bourdieu, "The Specificity of the Scientific Field & the Social Conditions of the Progress of Reason" in *The Science Studies Reader*, ed. M. Biagioli (New York: Routledge, 1999 [1975]), pp. 31–50.

[39] The recent scholarship around digital labor, however, has focused on drawing out sharp contrasts between the precarious conditions of the working-class professionals who are disenfranchised and marginalized by the digital economy and the dominating influence of the technological elite. See: Trebor Scholz, *Uber-Worked and Underpaid: How Workers are Disrupting the Digital Economy* (Boston: Polity, 2016); Lily Irani, "Difference and Dependence Among Digital Workers: The Case of Amazon Mechanical Turk." *South Atlantic Quarterly,* 114, no. 1 (2015), 225-234. These scholars offer vital insight into the widening socioeconomic rift digital technology produces. However, I argue that they overlook the internal volatility and precocity of "elite" entrepreneurial work.

[40] Emily Martin, *Flexible Bodies: The Role of Immunity in American Culture from the Days of Polio in the Age of AIDS* (Boston: Beacon Press: 1994).

research also emphasize agility and the ability to adapt to change. This business context places great value on mobility and the capacity to easily adjust to contingency. When people are constantly enjoined to remain flexible in the face of uncertainty, little wonder that these same entrepreneurs produce technology that entrains users to both monitor and remain open to change, thus coordinating the flows of hands, limbs, and bodies with the forms of plasticity increasingly demanded by the gig economy. I evaluate how self-tracking technologies express as they seek to accommodate bodies to the experience of mutability and change.

In thinking about the employment dynamics shaping digital tools, I also pay close attention to questions of community-building. Political scientists and theorists of contemporary neoliberalism have analyzed the notion of "community" mostly as that which coalesces in the absence of federal or wider social networks of support.[41] I analyze how community-building becomes productive of commercial activity. For example, I examine how what has become known as the Quantified Self "community" brings together developers, engineers, data scientists, and technology workers and offers professionals vital opportunities for networking, reputation-building, and credentialing in an increasingly fractured work environment. I argue that these organizing efforts by professionals should not only be viewed as a practical response to what Sherry Turkle sees as the alienating nature of online communication.[42] The space for fellowship and professional fraternizing that social formations like the Quantified Self create takes shape alongside the reorganization of the corporation as a site of community-building and not just efficient production, as promoted by large technology conglomerates like Facebook and Google.

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[41] Robert D. Putnam, *Bowling Alone: The Collapse and Revival of American Community* (New York: Simon & Schuster Paperbacks, 2000); Robert Bella, *Habits of the Heart: Individualism and Commitment in American Life* (Berkeley: University of California Press, 2007 [1985]); Amitai Etzioni, *The New Golden Rule: Community and Morality in a New Democratic Society* (New York: Basic Books, 1996).
[42] Sherry Turkle, *Reclaiming Conversation: The Power of Talk in a Digital Age* (New York: Penguin Press, 2015).

These institutional changes have continued to destabilize the line between work and play as they have made work-as-community both desirable and inaccessible to professionals in increasingly unstable, fractured, and "flexible" work environments. I discuss how the Quantified Self fills a vital function in this context by offering both a hobby to leverage in support of one's work as well as the social support of an external "community" that is absent for those working under conditions of flexible employment. In this regard, it is very telling that Chris's own interest in digital-self monitoring and his subsequent participation in the activities of the Quantified Self followed a bout of unemployment. The relationships and the image he built through his participation in the Quantified Self and similar technology forums have helped him redefine himself as a digital entrepreneur and as a technology thought leader. In considering this form of entrepreneurial sociality, my research examines how "community" in this context is put forth as something that is enduring and real, although in practice it is fickle and fleeting.

In examining how private community-building works to enhance one's professional qualifications, I also examine how the popular understanding of the Quantified Self as an organizing space for device users rather than device makers plays a particularly critical role. I argue that the people who attend the Quantified Self events and conferences or who give public testimony about their interest in self-tracking do so as a way of cultivating a *professional,* and not simply a hobbyist persona, of a passionate technology devotee. During the Quantified Self events, people do of course talk extensively about their personal interests in self-tracking technology, and some even volunteer to discuss their digital monitoring efforts during what has become known as the Show & Tell presentation or contribute their stories to be circulated on the "community" blog. I take this interest seriously, yet I do so in order to examine how this display of passion functions in an entrepreneurial context, particularly in the way it contributes to the

construction of two key figures that drive digital entrepreneurship: the figure of the devoted entrepreneur and the figure of the authentic self-tracker for whom the industry innovates.

The devout entrepreneur is a familiar figure in social thought. In particular, in his influential text, *The Protestant Ethic and the Spirit of Capitalism,* Max Weber has noted how capitalism is fundamentally rooted in a Protestant work ethic that borders on a religious "calling," a commitment to work as a vocation that has found its strongest expression in the American context.[43] Today, demonstrating sincere devotion for technology while framing entrepreneurial work as a life's passion remains a central part of the entrepreneurial dynamics in which contemporary self-tracking tools are developed. However, in my research, I consider that this affective stance toward one's work is not simply a given feature of entrepreneurial activity. Similar to the feelings of piety that have to be learned before they are felt, which Saba Mahmood had written about, devotion to one's work has to be developed before it can be experienced.[44] Device development becomes a calling, a "labor of love" that borders on religious passion, only through the acts of active cultivation that participants practice through their engagement in forums like the Quantified Self.

The professional imperative to make one's dedication to technology appear genuine and intense differently inflects the equivocation I regularly heard when I would ask to speak to participants of the Quantified Self about their interest in data. "I'm happy to talk with you," I was repeatedly told, "but I'm not a 'real' self-tracker." In a social space peopled by entrepreneurs, the "real-self tracker" is both a myth and an aspirational figure. By practicing

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[43] Max Weber, *The Protestant Ethic and the Spirit of Capitalism* (New York: Penguin Group, 2002 [1905]).
[44] Saba Mahmood, "Feminist Theory, Embodiment and the Docile Agent: Some Reflections on the Egyptian Islamic Revival," *Cultural Anthropology,* 16, no. 2 (2001): 202–236.

embodying the affective disposition toward the tools they sell and make through their engagement with the Quantified Self and other spaces like it where people put their enthusiasm for technology on display, I examine how entrepreneurs cultivate feelings of passion for technology so that the devotion for data they are expected to demonstrate to investors and customers comes to feel sincere and "real." In this way, the popular understanding of the Quantified Self as a community for extreme users is isometric with the cultivation of the figure of the entrepreneur who approaches the making of technology as though it were inseparable from a personal calling. The entrepreneur herself can only become believable and "real" through first endeavoring to embody the position of the enthusiast self-tracker. The embodied desire for technology developers cultivate in these settings exceeds the consideration of entrepreneurial passion as marketing "hype." Through participation in enthusiast forums like the Quantified Self, device developers endeavor to both show and to feel that their labor has surpassed mere work, and has truly become a life's passion. This is another way to understand the framing of the Quantified Self as a "community." "Community" supplies the affective register through which entrepreneurial enthusiasm for technology can be activated and staged.

The presentation of the Quantified Self as a "community" of data enthusiasts and "members," and not simply as an exhibition place for technology "vendors," has one final role to play in the context of digital entrepreneurialism. In particular, I evaluate how the image of the Quantified Self as a hobbyist rather than as a professional "community" – an image, as I've said, organizers and participants readily endorse – helps construct the impression that the Quantified Self is a site where popular interest in self-tracking tools has found its early expression. As participants produce content, display enthusiasm, and model excitement in digital tracking methods, they help construct the figure of the data devotee that stimulates the cycles of public

curiosity and entrepreneurial investment in digital tools. In is then in this secondary sense, as well, that the Quantified Self emerges as a productive site where professionals can exercise the passions that mobilize the digital economy. In evaluating how the cultivation of devotion in technological settings emerges as a central component of entrepreneurial labor, my research adds new dimension to scholarship that examines how the digital economy is variously sustained by unpaid or affective work.[45]

My research shows that the function of the Quantified Self as "community" exceeds its image as a social group that acts as a meeting ground for those who have internalized the biopolitical logic or as a forum that has been created in the vacuum left open by neoliberal policies as they relate to healthcare. More broadly, as I explore the range of practices, beliefs, and views of marketers, engineers, and developers of sensor-enabled tools, this research offers a more complex account of the dynamics that shape both data entrepreneurialism and concepts of data. In consequence, the hubris of data and the solidity of the data-driven subject dissipate. Instead, I reveal how digital knowledge is shaped by epistemic and employment uncertainty that more generally organizes the entrepreneurial environment.

Data Friction

In thinking about how the relationship of entrepreneurs to data is marked by breakdown, tension, and uncertainty, I adopt the conceptual frame of friction. "Friction" is a term that historian Paul N. Edwards uses to characterize the computerized information collected to evaluate weather patterns. The notion of "data friction" helps Edwards express how data are both

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[45] See: Trebor Scholz, *Digital Labor: The Internet as Playground and Factory* (New York: Routledge, 2013); Tiziana Terranova, "Free Labor: Producing Culture for the Digital Economy," *Social Text 63*, 18, no. 2 (Summer 2000).

contingent and socially constituted. Producing data "always involves a series of transformations," he notes. These interventions are mechanical as well as social and historical.[46] "Friction" is also a term that anthropologist Anna L. Tsing uses to characterize global connections that come together through messy negotiations and in the tension of "practical encounters" rather than in grandiose and smooth ways.[47] "A wheel turns because of its encounter with the surface of the road; spinning in the air it goes nowhere. Rubbing two sticks together produces heat and light; one stick alone is just a stick, "Tsing writes." As a metaphorical image, friction reminds us that heterogeneous and unequal encounters can lead to new arrangements of culture and power."[48]

Media and academic discourse that either celebrates or expresses concern over the seamless way data organize, document, or regulate people's lives mirrors popular rhetoric that equates data with slick bodies of water. In this discourse, data is commonly said to accrete into puddles, lakes, rivers, oceans, or ambiguous flows.[49] "The future will be filled with data" pundits proclaim. The liquid metaphor equates data with the easy fluidity of water. Water also presents an idealized view of technology. It sanitizes technology from messy contingency and lived reality. The metaphor of water keeps information that apparently "wants to be free" unproblematically moving along.[50] By contrast, friction creates resistance. In this work I am interested in examining the professional dynamics that introduce friction to the idea that data can

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[46] Paul N. Edwards, *A Vast Machine* (Cambridge, MA: MIT Press, 2010), p. 83.
[47] Anna L. Tsing, *Friction: An Ethnography of Global Connections* (Princeton, NJ: Princeton University Press, 2005), p. 1.
[48] Tsing, *Friction*, p. 5.
[49] Deborah Lupton, "Liquid Metaphors for Big Data Seek to Familiarize Technology," *LSE Impact Blog,* July 11, 2014, http://blogs.lse.ac.uk/impactofsocialsciences/2014/07/11/philosophy-of-data-science-series-deborah-lupton/
[50] For a discussion of notions of liberty and freedom in hacker and coding circles, see, for instance, E. Gabriella Coleman and Alex Golub, "Moral Genres and the Cultural Articulation of Liberalism," *Anthropological Theory,* 8 (2008), p. 255.

circulate or accumulate freely, without tension. When friction slows down momentum, it also allows experiences that may have simply rushed by to come into focus for closer analysis. Friction thus helps reveal that data, to use Tsing's words, are "charged and enacted in the sticky materiality of practical encounters."[51] Tsing does not speak about data in her writing, but her language offers a useful corrective to the images of crystalline and dynamic notions of data "flows."

The torpid viscosity of engagements produced through friction that Tsing writes about has a parallel in Dawn Nafus's idea of data "clots."[52] Although Nafus uses a liquid metaphor, her terminology resonates with the idea I am trying to capture through the figure of friction. Clots, like friction, register rather than overcome data's capacity for resistance. Against the image of expanding big data sets, data that clot, rather than dynamically course or accrete, come together only temporary and messily, if they are able to cohere at all. Thinking about the mobility of data as marked by friction, invites an analysis of the social and material conditions that enable or foreclose movement. By focusing on the volatility of entrepreneurial dynamics that organize the circulation of data, my research precludes a view of data as substances that smoothly flow from one medium to the next, from the body to the device.

Analysis that explores friction also produces new connections. Here, my work resonates with the writing of authors like Anne Stoler. Refusing to be blinded by the "panoptic glare of a … stylized official gaze," Stoler presents an alternate theory of archival records and of colonial archives in particular.[53] Crucial to her work is the excess she sees encoded in the very record

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[51] Tsing, *Friction,* p. 1.
[52] Nafus, "Stuck Data, Dead Data, and Disloyal Data."
[53] Ann Stoler, *Along the Archival Grain: Epistemic Anxieties and Colonial Common Sense* (Princeton, NJ: Princeton University Press, 2009), p. 23.

itself. “Colonial state archives” she writes, “are less monuments to the absence or ubiquity of knowledge than its piecemeal partiality, less documents to the force of reasoned judgment than to both the spasmodic and sustained current of anxious labor that paper trails could not contain.”[54] Against an imaginary of archives as steady records whose representational capacities accrete and become calcified with each “retrieval,” as Trouillot had called the process that strengthens archival authority, Stoler anxiously talks of the “pulse of the archive,” of the “tremors that point to a greater disturbance beyond its page.”[55] In my work, friction speaks to the way I likewise aim to wear away the veneer of smooth digital pathways, exposing the range of professional values and practices that have shaped contemporary data gathering.

Finally, friction depends on context. To think about data through the lens of friction means to pay attention to the specific settings where data – and data discourse – are created. Anthropologists like James Clifford have long emphasized the situated nature of record-keeping. Speaking about ethnographic writing in particular, Clifford wrote that anthropology produces only “partial truths.”[56] For Clifford, partial truths describe something other than incomplete or geographically specific knowledge. His expression raises larger questions about the position of the author and the status of ethnographic writing, insisting that by definition, ethnography produces only limited and situated forms of knowledge. This knowledge is not cumulative nor total; it is partial because it represents only one writer’s point of view. By paying attention to the discourse emerging from professional settings that agitates for the data-driven future, like the meeting room of the Quantified Self, the conferences where wearable and sensor-enabled tools

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[54] Stoler, *Along the Archival Grain: Epistemic Anxieties and Colonial Common Sense,* p. 19.
[55] Stoler, *Along the Archival Grain: Epistemic Anxieties and Colonial Common Sense*, p. 19; Michelle-Rolph Trouillot, *Silencing the Past: Power and the Production of History* (Boston: Beacon Press, 1995).
[56] James Clifford, “Introduction: Partial Truths,” in W*riting Culture: The Poetics and Politics of Ethnography*, ed. James Clifford and George E. Marcus (Berkeley: University of California Press, 1986), pp. 1–26.

are previewed, or the entrepreneurial environments where digital technologies are made, I emphasize the partial – that is the situated and therefore inherently limited – truths that data themselves produce.

We cannot assess how it feels or what it means to live in a data-driven world without accounting for the ambient social context in which data originate and the dynamics of professional environments that motivate the circulation of data. By applying the anthropological lens to explore the friction-filled nexus of social and expert relationships that shape the discourse on personal data, this research wears-away at accounts of data based purely on transparency, anxiety, and fear and offers an alternative way to evaluate the work of proliferating digital data sets.

Opening Interlude: The Most Connected Man on Earth

To hear Chris describe it, he suddenly found fame when he was "discovered" at Amber Case's CyborgCamp in 2012.[57] Chris first learned about Amber Case from a 2010 TED-talk video that circulated online. This was a presentation Case was invited to make after the series of conferences she organizing to explore the relationship between humans and technology, started to garner media attention. During her 2010 TED presentation, Case spoke to the audience about the emergence of what she has called the "digital second self," a concept she modeled on Sherry Turkle's notion of the "second self."[58] The "digital second self," according to Case, was a supplemental online persona reproduced through so many weblogs and social media profiles that one now had to maintain alongside one's physical, embodied identity. The notion of the computer-mediated self as a secondary, alternate persona stayed close to Turkle's original bifurcation between virtual and everyday experience. And during the TED conference, Case described the digital second self as a modern double burden. She argued that with the proliferation of digital profiles, one faced increasing pressure to perform self-presentation and self-care twice. Not only was there already social pressure to cultivate and manage one's physical appearance, now one had to worry about the appearance of supplementary identity: the online avatar.

By 2012, the year Chris had signed on to attend Case's latest installment of the CyborgCamp, Case had begun to change direction in the way she situated the relationship between the human and the machine. Instead of describing online identity as something that was

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[57] Chris, interview with the author, April 2015.
[58] Sherry Turkle, *The Second Self: Computers and the Human Spirit* (New York: Simon & Schuster, 1984); Amber Case, "We Are All Cyborgs Now," *TEDWomen 2010 Talk,* Filmed December 2010, www.ted.com/talks/amber_case_we_are_all_cyborgs_now.

in contest with one's real-world self, she began to shift to newer terminology that had started to circulate in technical settings: the Quantified Self. Case ran her events as an "unconference," which meant that participants generally brought ideas they wanted to discuss, and themes emerged organically out of that collection rather than planned out in advance. Nevertheless, in inviting three speakers ahead of time, Case tried to set the tone for the event to guide the types of ideas people brought to the table on the day of the CyborgCamp itself. In announcing the 2012 conference, she framed the event thus:

> This year's CyborgCamp will be a full day of conference and unconference sessions, fun, food and great people together to talk about the future of humans and technology. Three scheduled speakers will give talks on *biomedical engineering, cybernetic control systems and the stock market, and quantified self.* The rest of the day will be unconference sessions."[59]

The incorporation of Wolf and Kelly's expression "quantified self" was a marked transition from earlier Turkle-inflected terminology of digital second selves. Notably, her use of the lowercase form of "quantified self" in the announcement, as though to suggest that the expression has become a generic, well-accepted idea rather than the name of a specific set of events, already pointed to the effect Wolf and Kelly's ideas had started to exert on the broader technological arena. By setting "quantified self" alongside biomedical engineering, cybernetic control systems, and the stock market in the announcement, Case also signaled a shift in the way the technology industry was starting to think about digital identity. Her earlier Turkle-inspired adaptation of the digital second selves perhaps could still be understood through a wider sociology of screens and virtual realities.[60] The digital second self had become another role, another act to play in life configured as a stage. The new language and the inclusion of the

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[59] http://cyborgcamp.com/2012/07/ (emphasis added)
[60] Erving Goffman, *The Presentation of Self in Everyday Life* (New York: Doubleday, 1959).

expression “quantified self” now seemed to suggest greater symmetry between the data that appeared on the screen and one’s real embodied identity.

This was the right time for Chris to attend CyborgCamp. A software engineer by trade, he had already started to embrace personal data gathering in his daily life and occasionally even shared his views online. “You are the guy that tweets about information every now and then. And I go ‘yeah,’” Chris recalled about an interaction with someone in the audience.[61] “What do you do with it?” the guy probed Chris. “I take it all and I put it into a Google calendar.” Chris pulled up the calendar on his computer, a psychedelic page filled with myriad color-coded fields and tags (Figure 2). “That’s your entire life?” the guy asked Chris, impressed and intrigued by the careful way in which Chris cataloged this information. “Yes,” Chris answered unassumingly. The man flagged down Amber Case to see the calendar. Case convinced Chris to share the document with the group to explain how and why he kept such scrupulous accounting of his life. Apparently reluctant at first, Chris eventually agreed to take the stage. Amber penciled him in for an afternoon session at one of the unconference’s open slots.

Remembering the day, Chris wistfully described to me the image he still held in his mind’s eye:

> I didn’t want to drive too far down the Quantified Self route yet. It was still really hard to talk to people. People didn’t quite understand what was happening with bodies and information … [But] I held the unconference, and she put it up on the television, and I started showing people days, not in calendar mode, but in the agenda mode. There are thousands of pieces of information. You can just see it, this beautiful diary. And people were really surprised. The idea of self-tracking as footnotes to emotion, dog-eared pages of a life became real. They’d never seen it. They were playing with these ideas, but they’ve never seen it so personified.

[61] Chris, interview with the author, April 2015.

Figure 2: Page from Chris's calendar, Chrisdancy.com

Reporters from *Wired* and *TechCrunch* working the Quantified Self beat were in the audience that day. Following the impromptu presentation, they both approached Chris for an interview. Articles that were published a few months later created additional exposure for Chris – and for the Quantified Self – linking Chris explicitly with the language of self-quantification coined by Wolf and Kelly a few years earlier. "The Quantified Man: How an Obsolete Tech Guy Rebuilt Himself for the Future," *Wired* magazine introduced Chris in a headline; "Quantified Man," summarized *TechCrunch* in the body of the article.[62] And an idea began to coalesce of Chris as the most digitized person on earth. He claims that he was reluctant to embrace fame at first, but then slowly warmed up to his new public persona. Recalling with some excitement what those early days of his burgeoning publicity were like, he explained to me how he started receiving invitations to speak at various conferences and events.

> I can't remember what the next big story was, but it was probably some television piece out of some foreign country. And then by the end of that year the *BBC* called me. And then beginning of last year [2014] the *Wall Street Journal* did a piece on me. And then after the *Wall Street Journal*, I went over to England to meet some people. I've done some real cool secret stuff.

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[62] Klint Finley, "The Quantified Man: How an Obsolete Tech Guy Rebuilt Himself for the Future," *Wired,* February 22, 2013, www.wired.com/2013/02/quantified-work/all; Alex Williams, "The Power of Data Exhaust," *TechCrunch,* May 26, 2013, https://techcrunch.com/2013/05/26/the-power-of-data-exhaust/

The invitation to appear on the Showtime series *DarkNEt*, Chris tells me, came "one day, out of the blue" when he received a phone call from an unknown number. The voice on the phone asked Chris to do some "fact-checking" and quizzed him on what had happened on a given day. "Hold on," Chris replied, immediately starting a search on his computer where an intricate calendar cataloging the minutiae of his daily pursuits was housed. The caller was pleased by his unfazed and fast response. "Don't worry about it," he told him and booked him on the spot. In short time, a Showtime camera crew arrived to spend the week with him to document him for the show.

Although Chris frames this publicity as unexpected, even saying to me that the invitation to participate in the Showtime series came "suddenly," he courts attention. With an ear for language and an eye for theater, Chris intuitively appreciates the value of a good story, a quality he must have picked up from his mother. Orphaned at an early age, Chris told me that she turned to writing as a coping mechanism. Throughout her life, she wrote exquisite letters in beautiful handwriting to her aunts and uncles. When Chris, her firstborn, arrived, she began to keep a diary filled with elaborate details of his life. To make ends meet later in life, she purchased items at second-hand stores and resold them on eBay, enhancing their value by concocting fantastic stories about each object: "This is the shawl I wore when I met the Queen and she touched my right shoulder," she described in one post, according to Chris. "She was a character," Chris recalled warmly.[63]

Chris's dynamic personality and presentation style have likewise turned him into a desirable and compelling public speaker. He addresses an audience of one or a hundred with the passion and conviction of a pastor, his delivery rousing and engaging. Impassioned "This guy

[63] Chris, interview with the author, January 2016.

gets it!" or "I completely agree with him!" were comments I heard constantly throughout the conferences and Meetups where he spoke. Hearing his talk at South by South West (SXSW), a popular technology conference, Ernesto Ramirez, one of the co-organizers of the Quantified Self in Los Angeles, approached Chris afterwards. According to Chris, he exclaimed, "Chris, it's like Data Church with you!"[64] Though more of a reflection on Chris' delivery, the suggestion is hardly out of place in a technological arena rife with ecclesiastic references. In recent years, the trend has taken a literal turn as the title of Tech Evangelist to supplement a conventional sales role has become increasingly common and even desirable, trading on the religious passion for one's career that had long been a hallmark of American capitalism.[65] In new business pitches, it has likewise become customary for budding entrepreneurs to describe their business ideas not in instrumental, but in devotional terms, as products of life's work, as a personal passion and mission.

Chris's success can also be attributed to his fine-tuned sensibility for contemporary forms of communication. When he talks, he peppers even casual conversations with catchy, tag-line-ready phrases perfect for 140-character tweets and re-tweets through the social media service Twitter. In a media environment increasingly stressed by cursory audience attention spans, his easily quotable and sharable declarations have made him fast "click-bait" and have helped turn him into a contemporary "micro-celebrity."[66] "We live in a Snapchat world. Wearables are the fast food," he intones as we talk about the growing popularity of self-tracking technology.[67] "Up

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[64] Chris, interview with the author April and June 2015.
[65] Theo Priestley, "Why Every Tech Company Needs a Chief Evangelist," *Forbes,* August 18, 2015; www.forbes.com/sites/theopriestley/2015/08/28/why-every-tech-company-needs-a-chief-evangelist/#62c8e8a760a4 Max Weber, *The Protestant Ethic and the Spirit of Capitalism* (New York: Penguin Classics, 2002/1905).
[66] Alice Marwick, *Status Update: Celebrity, Publicity, & Branding in the Social Media Age* (New Haven, CT and London: Yale University Press, 2013).
[67] Chris, interview with the author, April and June 2015.

until now, humanity needed time and space. We now have a fourth dimension: Behavior"; "People don't take smoking breaks anymore; they take Facebook breaks;" "Everybody else wants to be an expert at your life." At one point I said something that caught his ear: "You should Tweet that," he counseled. During our conversations he occasionally paused to jot down a statement that he will repurpose later: "You don't become happy, happy becomes you." Then stops. "I need to remember that."

But it's his attunement to changing trends in the social reception of technology that perhaps has had the greatest effect on his media success. At CyborgCamp, what really struck a chord was the bombastic claim that Chris uses up to seven hundred devices to track his life. There is a level of the unbelievable in this statement, one that Chris uses to full effect. The spinning numbers produce a sublime – and a subliminal – effect. Since then, this assertion has become part of Chris's appeal, regularly repeated in article after article as evidence of Chris's incredible commitment and beguiling habits. The claim courts controversy, eliciting equal parts admiration, shock, and disgust. The number itself has weight, solidity, import. It is meant both to entice and to alarm. Mostly, it is mobilized in the press as well as by Chris himself without any explanation, as though simply submitted in evidence of his identity as "The Most Connected Man on Earth."

When I asked Chris about it privately, he modified the claim, explaining that he does not actually use that many devices at any one time. Rather, he arrived at this sum after tallying up all of the devices that he estimates track his activity, online and off. That includes the mobile applications he has purchased or installed himself, and to be sure, there are many. But the total also includes the forms of monitoring he guessed he has been exposed to throughout his life: surveillance cameras that Chris has come in contact with in stores, airports, and toll-booths,

information possibly gathered by merchants while shopping, as well as the technology used by his employers, insurance companies, and doctors to track his whereabouts, performance, and health at one time or another. The art of the sale is not in nuance, but in daring and delivery. Neither false nor true, the audacious statement is rather characteristic of the claims advertisers often make, like, "Made from the best stuff on earth" or "The best a man can get." Clearly exaggerated and not easily verifiable, the grandiose statements carry the veneer of the plausible while avoiding the burden of proof of claims that are more specific and easier to confirm. In the business world, it is common knowledge that a company can often get away with a pompous statement without legal repercussions on the premise that something that ambitious must clearly be a hyperbole.

Over the years, unhappy with the way he was portrayed as "an obsolete tech guy" in the initial *Wired* article that propelled him to notoriety, Chris has also taken full charge of his public persona. "I'm like a seamstress fixing up a dress" he tells me over coffee, commenting on his carefully curated online settings and preferences that he updates constantly in accordance with miniscule shifts in his life, though just as likely he could be speaking about his carefully curated public image.[68] "A stray thread here, a stray thread there," he says as he pulls at the edges of the tablecloths laid on the table we are sharing, pretending to repair the seams of a tattered edge. "Or if there is a loose bead," and he mends that too, delicately tucking an imaginary crystal back into place as he speaks. With time, he created a website to curate his public image and to collate his press clippings. Initially happy to just be noticed, he soon started charging for appearances and interviews.

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[68] Chris, interview with the author, January 2016.

Early on, to solidify and standardize his image, Chris also commissioned professionally rendered art and photography to distribute to media outlets and to use as a backdrop in his presentation materials and social media profiles. The first was a beautiful oil-on-canvas portrait painted by artist Aaron Jasinski in 2012 (Figure 3). Titled *Real You,* it features Chris dressed in a crimson suit facing off a steely robot, an arid, lifeless dessert behind them while ominous clouds build up above. Each holds a mask in his hand; Chris holding up the mask of the robot while the robot wields a mask of Chris's face. The work trades on the familiar conceptualization of cyborg

Figure 3: Painting by Aaron Jastinski

identity as an epic merging of flesh and steel that represents the intersection of the human with the machine, the contest at times dramatically staged by technology futurists the likes of Ray Kurzweil as a clash of civilizations – Man versus Machine. A poster that greeted thousands of visitors at the 2016 Consumer Electronics Show (CES), the largest annual technology tradeshow, capitalized on the same aesthetic (Figure 4). As sales of wearable and Internet-connected devices, commonly referred to as the Internet of Things (IoT), continue to grow, the conference dramatized the technology in the same terms as Chris's painting, picturing two interlinked hands,

one robotic, the other human (and notably white), magnanimously rising out of the ground like two buds of a flower in a gesture of both friction and fraternity.

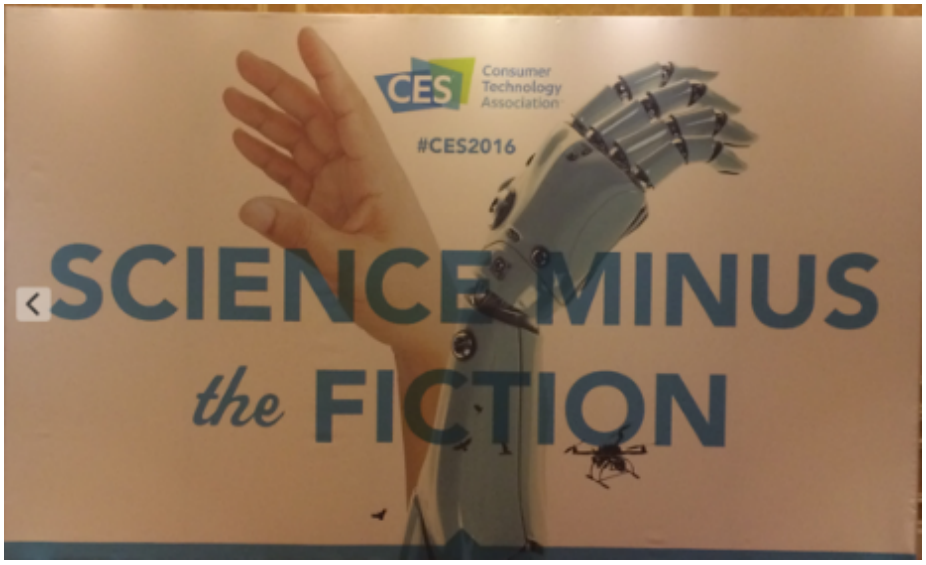

Figure 4: Life size poster greeting visitors at CES 2016. Photo by author.

The juxtaposed, extended hands are also reminiscent of a well-known fresco by Michelangelo, *The Creation of Adam*, that purports to capture the moment Adam was created by the hand of God (Figure 5). In a Western context, the gesture, especially the reaching, limp arms, has become a familiar part of the visual vocabulary of primal contact. However, this

Figure 5: The Creation of Adam, Michelangelo

motion also foregrounds a spiritual transformation and awakening, a religious idea that continues to supports the rags-to-riches ideology of the American Dream as well as technological enthusiasm. For Chris, echoing the industry's broader technological imaginary, the encounter with the robot heralds a transformation. Having lost a significant amount of weight since he first begun actively collecting personal data about his life, Chris is often featured in comparison shots demonstrating his success in shedding pounds and bad habits, but documenting as well

Figure 6: Before and After image of Chris, Mashable 13, 2014

his transition from an average man who was overweight and slightly goofy-looking to a sleek, well-kempt, edgy cyborg (Figure 6). "Whom do you identify with?" I asked Chris as we looked at the original painting of him opposite the robot, on his iPhone. Chris looked at me incredulously, pausing to give me time to answer a question that to him seemed obvious. I stayed silent. In a few moments Chris filled in the space, slightly exasperated with my hesitation: "Well, the robot is me."[69]

[69] Chris, interview with the author, January 2016.

A year after he commissioned the artwork, Chris staged a photo session in Japan where he was visiting the screening of a film based on his tracking activity, produced by a Japanese film company. This time, in a photograph called “Inner Net” taken by Kyle Thompson that has since frequently accompanied media articles featuring Chris, he once again toyed with the cultural mystique of the cyborg identity (Figure 7). Sporting a black leather jacket, he can be seen staring dejectedly at his raised arm. Instead of veins, wires are seen protruding from a

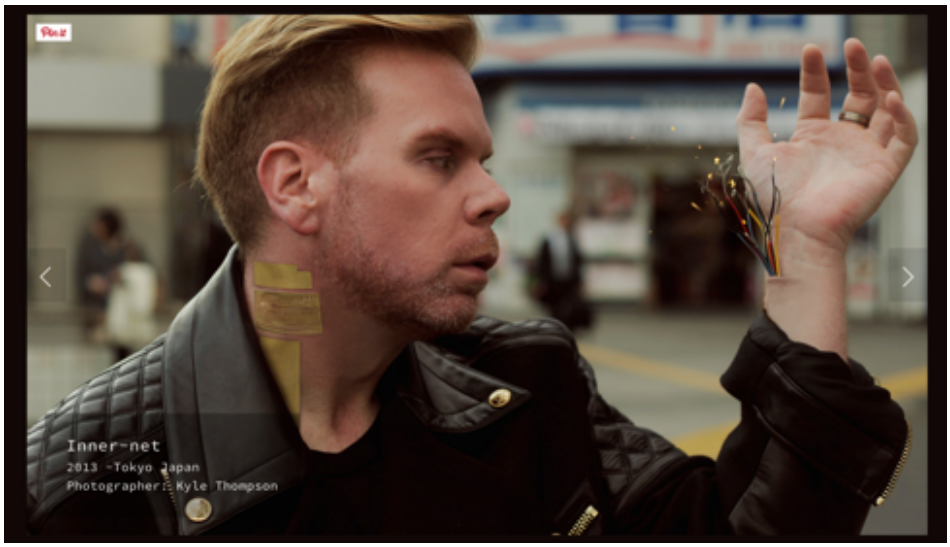

Figure 7: Photo by Kyle Thompson

bloodless, open gash in his wrist. A row of yellow bandages mimicking electrical tape suggestively cover additional wiring on his neck. At a time when panicked articles about the takeover by robots and automated technology once again are experiencing a renaissance fueled by the dystopian predictions of Silicon Valley futurists, the urban setting, the slashed wrist, and the black leather attire signal this communion as risky, but therefore somehow renegade, adventurous, and seductive. Chris cleverly and almost intuitively builds affinity with these ideas, constructing commercial curiosity and appeal by bulking up his cultural capital.

Not long after, as the much-hyped Apple watch was preparing to launch in stores, *Time* magazine ran a cover story ominously titled “Never Offline: The Apple Watch is Just the Start.

How Wearable Tech Will Change Your Life – Like It or Not" (Figure 8).[70] The artwork for the magazine cover seemed remarkably close to Chris's photography. It showed an extended arm made into a clenched fist in an ambiguous gesture of endorsement, defiance, and pain. A set of hospital or Wall Street-like screens with a cascade of data and graphs run the length of the bare forearm. When viewed online, the numbers and the line-graphs spring to life, become dynamic. Simulating a live feed of the anonymous model's biometrics, the numbers appear to rise and fall

Figure 8: Cover of Time magazine, September 11, 2014

in response to minute changes in bioactivity.

Chris was most proud, however, of the set of prints, also captured by Thompson, that were taken during a follow-up sojourn to Japan in 2015 (Figure 9). This series is completely wireless; there is not a cable in sight on any of the photographs as Chris poses against a set of natural backgrounds, a stark contrast to his dystopian industrial and lunar theme of years past. His favorite one echoes the photograph of the wire-strung arm from two years earlier. Where

[70] Lev Grossman and Matt Vella, "Never Offline: The Apple Watch is Just the Start. How Wearable Tech Will Change Your Life – Like it or Not," *Time*, September 11, 2014.

Figure 9: Photograph by Kyle Thompson

wires once erupted from punctured skin, a single branch delicately sprouts as he gently, almost protectively watches over it in a contemplative posture. But the picture likewise gestures to the oil-on-canvas portrait from 2012. In the latest print, Chris is once again pictured wearing a maroon jacket. This time, however, he traded in the suit for a more casual look.

The relaxed posture and pastoral landscape mark Chris's own growing interest in Buddhism, meditation, and technology-assisted – or, as he calls it, enhanced – spirituality. But it also signals Chris's shift in attitude toward technology. Rather than simply something external, Chris has come to speak of technology as something he has all but internalized. Chris often describes his digital self-tracking as an additional sense that he has added to his repertoire of embodied perception. On the day we first met, for instance, Chris had just returned from a week-long Buddhist retreat where he meditated for five days straight, was not allowed to speak, and had no access to technology. I asked whether this was difficult, having the absence of his devices in mind. "Oh yes," he responded, "My heart rate was a 150. You know, that's high when you're

sitting still."[71] Surprised and thinking he must have smuggled in a gadget, I confirmed, "Did you track your pulse?" He smiled at my naiveté. "Oh, no. I just know it by now."

Later that evening, while we eagerly consumed our dessert, Chris nonchalantly remarked without looking up from his plate that his blood sugar was going up. When I still looked puzzled – can one feel one's blood sugar rising? – Chris showed me his wristband tracker that flashed "62" as evidence, amused that I would doubt him. "Everyone is getting it wrong," Chris told me. "The internet is going away. Soon we won't [notice] it. And we won't [notice] the devices on us or around us." He feels that the clearing away of technology will open up space for human communication. Once technology disappears from view, rather than focus on the devices we'll at last be able to see one another. The latest series of photographs knowingly invites this idea. With no devices in sight, this is not a photograph that testifies to his rejection of digital tools. On the contrary, this image displays his apparently total resonance with the self-monitoring tools he uses. To Chris, the technological has come to feel natural. He hasn't renounced technology. With these photographs, he announces that he has become one with it.

[71] Chris, interview with the author, April 2015.

PART I:

TRANSPARENCY

Chris' skin-tight identification with the personal data he collects reflects the broader way my interlocutors in the Quantified Self community and the wearables industry often compare self-tracking to the state of being naked. The figure of the nude is produced when this technology is equated with tools like the X-ray that effectively render the body and the self, transparent. It likewise echoes in considerations of wearable devices as figurative scalpels that can slice bodies open and pull back the excess layers to reveal the "naked" data lying within. These tropes persistently suggest seeing personal data as a *second skin* that runs just under the body's surface, which digital devices only faithfully help uncover. As a result, personal data are too often presented as material, even as natural substances that can be abstracted from social entanglements and seen to offer a more accurate and unobstructed view of any one person.

I open this study by first examining the notion of digital transparency through this figure of the naked body. Critical attention to personal data is veritably awash in discourse on metaphor.[72] Although the idea of data as something that enables transparency has become pervasive, especially conjoined to concerns about privacy, the nude appears almost nowhere on these lists.[73] By contrast, references to naked bodies proliferate in popular and entrepreneurial discourse. In Chapter 1, Second Skin, I explore the sensual vocabulary of naked bodies that has increasingly set the tone and the terms through which personal data sets are situated by wearable

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[72] The Social Media Collective, a network of scholars in social sciences and the humanities working on a cultural analysis of data, had recently compiled an extensive list of the various metaphors that are employed in discussions of data. In 2016, an edited volume called *Digital Keywords: A Vocabulary of Information Society & Culture* published critical essays around a large number of data tropes, including "digit," "mirror," and "cloud."[72]
See: Social Media Collective Research Blog, "Metaphors of Data: a Reading List," socialmediacollective.org, https://socialmediacollective.org/reading-lists/metaphors-of-data-a-reading-list/ (accessed September 2016); Benjamin Peters, ed. *Digital Keywords: A Vocabulary of Information Society & Culture* (Princeton, NJ and Oxford: Princeton University Press, 2016).

[73] The exception is Susan E. Ryan's thoughtful history of wearable technology, in which she explores the value of nudity in turn-of the-century fashion influenced by a techno-futuristic imaginary, tropes that she contends carry through to our contemporary understanding of personal data sets. See: *Garments of Paradise: Wearable Discourse in the Digital Age* (Cambridge, MA: MIT Press, 2014).

developers and entrepreneurs. In thinking through the conceptualizations of data as one's second skin, Sherry Turkle's familiar figure of computing as one's "second self" is close at hand.[74] While Turkle's terminology suggests to see online identity as separate from one's real-life self, even helping to foreground the opposition of the virtual to the real, I consider how the figure of the nude instead activates an uncanny search for the "real" self that is seen as buried in the data.

While developers often see data as fitting people as tightly as a second skin, nudity is not itself a naked metaphor; it is coated in history. In considering how the trope of nudity functions in data discourse today, in Chapter 2, Social Skin, I think through some of the cultural and historical antecedents that have helped frame the nude body as a meaningful metaphor of digital self-exposure. Rather than as second skin, following Terrence Turner, I suggest thinking of personal data as "social skin," offering to see exposed digital second skin as already always cloaked in social forces.[75]

Metaphors matter because they both describe and shape the way people interact with their world.[76] The metaphor of nudity that has been adopted in entrepreneurial discourse has as much to do with a history of scientific inquiry that treats personal data produced by mechanical means as a more legitimate object of discovery as with the history of informatic disembodiment that has become caught up in escapist fantasies of the early digital era. The figure of the nude as an emblem of discovery furthermore pulls from racialized ideas that have over the past two centuries marked the naked native body as a visual mnemonic of purity and authenticity. Not least, the trope is also a product of more recent changes, intertwined with the desperate cycles of

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[74] Sherry Turkle, *The Second Self: Computers and the Human Spirit* (New York: Simon & Schuster, 1984).
[75] I am indebted here to such works as Lisa Gitelman, ed., *Raw Data Is an Oxymoron* (Cambridge, MA: MIT Press 2013), in whose footsteps I follow.
[76] George Lackoff and Mark Johnson, *Metaphors We Live By* (Chicago: University of Chicago Press, 2003).

publicity and self-branding associated with contemporary online "micro-celebrity." [77] This varied history continues to tacitly shape the way people are invited today to make sense of personal data sets as in themselves denuding. I argue that nudity less defines personal data than sets the terms by which personal data can be interpreted and understood in the technological arena and beyond.

[77] Alice Marwick uses the term "micro-celebrity" to discuss the dynamics of personal branding in the digital era. See Alice Marwick, *Status Update: Celebrity, Publicity, & Branding in the Social Media Age* (New Haven, CT and London: Yale University Press, 2013).

Chapter 1: Second Skin

My fieldwork has in many ways started with a scandalous flurry of naked bodies. On August 31st of 2014, right as I began making headway in my own research, a bombshell revelation spread across the Internet: five hundred nude photographs were scattered online after a hacker managed to gain access to private iCloud accounts of nearly one hundred women, including those of well-known celebrities like Jennifer Lawrence and Kate Upton. Already shaken by the revelations made by Edward Snowden a year earlier about NSA's extensive surveillance program, the leak triggered another public wave of anxiety around data privacy. Arguments for privacy in public forums were increasingly made by pointing to the naked bodies that now circulated on the web as though to say that greater security was required because of the intimate ways in which data expose us.

The figure of the naked body, however, configures the contemporary relationship to personal data, more broadly. The bold intersection of steel and wires with human flesh has been the hallmark of an older cyborg imaginary. The term "cyborg" originally developed by Manfred Clynes and Nathan Kline described not only a figure constructed of both organic and synthetic parts but represented a suited hero: the astronaut.[78] The spacesuit worn by the astronaut, the very thing that rendered him a cyborg, was an external contraption. The cyborg not only celebrated the incorporation of technology into the human body, but acted as reminder that technology was supplementary; that it helped constitute an "extension of man."[79] One need only think of Hollywood movies like the *Terminator* series or the techie regalia of the characters in the *Star*

[78] Manfred E. Clynes and Nathan S. Kline, "Cyborgs and Space," Astronautics (September 1960): 26–76.
[79] Marshall McLuhan, *Understanding Media: The Extension of Man* (Boston, MA: MIT Press, 1964).

Wars franchise, from whose visual repertoire contemporary designers and developers of wearable tools continue at times to draw, to get a sense for the way computer technology has been first hailed as an exo-skin. The armored galactic conqueror thus echoed superhero figures like Superman and Batman, illustrated characters that both prefigured and informed the cyborg imaginary at the same time as they drew their own cultural force from the sculpted finesse and weaponized glory of Greek and Neo-Greek classical art.[80]

This original notion of the cyborg was in many ways at odds with the more distributed ideas that Donna Haraway had later called for in her critical occupation of the term "cyborg," although the two notions located decades apart share the view that the apparent finitude of the organic body met new possibilities through the intersection with the machine.[81] The cyborg, therefore, was chiefly an enhanced figure. Devices were not mere appendages, but means of self-aggrandizement and self-reinvention, a way to extend and expand the capacities of one's body and one's self beyond measure.

Today, the cyborg as a weaponized figure has dissipated. It has been replaced by a cyborg identity represented as a naked body and one that is completely free of wires or technology as well as of sartorial obstructions. On the one hand, the naked body represents digital tools that many hope will soon entirely disappear from view. On the other hand, as sensors embedded in objects of everyday use produce voluminous quantities of personal

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[80] Susan E. Ryan, *Garments of Paradise: Wearable Discourse in the Digital Age* (Cambridge, MA: MIT Press, 2014), pp. 37–38.

[81] Donna Haraway, "A Cyborg Manifesto: Science, technology, and socialist-feminism in the late twentieth century," in *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991), pp. 149–181; Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network Theory* (New York: Oxford University Press, 2005).

information, the vulnerable, unclothed, and unprotected naked body has emerged as an allegory of this digitized exposure.

This was an image conjured by Susannah Fox, a researcher at the Pew Research Center. Speaking at the Public Health Symposium convened by the organizers of the Quantified Self to discuss the role of data in contemporary society, she compared collecting data about one's life with the aid of digital technology to standing "naked in front of the mirror."[82] Fox reasoned: "That's the beauty and the peril of data, isn't it? To see ourselves as we really are." Later she transcribed her speech for readers of her blog and posted it under a telling title: "Secret questions, naked truths." Fox's comments echo the broader technical ambient environment centered around the figure of the nude. Promotional images featuring fit and scantily clad models regularly help condition contemporary sensibilities to appraise personal data as a premier technology of exposure. A 3-D body scanner produced by the aptly named company, Naked Labs, is one example. *TechCrunch*, a well-known industry publication, had quoted the CEO of Naked Labs explaining the company name and mission: "Eyes do an amazing job of focusing on problem areas. You get into body dysmorphia if you're not careful. And it's hard to stay motivated. This [device] shows people their real progress, or the 'naked' truth."[83] Meanwhile, to explain the workings of their products to customers, many wearable technology makers make explicit connections between personal data and transparency by borrowing the visual language as well as the scientific authority of the X-ray or the CT scan.

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[82] Susannah Fox, "Secret questions, naked truths," Susanahfox.com, April 6, 2014, http://susannahfox.com/2014/04/06/secret-questions-naked-truths/

[83] Lora, Kolodny, "Naked Labs Enters the Fitness Fray With Body-Scanning Mirror," *TechCrunch,* April 14, 2016, https://techcrunch.com/2016/04/14/naked-labs-enters-the-fitness-tech-fray-with-body-scanning-mirror/

Proponents of "open" technology and advocates of privacy that work to guard against data's easy transportation compound the sense of exposure facilitated by personal data by regularly announcing the impending delivery of a transparent society, one in which every gesture, movement, and affect will soon be available for transcription and transmission along digital lines.[84] Popular author Patrick Tucker therefore warns his readers to expect "the naked future," while the online campaign NakedCitizens, collaboratively developed by European privacy groups, teaches its followers to understand one's vulnerability in a digital climate in corporeal terms.[85] Duplicating the message, the campaign's website features a naked man in a fighting stance with the tagline "Don't Let Big Business Strip You of Your Privacy Rights," inviting associations between personal data gathering and actual disrobing. In response to concerns about digital exposure, media scholars Finn Brunton and Helen Nissenbaum suggest that the only way to escape unwanted transparency is through concerted efforts of "obfuscation."[86]

Summoning this penetrating digital gaze, an engineer I spoke with observed: "It used to be [said] that everything that could be digital will be digital. Now it is [said] that everything that can be known will be known."[87] When I visited the offices of a major data conglomerate whose common spaces were decorated with dozens of oversized fish-tanks because their founder liked

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[84] In her first book, *Coding Freedom: Ethics and Aesthetics of Hacking,* Gabriella Coleman discussed the idea that many computer programmers share: that information should be "free," that is free to move around, be shared, and exchanged without institutional, corporate, or political constraints. This foundational attitude informs the widespread belief that data should be "open" – that is, free to move about from place to place, device to device, and even from device to body. I will discuss this theme in greater detail in Chapter 5. See Gabriella Coleman, *Coding Freedom: The Ethics and Aesthetics of Hacking* (Princeton, NJ: Princeton University Press, 2013).

[85] Patrick Tucker, *The Naked Future: What Happens in a World That Anticipates Your Every Move?* (New York: Penguin Group, 2014).

[86] Finn Brunton and Helen Nissenbaum, *Obfuscation: A User's Guide for Privacy and Protest* (Cambridge, MA and London: MIT Press, 2015).

[87] Field notes, August 2015, on file with the author.

them, the imputed fishbowl effect produced through data was placed on full display. The aquatic décor subtly primed the researchers, data analysts, and computer engineers who met for meetings or conversation amid the colorful tanks, to regard the personal data the company collected and processed as equally transparent, as that which allowed powerful, cunning, or simply technically savvy actors to peer over and inside the lives of others with the same ease as they were presently looking at the fish swimming in the fish-tanks beside them. A 2016 art installation in New York City titled "The Glass Room" turned on the same threat/promise of exposure, beckoning attendees with the chance to "look into your online life."[88] Personal data captured by computers have thus become largely aestheticized as a glass house – the glass house as metaphor of the body that has become similarly transparent in the digital era.

Chris echoed the seductive coupling of skin with personal data derived by digital means. In a message posted to his social media account on Twitter following the *Dark Net* premier, he arranged a compilation of covers from *Newsweek* placed side-by-side like a timeline that traces a shift in how computer technology intersects with the body (Figure 10). Selecting covers from 1993, 2012, and 2016 that, respectively, ran stories about the launch of the Internet, the full-scale move of the magazine online, and the latest issue featuring a nude and translucent silhouette on its cover, called the "Body" issue that highlighted a range of wearable and sensor devices that now proposed to make the body and the self transparent, Chris captioned his conclusion: "The 'inner-net' is here."

[88] https://theglassroomnyc.org/

Figure 10: Tweet by Chris

The juxtaposition of naked skin and personal data also underscores the salacious aesthetics of the series *Dark Net* and its coded discourse of veiling and unveiling with which I opened this dissertation. The relationship between skin and data as a technology of indecent exposure largely underwrites *Dark Net*'s narrative frame. It is not only that with eyes hidden and identity denied that the figure featured in the show's marketing materials becomes anonymized. In this posture, the model functions as a placeholder for the modern viewer, the everyday computer user whose vision and identity have likewise become digitized. Here, gender and skin tone set the general interpretive frame. The model's androgynous but feminized whiteness helps code this exposure – and, by association, digital technology discussed therein – as somehow illicit and promiscuous; as both risky and risqué. More than anything, the aesthetics of erotic films offer a more direct way to read this image. The covered eyes are a synecdoche for the exposed body that is understood to be seductively located off-screen but that the full-feature promises to inevitably deliver. The voyeuristic gaze reflects the promiscuity of knowledge, of seductive information that cannot be restrained. In this context of a promised revelation, it makes sense that the episode featuring Chris and his putative self-disclosure through data, otherwise

scheduled to run as a second episode in the eight-part mini docu-series, has been selected as the one to represent the series' broader theme of danger, seduction, and illumination during the show's premier that I attended at the invitation of Chris.

In a 2016 Spring Show, Xuedi Chen a student from the New York University Interactive Telecommunication's Program (ITP), a graduate program that blends artistic acumen with technological knowledge and prepares students to develop speculative projects and designs, picked up on this popular theme (Figure 11). Centered on a bodice that grows translucent as the wearer shares more and more information through her social media profiles, the project was

Figure 11: Mock-up of the project X.pose

intended as both a product prototype and a commentary on personal data.[89] "In the realm of data, we are naked all the time," Chen wrote on the website dedicated to the art piece. "X.pose is a wearable data-driven sculpture that reveals a person's skin as a real-time reflection of the data emissions that they are producing."[90]

[89] Chapters 5 and 6 approach the relationship between gender and data more directly.
[90] Xuedi Chen, "X.pose." Blog. *ITP Thesis 2014,* itp.nyu.edu. https://itp.nyu.edu/shows/spring2014/x-pose/

The sense of exposure produced by data is particularly heightened in context of contemporary wearable technology. For developers of wearable and sensor-embedded tools, the figure of the naked body is a promising one – it expresses the desired invisibility of technology that will help to make the person rather than the tools s(he) uses visible. The earlier cyborg imaginary, as I had noted, not only dramatized technology as a figurative armor but also valorized the conspicuousness of these tools. This view was widely embraced by early innovators of wearable computing like Steve Mann and Thad Starner who are recognized today as key founders of wearable computing. In the 1990s, they also helped to draw enthusiasm and curiosity for the field by creating an experimental club at MIT dubbed the Borg Club in a salute to the figure of the suited cyborg. [91] Members of the Borg Club committed to irreverently

Figure 12: The Borg Club. Steve Mann is far left. Courtesy of © Steve Mann, 1996.

wearing their bulky heads-up displays on a regular basis, inviting rather than shunning public scrutiny and attention because of the tools they donned (Figure 12).

[91] Ryan, *Garments of Paradise*.

For Mann, in particular, the fact that these devices were so noticeable held critical potential. He originally developed his own head-worn piece as political commentary intended to call out rather than to enable what he perceived as the expanding regime of public surveillance. He called his form of self-monitoring, which was "undertaken by an entity not in a position of authority," "sousveillance."[92] For Mann, who used various portable devices, including a portable camera that captured his daily routine on film, sousveillance, or self-observation, involved the use of portable devices that continuously recorded one's daily activities. But it was the ability to record oneself conspicuously, even demonstratively, that was central to his project. For instance, he wore a video camera around his neck as a performance piece and as a form of political protest. Every time Mann was detained at the airport while wearing the device, prevented from entering a store while he was visible filming, or was asked for footage he recorded in public settings, he goal was to call attention, through his actions, to the mono-directional, authoritative gaze that increasingly claimed the power to document the movements of others, but criminalized the attempts of others to reverse the gaze and scrutinize its power.[93]

Today, my conversations with device developers reveal the feeling that devices that are large and visible, distract. Bulky devices attract unwanted attention and my interlocutors often insisted that conspicuous tools would attract too much attention and thus would prevent unfettered access to one's experience. "Once you have more than one thing you start to look like, you know, Batman. It's a little disruptive," John, an avid enthusiast of wearable technology complained to me once.[94] "You have to stop and explain," commented Shawn, discussing his

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[92] Steve Mann, "Five Significant Contributions to Research," Wearcam.org, http://wearcam.org/contributions.pdf
[93] Dan Goodin. "Passenger cleared after TSA Checkpoint stare-down: Man fought the law and the man won," *The Register,* January 25, 2011, www.theregister.co.uk/2011/01/25/passenger_acquitted/
[94] Field notes, July 2015, on file with the author.

preference for more inconspicuous tools.[95] "I don't like things to be obvious. That sort of creates a barrier … I like a little bit of recognition, but not a lot."[96] By contrast, technology removed from view to them became forgettable. Forgetting promised to reduce the effects of mediation that otherwise threatened to contaminate personal discovery.

For many of the developers of wearable tools that I have spoken with, the figure of the naked body symbolizes a future where devices will effectively disappear from sight – and from mind. Self-monitoring gadgets disguised in clothing or accessories were therefore widely described by my interlocutors as "technology getting out of the way." As "the power of computation is condensed … it moves inside us, we forget it's technology," explained one developer.[97] "It's so unobtrusive. That's where it's going. It's so successful that you don't even think it's a machine. Once it becomes integrated, it will just be life. It will not literally disappear, but we will simply forget it exists," announced another.[98] Others quipped, imaging everything from rings to eyewear enhanced with concealed digital sensors: "We are redefining eyewear and we are putting technology in the rim, but you will not know it … We don't want it to feel like a wearable that you wear on your face … There is a very small market for people who want to look like an android."[99]

The promise of wearable technology to bypass mediation is enlivened by the physical proximity of devices to the skin. In professional settings, the perceived closeness of wearable devices to the body has entered this technology into a rhetoric of enhanced intimacy that

[95] Field notes, June 2015, on file with the author.
[96] Field notes, October 2015, on file with the author.
[97] Field notes, December 2015, on file with the author.
[98] Field notes, September 2015, on file with the author.
[99] Leslie Muller, "The Evolution of Wearables," presentation, New York, April 15, 2016.

amplifies the tools' imputed capacity to reveal. One wearable designer, writing in a widely-read industry report prepared by a New York brand-consulting firm PSFK, noted:

> With the emergence of smaller, more advanced sensors, the opportunity to embed technology in clothing allows for an integrated approach. If *you think of the skin as an interface, clothing becomes the instrument to communicate with the body*. This creates an *unobtrusive* and intelligent design, minimizing distraction. By integrating technology in clothing, *it no longer serves as an intrusion, creating a seamless flow of communication*. As a result, the wearer experiences a *deeper connection with themselves*.[100]

Skin is an "interface." Clothing – qua wearable technology – "communicates with the body." As a result, technology helps mediate a "deeper connection" with one's self without distractions. Another developer in a private conversation with me echoed this view, holding the sensors embedded in clothing in mind: "Clothing is already something that is very intimate. Now, what if clothing could communicate as a friend to tell you about moments you were not aware of?"[101] In our conversation, he suggested the closet, where one both removes clothing and devices at the end of the day, as a working metaphor of data analysis. The closet, of course, is a place that keeps things hidden and has long functioned as a cultural trope of hidden sexual identity. Similarly, in this conversation, my interlocutor used the closet as a trope of intimacy – the closet was a place where one's "true" identity was both stored and revealed, particularly as clothing, the metaphorical social disguise, is removed at the end of the day. In all of these instances, co-presence is collapsed into companionship, physical proximity into the kind of intimacy that eliminates disruptive mediation.

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[100] Billie Whitehouse, "Founder of wearable experiments shares her new vision for the quantified self," *PSFK,* October 20, 2016, www.psfk.com/2016/10/billie-whitehouse-wearable-experiments-technology-quantified-self.html (emphasis added)
[101] Field notes, December 2015, on file with the author.

Technology that is physically close to one's body is now also increasingly socialized as that which is *emotionally* close, as that which knows one "personally," or gets to know one on a "personal" level. The closet, suggests media scholar Shannon Mattern, is a productive rather than a static site of storage. It "has never been merely a space for storing inert objects and suppressing secrets. It's also a site of creation, transformation, and mediation. Our closets incubate epiphanies, dreams, and fears … they're where we work through our resolutely *un*binary identities."[102] Nevertheless, my interlocutors evoked the figure of the closet in the same manner narratives of sexual "coming out" use the closet as a storage site of intimate, private knowledge, as a metaphor of the deeply hidden self. In relating and relegating wearable technology to the closet, technologists and data enthusiasts viewed these tools as mechanisms that increasingly help to shed all manner of disguises.

If clothing obfuscates, the naked body, the one free of obstacles, provides, as the PSFK article hypes, "a seamless flow of communication." The desire for a post-clothing body – the kind that for now one can only see in the closet – which echoes in contemporary discourse on wearable technology, resurfaces and "rehearses an age-old dialogue between society and the body that proposes a process of invisibility based on an ideal of pure functionality and pure information," notes art and fashion historian Susan Ryan .[103] This discourse, particularly the emphasis on the naked body stripped free of clothing, of its disguises, is particularly evocative of turn-of-the-twentieth-century "functional anti-fashion." Where fashion was linked with capitalist modes of production, to forego fashion, if not yet clothing itself, was seen as an instrument of social liberation, a release from capitalist devotion to the fashion machine. Neutralized aesthetics

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[102] Shannon Mattern, "A stuffed history of the closet, where the 'past becomes space'," *Places Journal,* July 2017, https://placesjournal.org/article/closet-archive/
[103] Ryan, *Garments of* Paradise, p. 103.

promised an escape from oppressive, social constraints, broadly construed. The relationship between functional anti-fashion and the contemporary technical imaginary of the naked body can be seen even in the still popular science-fiction film *The Matrix*, where fashionable clothing was linked with a simulated reality called "the Matrix." Characters who escaped the virtual reality and resided in the "real" world, sported ragged attire marked by dark, brown, or neutral tones, clothing which looked so worn and torn that it only barely managed to cloth their naked bodies.

It may at first appear paradoxical that, in contrast to functional anti-fashion that still shaped the aesthetic imaginary of *The Matrix*, contemporary device developers embrace fashion; indeed, they hope to render their devices not only functional but also fashionable. However, fashion, here, is viewed as that which may only further reduce the effects of mediation. By integrating technology into fashionable items, developers hype and hope that technology can recede into the background; that it will become diffused in the broader social milieu. By aiding in the process of forgetting technology, fashionable items help to reveal. When devices stop being the focus of attention, according to this view, the technology can instead focus on the person. Therefore, PSFK promises, "By integrating technology in clothing" – and it is the everyday fashions that PSFK has in mind – "it no longer serves as an intrusion, creating a seamless flow of communication." When devices cease to draw attention to themselves and integrate into one's life effortlessly, in other words, when they fit like one's *second skin,* then, developers anticipate, these tools will generate information "seamlessly," without distractions.

Pieces of Me

The discourse on nudity that I have encountered in the professional settings where wearables are made at times suggests that even skin disguises. Data professionals appear to view

the body only as a shell that holds the data laying within; the physical skin is viewed as just another layer that needs to be removed so as to access the digital *second skin* within. Consider for instance the following image taken from a 2014 blog of a well-known market research firm, Forrester Research (Figure 13). This image offers the language in which entrepreneurs and technology developers speak both to each other and to their consumers. In turn, their rhetoric sets the terms by which people purchasing devices are invited to interpret the work of sensors and the personal data sets that result. Although I focus on Forester's iconography here, I have encountered similar iterations throughout my research.

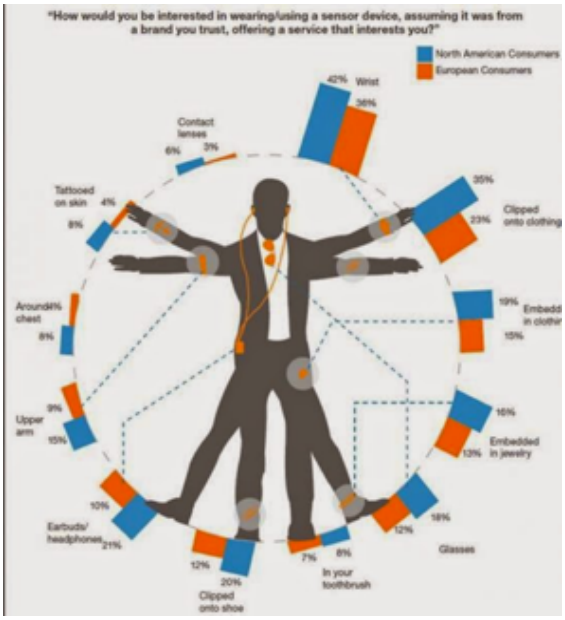

Figure 13: Forrester Research Graphic

Figure 14: The Vitruvian Man

Readers are likely to recognize in the silhouette of the suited cyborg its fleshy Renaissance double: *The Vitruvian Man,* sketched by Leonardo da Vinci in 1490 (Figure 14). To Western eyes, the *Vitruvian Man* is a familiar image whose ubiquity perhaps rivals only that of the *Mona Lisa*. Culturally, this drawing has widely been adopted as a symbol of Western science

and general health. Little surprise that Forester Research has chosen this parallel. The authority of this image already helps situate the wearables industry and the data it produces squarely within a canonical scientific discourse rather than at its margins. In adopting this image, Forester also establishes tacit correspondence with another component of da Vinci's sketch. With this drawing, da Vinci famously paid homage to the ancient Roman architect Vitruvius whose work was a meditation on natural proportion. The sketch's alternate title is *The Proportions of the Human Body According to Vitruvius*. In the original, the outstretched limbs of two superimposed positions etch a perfect circle, triangle, and square, epitomizing and articulating the natural symmetry Vitruvius – and da Vinci – felt was bound within the human form. As a shadow figure behind Forester's adaptation, this naked body also stands in for the "nature" that is revealed through data, one that "shows," as Susanna Fox had put it, "ourselves as we really are."

In the context of Forrester's blog post, the graphic is meant to animate a question about consumer comfort with wearable technology but in industry conversations, the illustration also has a secondary function: it is often taken as a progress map that proudly demonstrates all of the possible sites a bio-sensor can now be placed on the human body. The nodes indicate the places where bio-sensors embedded in wearable technology can now be placed on the body to collect a range of biometric and environmental data about the user. These could include watches and bracelets that collect heart rate and activity levels, patches and socks that measure blood oxygen or cadence, rings and headsets that keep track of stress, anxiety, and pleasure, and the list goes on. To gaze at this silhouette in professional settings, is to thus quietly marvel at the increasingly diminutive technology that now progressively canvases the body and to wonder – as one is often invited to do at industry events – at their increasing processing and knowledge-producing

capacities. It is also to appreciate the way technology helps document the body and the person seen as contained therein.

In this image, data are largely conflated with body parts and organs. Just like the body is made up of its individual but discrete parts, this image likewise offers to view personal data as making up "pieces" of one's self, as though data were digitized components of one's body. Thus, speaking about self-monitoring with the aid of various sensors, a friend aptly suggested: "It's like a puzzle I'm putting together." The sheer variety of wearable devices coming to market cultivates the perception that each part of the body contains discrete information that the expanding range of sensors is simply helping to extract and to document.

The relationship between the data and the self expressed in the image of the nude, a nude that only emerges in the figurative closet, is also often rendered in psychoanalytic terms, proposing the wearable technology can access a dimension that escapes a persona's conscious awareness. "Join the conversation … with your body," invites a promotional video for *Profusa*, a bio-sensor that measures tissues oxygen levels. "This device can know me better than I know myself, and can help me be a better human," claims an advertisement from Microsoft Band.

Personal data in these professional renderings are treated as manifestations not only of one's physiological but psychological processes; data help express one's very unconscious. An engineer speaking on a panel organized by a leading university on the future of wearable technology contrasted this revelatory capacity of wearable technology with the dissembling self-construction she felt we all engage in at times on social media. She reasoned, "Facebook is a place where you put out an image, but wearables are where you reflect on who you really are."[104] Similarly, Chris and I have spoken about how having access to his lifestyle and biometric data

[104] Field notes, September 2015, on file with the author.

gathered through a range of wearable and sensor devices has helped him expose his innermost thoughts, feelings, and desires. "Sometimes if I'm in a store and the clerk is being really rude, I'll just do this," he explained to me during one of our talks, holding up his arm and showing me the heart rate ticking away on his electronic wristband. "I won't say anything, I'll just stand there, holding it. And they look at it and see the heart, and they look at me and they go back and forth, and they just do this," Chris opened up his eyes wide, imitating the look of someone who arrived at a sudden epiphany. "It's a big shift when people start walking around with their heart on their sleeve … We can [now] empirically prove we are hurting each other. It's going to change everything."[105]

The idea that personal data collected from the body manifest deeper mental processes connects with the role media scholar Mark Andrejevic ascribes to body language experts, whose public presence, he notes, has proliferated in the first decade of the twenty-first century. In his 2013 book *Infoglut: How Too Much Information is Changing the Way We Think and Know,* Andrejevic explores a rise in post-millennium television shows that valorize body language experts.[106] Shows like MTV's *Expose* or the Fox drama *Lie to Me*, as well as a litany of body language experts whose presence has become increasingly conspicuous on political news panels, have flooded the airways. Andrejevic relates the growing interest in body language analysis to calls for heightened vigilance of the post-9/11 era. He also views the rise in interest in body language as a consequence of the data oversaturation – what he calls "infoglut*"* – that has characterized the past decade. Whereas digitally induced "infoglut" clouds judgment by oversaturating the faculties with information, body language, Andrejevic suggests, offers to cut

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[105] Chris, interview with the author, June 2015.
[106] Mark Andrejevic, *Infloglut: How Too Much Information Is Changing the Way We Think and Know* (New York: Routledge, 2013).

through the clutter. “In advocating what seems at first a radical empiricism,” Andrejevic notes, body experts “simultaneously project beyond surface appearances to a hidden essence.”[107]

The contemporary interest in body language, digital and otherwise, has a historical double. Much as turn-of-the-twentieth-century experts in phrenology and physiognomy treated somatic signals as signs of inner psychological constitution, for body language analysts of today “the mental is linked to the corporeal in a directly legible way.”[108] The body, as historian Elspeth Brown similarly notes, appeared to nineteenth-century scientists as an “index to the mind,” creating a “generalized ‘common sense’ concerning the relationship between exterior manifestations and interior states.”[109] The clarity and the “common sense” that body language offers to today’s experts contrasts, for Anrejevic, with the hazy state induced by information overload. The sense that body analysis surfaces otherwise obfuscated knowledge is precisely what drives interest in wearable and sensor-embedded digital tools. For many of the professionals I spoke with, personal data produced through wearable technology distilled and delineated a purer self that they saw as otherwise obscured by layers of both ideology and epidermis.

To some, the truth delivered by personal data speaks beyond individual physiology or psychology and extends even farther, to the very origins of man, as though personal data operate as the “molecular parchment on which an account of our species had been written,” much as DNA are popularly view to do.[110] Personal data are thus seen not only to surface one’s very

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[107] Andrejevic, *Infoglut*, p. 81
[108] Andrejevic, *Infoglut*, p. 81.
[109] Elspeth H. Brown, *The Corporate Eye: Photography and the Rationalization of American Commercial Culture, 1884–1929* (Baltimore, MD: Johns Hopkins University Press, 2005).
[110] Steve Olson speaking about DNA, quoted in Nadia Abu El Haj, *The Genealogical Science: The Search for Jewish Origins and the Politics of Epistemology* (Chicago: University of Chicago Press, 2012), p. 10.

unconscious but also to recover deeper origins viewed as obscured by modern interventions, helping surface not just the present but the "natural" man unencumbered by culture. Worried one of my interlocutors,

> I think so many of the people in American I know are totally disconnected from that. Their ways of sleeping, their ways of moving are so far from where our ancestors might have been. So how can we be a little more thoughtful about that while living with all of these modern wonders? There is a lot of good to the modern world and there is a lot that has disconnected us. How do we become true to our biology … and not engage in the types of behaviors that our ancestors would never have engaged in? … How can we make sure to be true to our nature?[111]

This person saw digital sleep and food monitoring as that which helps him recover these lost connections. These views are not simply marginal or esoteric; they characterize the views of device developers and entrepreneurs, perspectives that become disseminated in the wider social milieu as wearable and sensor-enabled tools are ushered into wider commercial production.

Body Hacking

The professional view of data as *second skin* that I have encountered in my research oscillates between Foucault's notion of the soul and the body, and departs from it. The "soul" Foucault writes *In Discipline and Punish*, is not the "reactivated remnants of an ideology" but the "correlative of a certain technology of power over the body."[112] The "technology" that Foucault has in mind are the new mechanisms of supervision and surveillance that have progressively shaped and animated the Western imaginary of the body since the nineteenth

[111]Field notes, April 2015, on file with the author.
[112] Michel Foucault, *Discipline and Punish: The Birth of the Prison* (New York: Random House, Inc, 1977), p. 29.

century. The "soul" is the residue of power, the effect of the social and political "technology" that holds the organic body captive and simultaneously gives it shape. Foucault writes,

> The man described for us, whom we are invited to free, is already in himself the effect of a subjection much more profound than himself. A "soul" inhabits him and brings him to existence, which is itself a factor in the mastery that power exercises over the body. The soul is the effect and instrument of a political anatomy; the soul is the prison of the body.[113]

In privileging "the soul" over "the body" Foucault effectively denaturalizes the body, offering the now classic construct that the body is not only an organic but a historical, political, and cultural entity, a by-product of a specific set of social controls exerted over it. But he also pacified the body. The organic body, for Foucault, is little more than a surface, a blank and inert slate for social inscription. In proposing to read the self and the body through data, contemporary enthusiasts of data monitoring echo a philosophical tradition that saw the subject as inscribed from without. However, whereas Foucault's "soul" constitutes the sociohistorical envelope that constrains and disciplines "the body," many today also turn to personal data as a means of breaking free and of "hacking" through these social restraints so as to access something more a priori, pure, and candid than the organic body or its sociocultural shell: the "real" self that is lying in wait.

The "soul" in Foucault's writing, the socialized constraints that both realize and limit the body, at times also echoes Walter Benjamin's concept of the "aura," which, I read in certain of his writings, as equated with false consciousness. This idea of the "aura" is especially well developed in the essay, "The Work of Art in the Age of its Technological Reproducibility." Here, the sartorial nature of the "aura" is particularly resonant as Benjamin directly speaks of

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[113] Foucault, *Discipline and Punish*, p. 30.

"aura" as a "veil" that needs to be removed.[114] Aura as a mask and as a veil is a symbol of tradition that holds a person in the grip of its authority – one that is associated in this essay with the figure of classical art. The loss of aura, however, is also the loss of tradition as authority, here equated additionally with the loss of the authority of classical art in the age of its technological reproducibility. Unlike classical art, so beholden to social structure and tradition, modern art, so Benjamin suggests and hopes, no longer operates as a symbol of power. Art movements like the Dada mounted a social and political critique intended precisely to undress and denude conventions that held people hostage and in place. Whereas classical art was draped in a sacred and protective coating, the purpose of modern art, as Benjamin saw it, was to tear down both the veil and social conventions. Its role was to shatter rather than to shutter. For Benjamin, modern art carried the potential of acting as a weapon against ossifying tradition. He wrote: "[F]rom an alluring visual composition or an enchanting fabric of sound, the Dadaist turned the artwork into a missile."[115] To break an object's or a concept's aura is not only to realize the world and its walls as constructed but to open the doors onto a new field of vision. His work is both a critique of new modes of production as well as a reflection of Benjamin's own complex understanding of the possibilities of new technologies of his time. The belief that the new technologies of his day also held revolutionary potential remained wedded to a fantasy of full disclosure, to the possibility of finding methods that would at last reveal the world as it really was.

Contemporary data discourse remains similarly animated by the revolutionary possibility of the exposé, of standing naked in front of one's mirror in one's metaphorical closet, where one

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[114] Walter Benjamin, "The work of art in the age of its technological reproducibility," in *Walter Benjamin: Selected Writings, Volume 4, 1938–1940* (Cambridge, MA and London: The Belknap Press of Harvard University Press, 2003), p. 255.
[115] Benjamin, "The work of art in the age of its technological reproducibility," p. 267.

would at last glimpse oneself as one really is. Personal data are thus widely cast as constituting a secondary self that is hidden within the body, the spectral, doubled quality of data reflected in the popular vocabulary of personal data as one's "digital double," "trace," "shadow," "duplicate," or "copy." The language of revelation, and even of liberation, is especially resonant in contemporary invocations of "hacking," where wearable technology takes on the role of Michelangelo's chisel. A popular lore proposes that Michelangelo regarded sculpting as an act of extraction. He saw his work as one of unmasking rather than of carving, of setting free a precise form already trapped within the stone. His job was less to invent the piece than to expose it. Throughout my research, claims that wearables helped "hack" the body were issued in a similar spirit by developers to suggest that digital tools were implements with which to carve away the excess so as to release the essence encased within.

The term "hacking" is an import from computer engineering. As used by computer programmers, "hacking" describes a creative approach to problem solving where one cuts through a technical issue by creating shortcuts to it. A programming challenge is seen here as a field of weeds through which an engineer cuts by hacking away at the keyboard as though the keyboard were a metaphorical machete. The term's more sinister connotation also popularly denotes a computer break-in. These two uses of the term "hack" enliven the technical and colloquial understanding of computer hacking, seen both as the industrious activity of computer engineers and as an illegal activity of pernicious pranksters. In both cases, hacking implies a process of breaking something open and thus creating a shortcut to it or through it, be it a difficult problem or a computer system. Hacking has likewise become a common trope of personal data analysis. "Being an engineer, I am always looking for shortcuts … I am always looking for the way that will work faster," explained Ben, himself an engineer, when talking with

me about his interest in collecting personal data through self-tracking that allows him to "hack" his body.[116] Wearable tools that automate data processing offer the shortcut he craves. The physical and even the violent language of bodily "hacking" thus holds the promise of accessing a space outside of mediation, of surfacing or cutting through things that stand in the way.

The cover art for the coffee-table book and the accompanying documentary film about the future of personal data, titled *The Human Face of Big Data* (Figure 15), encapsulates this imaginary.[117] The image clearly pays homage to the embryonic "Star Child" of Stanley Kubrick's science-fiction classic, *2001: A Space Odyssey* (Figure 16).

Figure 15: Poster for the film The Human Face of Big Data.

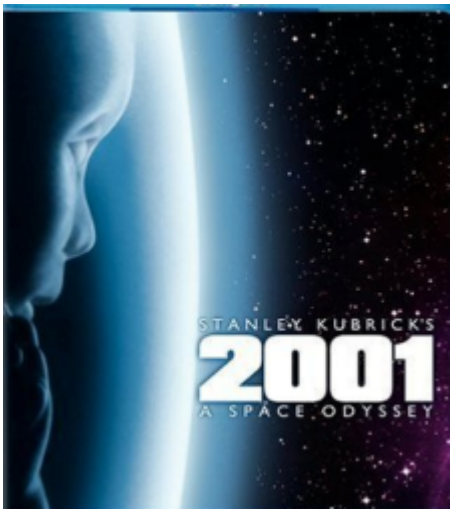

Figure 16: Stanley Kubrick's 2001: A Space Odyssey. A DVD cover (2007 release).

However, it likewise conjures the notion of data as *second skin* that I have encountered throughout my research and have developed within this chapter. The artwork for *The Human*

[116] Ben, interview with the author, July 2015.
[117] Jennifer Erwitt and Rick Smolan, *The Human Face of Big Data* (Against All Odds Production, November 20, 2012). The film featured interviews with some of the top executives from Google, 23andMe, and other leading technology firms.

Face of Big Data contains a telling ambiguity. It leaves unclear which of the double profiles represent the "human face" derived from data. Data appear to constitute both the pixelated outer casing that is set around the human form as well as the face that comes together beneath a veneer now made translucent.

In our conversations, Chris offered a parallel visual. Explaining to me what it felt like for him to have access to so much personal information, he paused, then said: "It's like your whole life envelops you," adding later, "It's a womb."[118] Following Chris's explanation of personal data both as an external envelope and as an internal, generative coating in which the self is seen to be enshrined, it is this fetishized self-doubling and self-distillation qua digital self-disclosure that expresses what I have called here data as *second skin.*

Digital Taxidermy

While the cover art of *The Human Face of Big Data* uses the spectral visage only figuratively, artist Heather Dewey-Habgorg's haunting installation, *Stranger Visions,* has helped make literal the idea that a human face is hiding within one's personal data. The busts that Dewey-Hagborg constructs are built from DNA of anonymous strangers. Although Dewey-Hagborg focuses on DNA, given the already common conflation between DNA and computer code, the art project was initially intended as a broader commentary on the contemporary dynamics of personal data; a reflection on the semblances between people and their data and the concomitant dangers of digitally mediated identity.

[118] Chris, interview with the author, January 2015.

To highlight the ways in which people shed personal data everywhere they go, often without even noticing, Dewey-Hagborg focused on the DNA she collected in random encounters: DNA swiped from a discarded piece of chewed-up gum on the pavement, a strand of hair left behind on the subway, an abandon glass on a bar counter, or a leftover napkin on a restaurant table (Figure 17). Identifying skin color, hair color, eye color, and gender from available DNA registries, Dewey-Hagborg created a computer program that helped her process the DNA data and to generate an electronic portrait of the visages to whom the DNA had once belonged. Then, using a 3-D printer, she printed the faces. The fleshy, life-size busts that she reconstructed appear to emerge from the data not unlike the sculpted figures that surfaced from Michelangelo's stone, as though the artist had simply discovered them there (Figure 18). The busts also return to *Dark Net's* pornographic imaginary where the head that appears on the poster, cut off at the neck, acts as a synecdoche for the rest of the scandalously exposed body located off-screen.

Figure 17: Hair samples used in Stranger Vision.

Figure 18: Busts at the Stranger Vision Exhibit

Although her art invites association with conservation as well as with copying and printing, the process of creating the busts revealed other metaphors. Dewey-Hagborg's work suggests seeing art and artistry, craft and craftiness not only as a way of evaluating and categorizing her relationship to data, but as a way of thinking through that which contours data. Dewey-Hagborg's process of working with data, of surfacing faces from the data she discovers, materializes and performs data-gathering as a form of social construction, as itself an art. The busts, for one, are not perfect replicas. Much of the information is still missing. Dewey-Hagborg's art is speculative rather than precise. In the act of gathering available information on DNA data, Dewey-Hagborg had to confront limitations as well as biases encoded into data sets marked by preconceived notions of gender and race that are often presented as a priori rather than as culturally and historically constructed in DNA records.[119] Moreover, in the process of excavating a face from the data, Dewey-Hagborg had to not only reconcile tensions in the data set but also make inferences and use her imagination to fill in the gaps. Since no genetic marker

[119] Heather Dewey-Hagborg, "Sci-fi crime drama with a strong black lead," *New Inquiry,* http://thenewinquiry.com/sci-fi-crime-drama-with-a-strong-black-lead/

for age is available, for instance, she had to artificially set it. And after generating a series of plausible visages, she combed through the resulting set of faces looking for the faces that were the most striking, beautiful, or that simply felt familiar.[120]

In so doing, Dewey-Hagborg's art expresses that DNA, as theorists like Nadia Abu El Haj have shown, is not only a biological but also a social material. "The scientific and commercial promise is that each of our genomes will become increasingly knowable and both the risks that we face and our most fundamental selves will become ever more legible," El Haj writes of the conventional view.[121] The reading of this molecular archive, Abu El Haj argues, is not a straightforward process, but one that is itself already politically and socially mediated. In decisions made about DNA to be coded or junked, DNA emerges as a product of contemporary debates as much as it can be seen as a historical archive. Similarly, Dewey-Hagborg's art cannot be understood in isolation, as finished pieces on a wall. Rather, her entire process of shaping and sculpting data sets to create a face functions as a performance piece that offers vital commentary on the contemporary imaginary of personal data.

Despite the creative process involved in generating these visages, media outlets have seized onto the spectral quality of Dewey-Hagborg's work, largely looking at the faces she displays as eerie replicas of the people they represent. The notion that data could – even if they may not yet – carry the possibility of perfect self-doubling have ushered her work to popularity. Personal data are thus made to seem as though they were almost tangible and material, as fragments that can be recomposed in alternative ways, perhaps not unlike dehydrated ingredients that lose their shape, but can be restored to their former form at a future date. The fantasy that

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[120] Heather Dewey-Hagborg. Interview with the author, New York, December 15, 2016.
[121] Abu El Haj, *The Genealogical Science*, p. 228.

appears to drive development of self-monitoring tools is that one's personal data – like Humpty Dumpty – may be one day put back together. Then, one will become wholly reconstituted, but also in an important sense, made whole again.

It is telling that in the exhibition halls of art galleries where Dewey-Hagborg's has displayed her work, she often fixes the busts on empty walls in a manner evocative of taxidermic displays of animal heads. "Taxidermy," as Donna Haraway has pointed out, "fulfills the fatal desire to represent, to be whole."[122] In the more extreme technophile enclaves, like the online discussion boards of Transhumanist enthusiasts, these views on data lubricate conversations about immortality where the expectation that one will one day be able to extract and upload all of the data about oneself to a device more permanent than the body and thus overcome death, if not materiality, feels for many to be within reach.[123] But even in more mainstream discourse, the public face of personal data has become one of smooth and continuous emission that is seen to at once duplicate the social self and the organic body in digital form at the same time as it is viewed as extracting the "real" self from the grips of the Foucaultian soul.

The fetishizing of nudity as an emblem of a more authentic nature revealed by personal data resurfaces the primitivism that has long echoed in computer discourse. In his 1998 study of computer scientists working to create what they then saw as "artificial life," anthropologist Stefen Helmreich has highlighted how programmers relied on native imagery to stage computerized models they created as something that approximated earlier, "simpler" forms of

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[122] Donna Haraway, "Teddy bear patriarchy: Taxidermy in the Garden of Eden, New York City, 1908–1936," *Social Text: Theory/Culture/Ideology II* (Winter 1984–1985), p. 25.

[123] Transhumanism is a technological subculture invested in improving health, particularly longevity, with genealogical roots stretching back to nineteenth-century eugenics. Transhumanists often focus on replacing what they perceive, in a more classic cyborgian frame, as faulty biological body parts with mechanical prosthetics.

life.[124] The computer scientists regarded the artificial life that they constructed on the computer as models of earlier, more primitive social formations. In fact, Helmreich showed that the life forms computer programmers created in their labs were constructed around liberal notions of self-sufficiency and competition. Yet, the programmers themselves regarded their work in the mode of salvage anthropology; they believed that the algorithmic models of sociality they built helped to reclaim a more authentic model of sociality as it once had been, at the beginning of time.

The juxtaposition of skin and data likewise activates the taxidermic impulse of salvage anthropology particularly marked, as media scholar Fatimah Tobing Rony had noted, in early photography and film, where the indigenous naked body figured as a frequent subject. In focusing on representations of the naked form, early photography and film extended the role of the nude in classical art. But the new medium also echoed the early ethnological tradition where the nudity of indigenous people constituted part of the "discourse of authenticity" that then also shaped salvage anthropology. Rony has called this mode of ethnological representation taxidermic because just like taxidermied displays of animal parts, the naked native served to fix an imagined past, as though his or her exposed body represented forms of arrested life, one that photography and film aimed to further consecrate and preserve while bringing the audience the voyeuristic pleasure of spying the early man qua primitive as he once must have been. Early photography of indigenous people thus often staged naked bodies as symbols of uncorrupted purity and history, as emblems of an original Man writ large.[125] Stripped of history, the photographed or televised indigenous body was often treated as a time capsule of the naked past.

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[124] Stefan Helmreich, *Silicon Second Nature* (Cambridge, MA: MIT Press, 1998).
[125] Fatimah Rony *The Third Eye, Race, Cinema, and Ethnographic* Spectacle (Durham: Duke University Press,1996), 108.

The figure of the naked body that mediates digital discovery activates this former taxidermic anthropological imaginary, now staging personal data rather than the indigenous body as the bearers of authentic nature, as the "real" self, once lost but now resurfaced and preserved. Digital self-tracking thus also renews a colonial imaginary of the world wanderer whose sacrificial travels brings the modern (wo)man into contact with natural wonders. But rather than the far reaches of civilization, the modern explorer metaphorically travels to the limits of one's very self where the adventurer likewise returns with the spoils of the trip: the naked body, the one uncontaminated and unspoiled by history or culture. Much as native tribes were once conceived by salvage anthropologists as uncorrupted time capsules of the past, it is personal data that, by being staged through the taxidermied figure of the nude, are now represented as more authentic, pure, and true.

Skinned Bodies

I found the themes discussed above neatly inscribed in two museum exhibits that I encountered, indeed felt drawn to because of their intuited similarities, during my research: the more recent *Body Metrics* exhibit that was on display near Silicon Valley in the San Jose Tech Museum of Innovation starting in 2015 and the long-running *Body Worlds* exhibit with branches throughout the country and internationally, though I had visited only two locations: in Las Vegas (while attending the CES conference) and in New York City. Considered alongside one another, the two exhibits say much about the way personal data are today publicly staged.

Matching the ambitious rhetoric issuing from Silicon Valley whose "spirit," per the Tech Museum's website copy, the museum had committed to capture, *Body Metric* grabbed attention

from the start, promising an "experience beyond anything now available to consumers."[126] The website beckoned would-be visitors: "come and explore human data streams measured and made visible using a Somaxis EXG muscle and heart sensors, a wireless NeuroSky EEG headset, and a customized iPod," devices whose health care – and aviation-inspired names alone were meant to stand testament to their scientific rigor and efficacy. More than a showcase of state-of-the-art technology, the exhibit offered social commentary, instructing guests on ways to interpret their digital output in the halls of the museum, and later on, in their daily lives. In particular, by keeping track of one's physiological and psychological states through EEG, heart rate, muscle tension and geolocation monitoring, the museum proposed to broker access to one's very psyche that doubled as the "digital you." Translating for the modern reader, one local review of the exhibit had expressed the high-tech rhetoric in more contemporary parlance: "in a snapshot," it says, what the exhibit creates is "an internal selfie."[127]

The appeal to self-discovery and self-excavation through the peeling back of surfaces closely mirrored the narrative presented at *Body Worlds*. *Body Worlds* is a long-running anatomical show that endeavors to bring knowledge of the body to the lay public. In particular, the exhibit prides itself on presenting bodies, preserved through the technique of plastination, in what it calls "natural" poses. Never mind that the contortion of the elderly (all cadavers are of people who ranged from 60 to 90 years old at the time of death) and Asian bodies of anonymous donors into poses miming young, healthy, and idealized Euro-American male postures –

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126 The museum website (www.thetech.org) previously carried the tagline "Capturing the spirit of Silicon Valley." Now, instead of the tagline, one finds a description in the same spirit: "The Tech Museum of Innovation is a family-friendly interactive science and technology center located in the heart of downtown San Jose, California. It has become a landmark for visitors seeking a glimpse of the most inventive place on Earth – Silicon Valley. Our mission is to inspire the innovator in everyone."

127 Angela Hill, "New 'Body Metrics' exhibit opens at the Tech – it's all about you," *The Mercury News,* October 29, 2014, www.mercurynews.com/bay-area-news/ci_26824224/new-body-metrics-exhibit-opens-at-tech-its

mimicking Rodin's *Thinker*, playing football, with the sole female body symbolizing procreation – made for the most unnatural display (Figure 19). Staged to operate as real-life atlases, the patent disregard of the histories of skinned donors reflected the exhibit's goal of prompting

Figure 19: Football Gladiators, www.bodyworlds.com

questions about visitors' own bodies rather than the experience of these particular bodies. It is only through stripping away both skin and social context that this exhibit, not unlike the devices I encountered at *Body Metrics*, promised to make the "interior face visible."[128]

A manager confirmed the connection I sensed between these truly exposed and vulnerable bodies and the more banal and administrative appeals of wearable technology displayed at *Body Metrics*. People come to this exhibit, he said, to learn about themselves, an idea only echoed in the prophetic slogan advertising the show in New York: "Destination: You" (Figure 20).

Figure 20: Image: Body Worlds pulse, Destination: You banner, www.bodyworlds.com.

[128] www.bodyworlds.com/en/exhibitions/mission_exhibitions.html

In their promises to move beyond surfaces in locating the body and the self, both exhibits activate a familiar trope of the nude body that had long correlated truth with the state

Figure 21: The Skin Man, www.bodyworlds.com

of undress. *Body Worlds* takes the idiom to a literal extreme by suggesting that even the epidermis disguises. In one of the displays, a corpse tellingly holds out his own skin as a final, strange offering (Figure 21). The skin, an irrelevant barrier now, lays limply in his outstretched hand. This disguise shed, he stands entirely vulnerable and exposed.

Body Metrics similarly aimed to move beyond the epidermis to the body and the psyche within. In a poster that greeted visitors at the start of the exhibit demonstrating all that the data one can collect throughout the exhibit accomplishes, a boy is shown standing in a posture of readiness, wearing all three devices (Figure 22). His entire body is pixelated, making his features difficult to discern. An attendant explained to me that this abstraction was meant to pay homage

Figure 22: Body Metrics exhibit, on-premise billboard.

to digital privacy and I was likewise invited to distort my photograph, taken at the entrance, to create the desired level of anonymity. The blurry effect, however, seemed less to disguise than to reveal. The boy's t-shirt, as though displaying thermal information collected from sensors embedded in clothing, explodes in a panoply of colors simulating a heat map. The geometric patterns that frame his shape evoke the crystals of a data visualization graph or chart, indexing the data of which his body appears to be composed. The result is a translucent figure supposedly stripped open by the digital gaze that sees past his visage and straight through to his body and his internal state.

While on the surface offering very different corporeal displays, both exhibits claim to make visible the inner workings of the body. At *Body Worlds*, when the skin is pulled back, one discovers the internal machinery of the body. At *Body Metrics*, one finds data. These two exhibits reveal the degree to which the digital gaze and the anatomical gaze have become paired in the popular digital imaginary. In fact, one is often conceived as the logical extension of the other, as though wearable devices now simply take over and extend the function of the scalpel as the instrument that helps peel away layers of useless epidermis to reveal the data within in ever

more precise ways. Like the muscular body that is unveiled once the skin is pulled back, wearable developers and personal data enthusiasts default to thinking of data as a *second skin* running just under the body's surface.

Chapter 2: Social Skin

The trope of nudity that shapes the discourse on personal data is a familiar one; the naked body is a well-worn idiom of knowledge. The English language is saturated with terms that equate the process of discovery with the removal of clothes. Knowledge often appears as shrouded in covers that must be persistently dis-guised, dis-closed, and dis-covered. The premise that one searches for answers by removing excess layers, including the skin, extends far into history. As various scholars have noted, this trope has been foundational to both Western philosophy and Western medicine.[129] Similarly, Hans Christian Andersen's classic tale, "The Emperor's New Clothes," has long allegorized truth as a scene of unveiling.[130] In the story, the king, convinced by two swindlers that they had actually woven him marvelous clothes, sets out before his kingdom naked. When the moment of truth arrives, the courtiers recognize the king's nudity but do not dare to acknowledge it. The royal suspects his indecent exposure but pretends not to notice. The key failing of the king is precisely that he is too taken with clothing, with fabrics, and therefore also with disguises. The charade would continue indefinitely were it not for a young boy who removes the cloak of illusion, declaring, "But the king is naked!"

Postmodern and postcolonial critique has offered ways to problematize nudity as a sign of discovery. It is in this spirit that Derrida had suggested to see the disrobing of the king in Andersen's tale as a fantasy rather than as an allegory of truth.[131] The naked body, for Derrida, remains a fetish object. It acts both as an index of desire for easy-to-uncover truth and as a

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[129] On the relationship between depth and knowledge in Western philosophy, see Page duBois, *Torture and Truth.* (New York: Routledge, n.d); on anatomy, see Shigehisa Kuriyama, *The Expressiveness of the Body and the Divergence of Greek and Chinese Medicine (New York:* Zone Books, 2002).
[130] Hollis Robins, "The Emperor's New Critique," *New Literary History,* Multicultural Essays (2003): 659–675.
[131] Jacques Derrida, "The Purveyor of Truth," *Yale French Studies* 52 (1975): 31–113.

substitute for the salacious and satisfying reveal, which never fully materializes. The nakedness of the king, in "The Emperor's New Clothes," can be understood only as a symbol that exposes the longing for truth, not as the fulfilment of this desire.

For anthropologists like Claude Levi-Strauss and philosophers like Jacques Derrida and Georgio Agamben, the figure of the naked body has also long marked the start of culture rather than the ground zero of nature; the naked human body articulates with the creativity and robustness of society rather than operates as a symbol of a pure and authentic essence.[132] These authors often treat the naked body as the very thing that creates the bifurcation between nature and culture. For instance, in *The Animal That Therefore I Am*, Derrida finds himself confronted by his cat as he steps out of the shower.[133] Both the philosopher and the cat appear for a moment without clothing. But it is only Derrida that feels naked. Faced by a sense of shame that he speculates, in a theological modality, the animal does not feel, the sense of the interpolative culpability strips the philosopher. "The animal is … not naked," Derrida writes. "There is no nudity in nature." Nudity is proper only to man; it is "one of the 'properties' of man."[134] Standing before the animal and feeling cognizant of his own nakedness, the title in the original French – L'Animal Que Donc Je Suis – reveals Derrida's central quandary. The title is a play on words, the conjugated form of the verb "to be" in the first person (Je suis) echoed in the conjugated form of the verb "to follow" (Je suis). Translated literally, the title can thus mean both "The Animal That Therefore I Am" as well as "The Animal That I Therefore Follow." But then Derrida also states that he stands before the cat. He is left confounded about "who comes

[132] Claud Levi-Strauss, *The Naked Man: Mythologiques, Volume 4* (Chicago: University of Chicago Press, 1971).
[133] Jacques Derrida, *The Animal That Therefore I Am* (New York: Fordham University Press, 2008).
[134] Derrida, *The Animal That Therefore I Am*, p. 5.

before and who is after whom? I no longer know which end my head is. Madness."[135] The distinction that invites the question of difference between himself and his pet, of culture that follows nature, the animal before the naked man, is constructed after the fact and only linguistically, although it is also this difference that now places Derrida ahead of the animal – that is, before him. A naked body likewise mediates Agamben's well-known bifurcation between *zoe* and *bios*; the two categories determined by an intermediary, the Homo Sacer, which Agamben himself calls "bare life."[136] The naked body does not exist at the limits of culture; it delimits nature.

Anthropologists Terence Turner has similarly shown that the naked body is never empty of signification. While a familiar linguistic convention suggests that truth appears in disguises that have to be fastidiously removed, in his 1980 article, "The Social Skin," Turner examines flesh as always already a "symbolic stage upon which the drama of socialization is enacted."[137] Turner's commitment to socializing naked bodies was aimed at rendering impotent a colonial imaginary that had romanticized exposed skin of native people as a symbol of truth and authenticity. Writing against the Eurocentric logic that equated the nudity of native people with a lack of history or social sophistication, Turner worked to show that the naked body is never a blank canvas but always already replete with social meaning.

In the previous chapter I discussed the way developers of wearable tools approach data as though they constituted one's *second skin.* Following the critique of nudity proposed by

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[135] Derrida, *The Animal That Therefore I Am*, p. 10.
[136] Georgio Agamben, *Homo Sacer: Sovereign Power and Bare Life* (Stanford, CA: Stanford University Press, 1998), p. 8.
[137] Terence Tunrer, "The Social Skin," *Journal of Ethnographic Theory* 2, no. 2 (1980), p. 486, reprint of Terence S. Turner, 1980, "The Social Skin," in *Not Work Alone: A Cross Cultural View of Activities Superfluous to Survi*val, edited by Jeremy Cherfas and Roger Lewin (London: Temple Smith), pp. 112–140.

anthropologists and philosophers, this dissertation maintains that data never offer a naked view of personal experience. The image of data as *second skin* holds important rhetorical force in professional settings. However, as I will consider throughout this dissertation, this entrepreneurial discourse does not even operate seamlessly within professional settings themselves. In fact, as the chapters to come will show, professionals hold a much more variegated understand of data than the surface rhetoric of *second skin* at first suggests. This research inevitably reveals that data, not unlike flesh or the body, are *social.* They represent, to borrow Turner's words, the "symbolic stage upon which the drama of socialization is enacted."

In this chapter, I would like to examine the social context in which the notion of data as one's *second skin* which device developers and entrepreneurs endorse today, could have acquired some of its contemporary meaning and weight. For one, the view that wearable devises can manifest one's "true" essence, that they can help to reveal one's "real" self, can be traced back to the representational authority automated tools have acquired in the nineteenth century, as historians Lorraine Daston and Peter Galison have explored.[138] Contemporary treatment of data as the disembodied digitized substance of one's essential self can also be situated in the views of mathematicians and engineers connected with the field of cybernetics whose work in the nineteen forties is widely recognized by media scholars and historians of sciences as foundational to early computer development and later to the popular conceptualization of the online experience.[139] In the first part of this chapter, this work helps to situated contemporary

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[138] Loraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007).
[139] See: N. Katherine Hayles, *How We Became Posthumn: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago and London: The University of Chicago Press, 1999); Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago and London: The University of Chicago Press, 2006).

data rhetoric in this turn-of-the nineteenth century and mid-twentieth-century techno-social imaginary.

These historical approaches offer important precedents for contemporary models of digitality. However, the professional treatment of data as *second skin* that I have observed can also be connected to other, more recent factors. In particular, in the second half of this chapter, I consider the role blogging and social media has played in creating new ways for thinking about the relationship between people and the digital data they produce. The contemporary convention of seeing data as one's *second skin*, as I had explored in the previous chapter, has to be viewed as a product of these relatively recent shifts in the social reception of computing, and not only as a direct descendant of earlier socio-technical discourse. Situating the views professionals hold of data within this historical and contemporary context, helps to show that despite the language mobilized by entrepreneurs and developers, data are irrevocably social substances after all.

Technically Human

Critical data scholars have already begun to note that the contemporary discourse on digital data stages a marked return to what Lorrain Daston and Peter Galison have called "mechanical objectivity. [140] Daston and Galison first developed the concept of "mechanical objectivity" to historicize the concept of objectivity, itself. The historians insisted that notions of truth and the relationship between knowledge and the experts producing it have shifted across time. In the middle of the nineteenth century, just as a range of mechanized equipment, including

[140] See: Lisa Gitelman, *Raw Data is an Oxymoron* (Cambridge: MIT Press, 2013); Kate Crawford and Dana Boyd, "Critical questions for Big Data: Provocations for a cultural, technological, and scholarly phenomenon," Information, Communication & Society 15, no. 5 (2012), 662–79; Nathen Jurgenson, "View from nowhere," *The New Inquiry*, October 9, 2014.

the photo camera, started making its way into the scientific laboratory, a new regime of truth began to take shape. Earlier models of scientific expertise relied on visionary qualities of the scientific genius who could decipher ideal form from the imperfect earthly matter he encountered. By contrast, mechanical objectivity rendered the individual observer an imperfect and a hopelessly flawed witness while it endowed mechanized tools with the capacity to strip away convention or bias to directly access brute, naked facts. Subjectivity as a faulty form of observation emerged through this new reverence for the machine. In the age of the scientific genius, the scientist gifted with exceptional perception, revealed the truth. In the age of mechanical objectivity, only the machine could perceive properly. The work of Étienne-Jules Marey, who invented many of the graphic methods used in scientific laboratories to this day including the sphymograph to measure and graphically display pulse, supplies some of the language of this techno-scientific imaginary. "When the eye can no longer see, the ear cannot hear, or touch cannot feel, or even when our senses appear to deceive us, these instruments perform like a new sense with astonishing precision," Marey wrote.[141] This former technical imaginary continues to resonate in the professional regard for digital tools which are often endowed with the authority to render people as they "really" are.

The fragmentation of sensation and perception into measurable quanta has also been connected by historians of science and technology, like Johnathan Crary and Ansen Rabinbach, with the emergence of capitalism and industrial modes of production. In that time period, "the human body and the industrial machine were both motors that converted energy into mechanical work," observed historian Anson Rabinbach. "The automata no longer had to be denied a soul –

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[141] Quoted in: Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Oakland: University California Press, 1992), 95.

all of nature exhibited the same protean qualities as the machine."[142] Rabinbach stresses that the comparisons between humans and machines centered around questions of labor. Efforts to render people as efficient and as productive as industrial tools drove the analogy between people and technology. Crary emphasizes that the very idea that sensation can be measured and classified emerged in tandem with an economic system that emphasized rationalization and atomization, a system that centered on the breaking down of things – of people, of goods, of experiences – into measurable units that can be bought, exchanged, or sold.[143]

However, machinery and industrialization also offered new models of the body to mid-twentieth century scientists. Doctors experimenting with new medical techniques like organ transplants or the developing new prosthetics for veterans of World War II, increasingly approached the body much like a machine: as an instrument that could be taken apart for parts, refitted, and fixed. Furthermore, the shift to Fordist modes of production provided additional background against which scientists and medical practitioners could begin to posit that a relationship between bodies and machines was not only metaphorical but real. Methods of standardized production offered new concepts of the body; the body was progressively viewed as composed of standardized parts that could be swapped in and out, or that one day could be synthetically engineered and mass produced. Scientific inquiry and technological development was thus motivated, as sociologist Melinda Cooper put it, by the "attempt to create the conditions under which the difference between the organics and the mechanical becomes effectively negligible."[144]

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[142] Rabinbach, *The Human Motor*, p. 2.
[143] Johnathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture* (Cambridge: MIT Press). 1999
[144] Melinda Cooper, *Life as Surplus: Biotechnology and Capitalism in the Neoliberal Era* (Seattle and London: University of Washington Press, 2008), p. 122.

This manner of thinking of bodies in terms of machines, endures. It often surfaced in the way my interlocutors spoke of the body. At one Quantified Self event, for example, Dave offered a particularly striking comparison between automobiles and bodies – one, he says, his father, a car aficionado himself, failed to fully appreciate, to his own peril. His father's failure drove Dave's own interest in digital self-monitoring. His father loved cars and, according to Dave, spent more time in the garage than with his own son. When he became older, he discovered blood in his stool, went for a colonoscopy, but never made use of the information. Eventually he died of colon cancer. "He understood the car in a way he never understood his body," Dave explained. "He had such a dissociated experience with his own body … and I thought, my god, how is that we can have sensors and devices in our cars to understand how this thing works and when it will break down, but we have so few things that we know about our body?"[145]

In her now classic study *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature*, *and Informatics,* N. Katherine Hayles examined additional circumstances that allowed the view that "humans and machines were brothers under the skin" to blossom.[146] The parallel between man and machine has become best expressed, she suggests, in key debates of the Macy Conferences that were convened between 1945 and 1960 in New York, and which gave rise to a new field: cybernetics. Cybernetic theory, supported in large part by work of mathematicians like Claude E. Shannon and Norbert Wiener, sought to formalize not only communication, but human bodies. During this time period, human bodies and capacities were already widely viewed in terms of the technological imaginary. As I reviewed, Rabinbach had observed that the capacities of human bodies were increasingly modeled on the productivity of

[145] Dave, interview with the author, December 2015.
[146] Hayles, *How We Became Posthuman*, p. 19.

machines whereas authors like Cooper and Serlin observed that human bodies appeared replaceable and as capable of being mass-produced as synthetic ones. Cyberneticists extended this view even further: they endorsed the view that both people and machines were fundamentally organized by a computational logic.

In particular, Hayles explores how Shannon and Wiener advanced the idea that materiality through which "information" was conducted and the context in which messages were embedded, was secondary if not irrelevant. In principle, it mattered little if information was contained within organic or artificial forms. The mathematicians proposed to understand information as a disembodied pattern, as a dematerialized sequence of signal and noise. Explaining this position, Wiener poetically wrote:

> Our tissues change as we live: the food we eat and the air we breathe become flesh of our flesh and bone of our bone, and the momentary elements of our flesh and bone pass out of our body every day with excreta. We are but whirlpools in a river of ever-flowing water. We are not stuff that abides, but patterns that perpetuate themselves.[147]

"Ranging human intelligence alongside an intelligent machine" has helped put "the two into a relay system that constitutes the human as a special kind of information machine and the information machine as a special kind of human," Hayles observes.[148] By disregarding form, cyberneticists began to image that computers could not only supply new mechanistic analogs for the body where cognition, in particular, was reimagined as computerized computation, but that it was inherently possible to translate and transfer the human into digital form.

The notion of information as disembodied and the human body essentially as a vapid casing for "information" did not go uncontested. The Macy Conferences, conceived as an

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[147] Norbert Wiener, *The Human Use of Human Beings* (London: Houghton Mifflin, 1950), p. 96 quoted in Hayles, *How We Became Posthuman*, p. 104.
[148] Hayles, *How We Became Posthuman*, p. 65.

interdisciplinary gathering, were fraught with disagreement. As psychoanalysts and anthropologists working alongside mathematicians and engineers began to confront these ideas, Shannon and Wiener's theories were widely debated.[149] For example, while Shannon and Wiener proposed to treat information purely as signal or pattern, empty of semantic content, British physicist, Donald Mackay, insisted that neither medium nor meaning or context could be reasonably abstracted from the message. However, what first started out as a limited and technological concept proposed by Shannon and Wiener, soon began to take on broader significance. Neurophysiologist Ralph Gerard grew concerned that, as the conferences wore on, discussions that appeared speculative at the beginning were increasingly treated as confirmed fact. During the seventh conference he called out the shift in tone:

> It seems to me … that we started our discussions and sessions in the "as if" spirit. Everyone was delighted to express any idea that came into his mind, whether it seemed silly or certain or merely a stimulating guess that would affect someone else. We explored possibilities for all sorts of "ifs." Then, rather sharply it seemed to me, we began to talk in an "is" idiom. We were saying much the same things, but now saying them as if they were so. [150]

While registering his discontent, Gerard's lament also shows the influence Shannon's and Wiener's theories increasingly took on.

In *Closed World: Computers and the Politics of Discourse in Cold War America,* historian Paul N. Edwards considers some of the post-World War II political context that helped Shannon's and Wiener's initially contested ideas to increasingly become adopted as matters of fact. In particular, Edwards accounts for the way Wiener's and Shannon's theories about the

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[149] For example, Margaret Mead and Gregory Bateson were the two anthropologists who attended these meetings.
[150] Ralph Gerard, quoted in Paul N. Edwards *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: The MIT Press, 1996), p. 192.

disembodied nature of information were increasingly shaped by anxieties about the Cold War.[151] In this period, U.S. policy had started to embrace a rhetoric of "containment" in respect to the communist threat posed by the Soviet Union. Pivoting on the logic of "containment," Edwards observes that political action operated through a two-pronged strategy: expand U.S. influence globally while also close the world off from perceived communist expansion.[152] "Containment" framed the Cold War as a moral duel between two opposing worldviews, each striving to enclose the other in its sphere of influence. The notion of the globe as that which must be united in a fight against communism and in the process, become "opened up" to capitalism dominated the political and popular imaginary of the time. As a result, not only did national security become globalized, but the discourse produced a notion of the world as a "closed world." Where the image of the "closed world" dominated, "the globe itself was seen as a closed whole, as a single scene in which the capitalist/communist struggle was the only activity."[153] Edwards emphasizes that cybernetic theory of disembodied information held distinct ideological appeal in this political climate. In proposing to overcome and broker physical boundaries, cybernetics helped both to conceptualize and to activate the image of a closed world, of the globe as a unified system, as a theoretically stable, coherent, and commensurable whole in which surveillance and monitoring could proceed without interruptions.

In this militarized climate, a cybernetic understanding of communication was itself over-determined by a weaponized imaginary. Edwards writes: "Cybernetic psychology began as an effort to theorize humans as component parts of weapons systems and continued, after the war,

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[151] Edwards, *The Closed World.*
[152] Edwards, *The Closed World*, p. 2.
[153] Edwards, *The Closed World*, p. 14.

to draw crucial models and metaphors from those concerns."[154] Applied centrally to questions of command and control, the human was instrumentalized not as an organic or a cultural body with thoughts, feelings, a biography, and a social sphere, but as a "machine in the middle."[155] The human body was conceived here only as a component in the command-and-control infrastructure that integrated the person and the machine into a single "command circuit."[156]

By the 1960s, as social critics and youth movements across the country began speaking out against the Cold War Era technocracy inaugurated by cyberneticists two decades earlier, the computation metaphor seemed to come under attack. In 1964, students took to the streets of University of California at Berkley, holding up empty computer cards in a sign of protest. "I am a UC student. Please do not fold, bend, spindle or mutilate me," one person wrote to register his rejection of a bureaucratic mechanism that increasingly reduced people to signs and symbols, to little more than information patterns in a machine.[157] Much of historical scholarship understands the American counterculture movements of the 1960s to have rejected the Cold War technocracy in these terms.

While historians often combine the youth movements of the 1960s into a singular monolithic group that rejected Cold War-era technocracy and hierarchical bureaucracy wholesale, Fred Turner has challenged these assumptions, arguing that some groups maintained historical continuity with the cybernetic way of thinking about bodies and technology. In particular, Turner proposes to differentiate between the politically engaged New Left of the 1960s and the "libertarian, lifestyle tinkerers" he called the New Communalists. The latter joined

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[154] Edwards, *The Closed World*, p. 181.
[155] Edwards, *The Closed World*, p. 197.
[156] Edwards, *The Closed World*, p. 205.
[157] Turner, *From Counterculture to Cyberculture.*

the New Left in vocally denouncing hierarchical structures and bureaucratic control, but unlike the New Left, they heartily embraced technology as a means of transforming their lives. Their interest and even reverence for cybernetic ideas helped lay the foundation and the terms in which personal computing and later the Internet would be viewed during the 1980s and 1990s.

In the 1960s, the New Communalists were part of a growing movement of young adults who aimed to embody the romantic American frontier mentality by literally taking to what they imagined were the edges of civilization, launching a burgeoning commune culture across the United States. While rejecting Cold War politics, the New Communalists embraced both information theory and the highly collaborative style of work that characterized the military-industrial complex. "The cybernetic notion of the globe as a single, interlinked pattern of information was deeply comforting: in the invisible play of information, many thought they could see the possibility of global humanity" Fred Turner had observed.[158] As they retreated to communes, experimented with mind-altering drugs, or excused themselves from mid-century prescriptions of "the good life," The New Communalists also read the works of cyberneticists like Norbert Wiener and Buckminster Fuller and of the media theorist Marshal McLuhan. In the process, "they began to imagine institutions as a living organism, social networks as webs of information, and the gathering and interpretation of information as keys to understanding not only the technical but also the natural and social worlds."[159] Unlike the New Left who decried the bureaucratic logic of computational forms, The New Communalists saw new possibilities in cybernetic concepts of information. Cybernetics offered a "vision of a world built not around vertical hierarchies and top-down flows of power, but around looping circuits of energy and

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[158] Turner, *From Counterculture to Cyberculture*, p. 5.
[159] Turner, *From Counterculture to Cyberculture*, p. 4.

information."[160] According to Turner, The New Communalists first induced this alternate consciousness through drugs, and music. Later generations, however, sought the experience of disembodiment in the workings of computer technology and the Internet.

Besides being united by a cybernetic rhetorical framework that proposed a "cybernetic vision of the world, one in which material reality could be imagined as an information system," the New Communalists coalesced into a network of people who have had a lasting impact on the way computers were socially articulated. In particular, Turner attributes the spread of cybernetic principles among the New Communalists and beyond to the personal networks established by Stewart Brand. Brand had built what Turner called "network forums," first through the publication of the *Whole Earth Catalog* in the 1960s, in which Brand circulated reading lists alongside articles about new tools, and then through the organizing of influential early online forums and communities.[161] Brand thus helped both consolidate and fuel the visionary imaginations of The New Communalists. Although the *Catalog* ceased publication in 1972, Brand – located in San Francisco – continued to act as an important intermediary between the academic computer culture and the countercultural elite. In the coming years he brought innovators, enthusiasts, technophiles, and the countercultural credo together through the quarterly *Whole Earth Review* (a publication that Brand started in the 1980s to revive his iconic catalog in magazine form), and later the Whole Earth 'Lectronic Link, or the WELL.

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[160] Turner, *From Counterculture to Cyberculture*, p. 38.
[161] Turner, *From Counterculture to Cyberculture*, p. 5.

The Virtual "Second Self"

For much of the 1960s and the 1970s, computers, as Turner had put it, "loomed as technologies of dehumanization, of centralized bureaucracy and the rationalization of social life."[162] However, brokered in part by the network forums established by Brand, cybernetic ideas about disembodied information also entered popular discourse. By the 1980s, as smaller "personal" computers that could be used in the home flooded the market, the imagery of technical disembodiment emerged as the central conceptual frame of this technology, an idea that later extended to the World Wide Web. The computer and then, by extension, the Internet were welcomed as otherworldly, defined frequently through the metaphor of outer space. Constituting a third space, a world apart, computational tools were thus widely embraced as sites where traditional boundaries of race, sex, gender, or normative values could become subverted and act as the very means through which these cultural changes could be brought about. In so doing, computers were seen not only to open access to an alternate virtual reality but also helped produce what Sherry Turkle categorized as the virtual "second self" – the self that appeared to be unencumbered by geographic limitations, physical impediments, or social structures.[163] Through the computer and the Internet, as Turner had summarized, "the individual self, so long trapped in the human body," had finally been set "free to step outside its fleshy confines, explore its authentic interests, and find others with whom it might achieve communion."[164] Media theorist Wendy Hui Kyong Chun had called this euphoric period a "heterotopia of compensation" where computational tools were seen to enact a liminal space for "economic, social, or sexual redress

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[162] Turner, *From Counterculture to Cyberculture*, p. 2.
[163] Sherry Turkle, *The Second Self: Computers and the Human Spirit* (New York: Simon & Schuster, 1984).
[164] Turner, 1.

that simultaneously represented, contested, and inverted all other 'real' spaces."[165] This zeitgeist was also articulated in cyberpunk literature of the era, like William Gibson's *Neuromancer,* a book that had launched the term cyberspace into popular circulation. In the book, the term cyberspace described a computer-mediated universe that humans could access by plugging the computer chord into their brains. The cyberpunk aesthetic and the term cyberspace became widely used to describe the experience of connecting to the Internet itself.

The connection between the cyberpunk imaginary and the experience of going online is wholly encapsulated a 1993 *Time* magazine cover and feature story that discussed the burgeoning interactive sphere. (Figure 23). The lead story of this issue presents the Internet in dark and menacing tones evocative of Gibson's writing. The headline of the feature describes the Internet as an "Electronic Underground" filled with "Virtual Sex, Smart Drugs and Synthetic Rock 'N Roll."[166] The cover reinforced these dystopian associations. More importantly, it articulates the popular idea that the Internet facilitates the experience of disembodiment. On the cover of the magazine, a young man is pictured seated at a computer screen. Though dressed as a proper school-boy in a clean, pressed shirt with a white collar, his hair cut short, he also sports the insignia of a renegade "punk" subculture, his hair slightly ruffled, black leather gloves on his hands. The contamination of white normative ideals by renegade fashion likewise mirrors the wayward werewolf transformation supposedly performed by technology that now envelops him. He is wearing an electronic headpiece reminiscent of Steve Mann's early wearable camera. The glass screen of the headgear covers the right eye like a modern-day pirate eye-patch. As it

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[165] Wendy Hui Kyong Chun, *Control and Freedom: Power and Paranoia in the Age of Fiber Optics* (Cambridge, MA: MIT Press, 2006), p. 55.
[166] Philip Elmer-Dewitt, "Cyberpunk! With virtual sex, smart drugs and synthetic rock 'n' roll, a new counterculture is surfing on the dark edges of the computer age," *Time,* February 8, 1993, http://content.time.com/time/magazine/article/0,9171,977654,00.html

duplicates the green-lit code of the computer screen before him, the reader is meant to grasp that the boy's vision had already become partially computerized, triggering associations with the Terminator and the Six Million Dollar Man or a myriad other rebel cyborg action figures of the previous two decades. The leather gloves rigged with dangling wires provide the final embryonic connection to both the computer and the symbolic – what the article hypes dramatically as the "dark edges of the computer age." The wires appear to at once to enable access and to control his actions.

Figure 23: February 8, 1993 Time *magazine cover*

Suited up thusly, the young man is also presented as an electronic space traveler, an intrepid explorer seated at the computer as though at an airline control panel preparing for his first ascent into a parallel universe. This conceptualization of the computer user as a pseudo-astronaut/soldier creates a symbolic connection between the original cyborg and contemporary computer technology. The connection between space travel and computer use is further

reinforced throughout the article. Within the body of the editorial, a picture of Nigel, Serius, and Mu, editors of an early popular technology publication *Mondo 2000,* is set against a galactic

Figure 24: Time *magazine February 8, 1993 cover story art, p. 61.*

background (Figure 24). The caption explains that the "surreal" effect was achieved by using something known as Adobe Photoshop software. Though now patently anachronistic, the fantastic juxtaposition suggests seeing the Internet and computer experience as equally transformative. The interactive experience promised to deliver an escape from the ordinary. Untethered from rigid confines of earthly materiality, users of the Internet and the computer could go traveling.

The boy's youth, furthermore, marks personal computing as new and exciting. His hands hover over the keyboard in mid-action as though the reader fortuitously just happened to catch him there, at the inaugural moment. Gazing off into the distance, his stare is filled with a mixture of flat detachment, longing, and contempt as he sends what seems like one final farewell to earthly concerns. Before our eyes, his identity is split in two. While he is still here, his digital

double is already elsewhere. Plumes of smoke, like an electronic tornado, work on his psyche, performing a kind of techno-exorcism, pulling out his doubled spectral body and hurling him – Rubik's cube, calculator, soldering iron, screwdriver, wrench, and all – into the nether regions of the early Internet. On the surface, this young man remains an innocent, fresh-faced kid. Behind him, however, another self deep in thought already lurks, eyes fixed firmly on the computer screen looking out with a mixture of concentration and wonder. "Cyberspace," the feature article explains, is a place that removes participants from ordinary lives and "allows them to leap over barriers of time, place, sex and social status." This image perfectly captures an entire era of digital identity marked by radical disembodiment. The first wave of wearable technology largely belongs to this period of digital escapism. Whether it is the "Borgs" of the MIT Media Lab who took to ceremoniously wearing their conspicuous machines to more irreverent ideas developed by technologists and fashion designers, wearables were play-things that facilitated a descent into the extraordinary. Cultural theorist Anne Cranny-Francis has suggested that this period constituted a "straight-out erotics of power … which offered … freedom from mundane physical reality."[167]

In 1993, the same year that the *Time* feature story came out in the press, Stewart Brand had taken this worldview to *Wired* magazine, which he had founded together with Kevin Kelly, one of his early hires at the *Whole Earth Review*. Since then, *Wired* has become a leading technology publication that has disseminated and helped further entrench these views,

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[167] Anne Cranny-Francis, "From extension to engagement: Mapping the imaginary of wearable technology," *Visual Communication* 7, no. 3 (August 2008), p. 267, quoted in Susan E. Ryan, *Garments of Paradise: Wearable Discourse in the Digital Age* (Cambridge, MA: MIT Press, 2014), p. 70.

particularly the commitment to technology that has helped to shape what media theorists Richard Barbrook and Andy Cameron have characterized as "Californian ideology."[168]

As one of Stewart Brand's protégé's, Kevin Kelly can be viewed as the connective thread between Brand's view of computing and the Quantified Self, which Kelly helped to establish along with Gary Wolf. The very same cybernetic understanding of humanity as disembodied information which shaped Brand's views of computing seems echoed in the organizing efforts of the Quantified Self – and even in the phrase "quantified self" itself. For example, in the article "The Data-Driven Life," which Wolf published in *The New York Times* in 2010 – an article that has come to operate almost as a manifesto for the Quantified Self – Wolf made this connection more explicit. In particular, he lamented that the numerical and computational processes popular in professional settings have not been sufficiently applied to personal life. If the work of a car or an assembly line can be analyzed as a number – why (still) not the person? He argued,

> Corporate executives facing down hostile shareholders load their pockets full of numbers … [But] in the cozy confines of personal life, we rarely used the power of numbers. The techniques of analysis that had proven so effective were left behind at the office at the end of the day and picked up again the next morning. The imposition, on oneself or one's family, of a regime of objective record keeping seemed ridiculous. A journal was respectable. A spreadsheet was creepy.
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> …We use numbers when we want to tune up a car, analyze a chemical reaction, predict the outcome of an election. We use numbers to optimize an assembly line. Why not use numbers on ourselves?[169]

Wolf's concept of a "data-driven" life, a phrase he adopted from the professional dictum of a "data-driven" business, can be seen not only as a new idea wrenched from commerce but an idea

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[168] Richard Barbrook and Andy Cameron "The Californian Ideology," S*cience as Culture* 6, no. 1 (1995): 44–72.
[169] Gary Wolf, "The data-driven life," *The New York Times Magazine,* April 28, 2010, www.nytimes.com/2010/05/02/magazine/02self-measurement-t.html

already coextensive with the mechanistic understanding of the body, and specifically the cybernetic imaginary forged in the 1940s Cold War America and subsequently publicized by Brand.

From Second Self to Second Skin

The notions of a data-driven life that has powered the Quantified Self and cybernetic ideas about digital disembodiment are not seamlessly connected by a historical red thread, however**.** From the early days of cybernetic research to the boom of personal computing and the early rise of the Internet from the 1980s to the early 2000s, a single idea dominated: the liberating and transgressive potential of technical disembodiment. The possibility of abstracting the self into a set of computerized data points rested on a basic presumption that a fixed identity that returned to the body could be eliminated altogether in favor of a disembodied sociality. Because, following cybernetic principles, data was understood as dematerialized, one could entertain the fantasy of leaving the mortal and the biological body behind. Indeed, for many early enthusiasts of the Internet, "cyberspace" held out this transgressive possibility. At least on the internet and at the computer, the story went, one could be anyone. The internet thus opened up the space for an egalitarian imaginary: "For those always already marked, the Internet supposedly relieves them of *their problem, of their flesh* that races, genders, and handicaps them, of *their body* from which they usually cannot escape," Wendy Hui Kyong Chun had summarized the spirit of the times.[170]

[170] Chun, *Control and Freedom*, p. 133 (emphasis in the original).

However, in the past decade, this popular image has all but reversed. As the entrepreneurial discourse of data as *second skin* suggests, data are said to provide a return to the body, rather than an escape from it. The shift has to do not only with changes in technology, as my interlocutors often insist, but also with its social reception. In part, the shift was precipitated by a scholarly critique. Media and communications scholars have productively pointed out that while the computer and the Internet were widely hailed as subversive of social, political, and bureaucratic structures, or even corporeal boundaries, the reality was that electronic disembodiment always already hinged on worldly difference. Rather than being "post-race," cyberspace space only served to replicate and at times reinforce familiar social divisions, not least by passing off the idea that race was only "skin deep" and thus could be overcome with technology that abstracted skin color from view.[171]

In her analysis of one exemplary promotional campaign by the communication company MCI that ran on television during the 1990s, Chun highlights how "passing" online always already implied a racialized and gendered identity where the non-marked, normative body remained ideologically male and white. As the advertisement moves through a parade of racialized and gendered bodies that serve to symbolize digital multiculturalism and racial egalitarianism, the commercial culminates in a domestic scene featuring a white man typing directly into the computer screen rather than looking out at the audience as all other figures have done. In this commercial, Chun stresses, "the fact that MCI must offer an image of a white male, if only to show him ignoring 'us,' reveals the impossibility of 'pure textuality,' of pure mastery, as well as the privilege still inherent to this white male place-holding position."[172] Moreover,

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[171] Chun, *Control and Freedom*, p. 132.
[172] Chun, *Control and Freedom*, p. 143.

many of the cyborg images of the era that supposedly heralded a post-gender and post-racial identity that exceeded rigid confines of the body also hinged on familiar sexist and gendered tropes. As Elizabeth Ryan points out,

> The pop culture cyborg's signature leather, latex, and metal constituted a trope for the invasion of the organic boundary of the skin. But this "flesh-eating" cyborg image became overextended and, rather than signifying society's frightening future, as did Fritz Lang's 1927 robot in *Metropolis,* techno-fetishes of the 1990s tended toward domesticated, archaic, even medievalizing interpretations. Consistently and despite iconic cyborg-supermen like the bionic *Six Million Dollar Man* (1974–1978) or *Robocop* (1987)*,* the popular cyborgs that appeared in that period were female if not feminist.[173]

The flip side of disembodied consciousness as male and white was what Chun also called "high-tech Orientalism" of cyberpunk literature like *Neuromancer,* which had supplied some of the inspiration for the rhetorical and visual vocabulary of the cyborg imaginary over the last two decades of the twentieth century.[174] The invitation to be anybody in the digital context, to leave one's body and to go traveling, was in fact often thematized through an explicitly racialized topology. The digital other wasn't simply anyone. High-tech Orientalism frequently aestheticized the other as belonging to the Far East, thereby only rehearsing the "themes of Oriental exoticism and Western penetration."[175] Moreover, the suggestion that one could pass for anyone else online, that the computer or the Internet made it possible to forego the limitations of one's own body and become anybody, read as an explicitly white and male fantasy that took for granted that this form of virtual skin-walking could fully replicate the experience of embodied otherness that philosopher Frantz Fanon, among others, had so poignantly theorized.[176] With none of the

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[173] Ryan, *Garments of Paradise*, p. 64.
[174] Chun, *Control and Freedom*, p. 189.
[175] Chun, *Control and Freedom*, p. 189.
[176] See Frantz Fanon, *Black Skin, White Masks* (France: Editions du Seuil, 1952. English Translation: 2008).

burdens of actually inhabiting another's body, there was "always an option of … leaving when things get too uncomfortable or difficult."[177]

Scholarly critique of digital identity as fundamentally rooted in worldly dynamics coincided with a popular reintegration of embodied experience with digital identity. By 2005, as Silicon Valley was recovering from the explosive crash of dot-com businesses, the Internet entered a new phase: Web 2.0, characterized by a growth in social media platforms that enabled information and video sharing. For those without a technical background, services like Blogger, Facebook, YouTube, and Twitter made publishing personal content simple. On these platforms, identity largely replaced anonymity as the mediating paradigm.

As the technical barriers-to-entry for online communication were lowered, social media and the Internet were suddenly welcomed as spaces for self-expression rather than for digital self-abstraction. Blogs and personal profiles were widely regarded as an "archive of feelings" that offered a "record of the realities and fantasies" experienced by their authors, dreams and experiences that returned to the situated, worldly body.[178] As records of feelings expressed from

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To account for some of the reasons the materiality of both bodies and devices could have become removed from the cybernetic vision of the world, Hayles also turned to the social context in which theories about disembodied information were at first produced. For instance, in describing Weiner as someone who has never fully felt at home within his own skin, Hayles captured some of the reasons embodiment could have been posited by Wiener as an impediment simply to be abstracted. By all accounts Wiener was a brilliant mathematical mind but a maladroit laboratory scientists and an awkward athlete – "a man" she writes, "so uncomfortable in his own body that he could not throw a horseshoe in even approximately the right direction and had to abandon a career in biology because he was too clumsy to do the lab work" (Hayles, p. 89). However, the idea could only have been sustained, she notes, by broader networks of power and scientific privilege that have already historically taken the supporting-labor, largely female assistant for granted. Janet Freed, a typist and a coordinator of the Macy conferences, emerges here as a paradigmatic example of this type of erasure. Outside of the manuscripts that she laboriously produced from noisy recordings, there is only a faint record of her own presence in conference materials or archives. When she is featured alongside other participants in one conference photograph, her name is misspelled as Janet Freud, further obscuring her identity to posterity. The system, Hayes observes, has a hard time incorporating her even as she is the one that brings it into being.

[177] Chun, *Control and Freedom*, p. 235.

[178] Ann Cvetkovich, *Archive of Feelings: Trauma, Sexuality, and Lesbian Public Cultures* (Durham, NC: Duke University Press, 2003), quoted in Kara Van Cleaf, "Blogging through motherhood: Free labor, femininity, and the re-production of maternity" (PhD Diss., The City University of New York, 2014), p. 4.

individual and situated points of view, blogging was initially received as a medium that had reunited textually with embodied identity. Expressing this popular sentiment, political scientist Eric Ringmar even argued in a 2007 book called *A Blogger's Manifesto*, whose title ceremoniously referenced John Perry Barlow's notorious "Hacker's Manifesto," that anonymous blogging, while perhaps necessary in certain situations, is in fact fundamentally undemocratic and should be avoided.[179] Calling for embodied speech, for online communication clearly hinged to real-life identity, he cautioned that:

> Disembodied opinions are easy for traditional elites to dismiss ... In general, disembodied opinions are unlikely to have much of an effect. By not being *attachable to a particular person*, they can't be socially located and for that reason they have no social significance.[180]

Ringmar's manifesto celebrated the online blogger who reveled in revealing his or her identity; who now saw the Internet as a fundamental site for self-exposure rather than disembodied skin-walking. "The internet revolution has given us all a chance to be irreverent, blasphemous, and ungrammatical in public. We can reveal secrets, blow whistles, spill beans" he euphorically wrote.[181]

Chris Hughes, one of the original founders of Facebook, and sociologist Duncan Watts expressed similar views in a 2006 *New Yorker* exposé on the then-burgeoning social media scene, insisting that the interactive experience had become increasingly connected to offline

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[179] Erik Ringmar, *A Blogger's Manifesto: Free Speech and Censorship in the Age of the Internet* (London and New York: Anthem Press, 2007). In 1996, John Perry Barlow, founder of the Electronic Frontier Foundation, wrote "A Declaration of the Independence of Cyberspace." The document spoke out in rejection of regulations, articulating a common spirit of the time that valorized the Internet as a space for decentered, egalitarian communication and exchange. The document can still be accessed at www.eff.org/cyberspace-independence

[180] Ringmar, *A Blogger's Manifesto*, p. 134.

[181] Ringmar, *A Blogger's Manifesto*, p. 154 (emphasis mine).

identity and not anonymity, as it once was.[182] In particular, Watts saw social media as a platform for much-needed visibility, particularly for bored or unemployed youngsters who apparently suffered from a lack of social recognition. For those looking for companionship or work, he proposed, social media served "the essential purpose (for young people without jobs, families, and other social responsibilities) of seeing and being seen." Hughes was much more direct:

> If you don't have a Facebook profile, you don't have an online identity … it doesn't mean that you are antisocial, or you are a bad person, but where are the traces of your existence in this college community? You *don't exist* – online, at least. That's why we get so many people to join up. You need to be on it.

On a purely technical level, identity had always been a defining feature of the computer and the Internet experience. Computers gathered "cookies" from websites as people browsed online pages, amassing careful records of users' online "behavior." When the Internet became commercialized, advertising revenue based on the regularity of website visits and banner ad click-through rates characterized the web experience and even helped usher in the Internet as a commercial powerhouse. Social media, however, many felt, has helped push personal identity from the back-end of computer infrastructure to the forefront of online interactions. Marc Andreessen, a Silicon Valley veteran and the inventor of the first web browser Mosaic, reflected on this shift in a 2012 feature interview with *Wired* editor-in-chief Chris Anderson.

Chris Anderson:	In retrospect, it seems like social [media] is another dimension of the Internet that was there from the beginning – as if the technology wanted it to happen.
Marc Andreessen:	I often wonder if we should have built social into the browser from the start. The idea that you want to be connected with your friends, your social circle, the people you work with – we could have built

[182] John Cassidy, "How hanging out on the Internet became big business," *New Yorker*, May 15, 2006, www.newyorker.com/magazine/2006/05/15/

	that into Mosaic. But at the time, the culture of the Internet revolved around anonymity and pseudonyms.
Chris Anderson:	You built in cookies so that sites could remember each user.
Marc Andreessen:	But we didn't build in the concept of identity. I think that might have freaked people out.
Chris Anderson:	It might still.
Marc Andreessen:	Yeah, I'm not sure at the time people were ready for it. I don't think it was an accident that it took, you know, 13 or 14 years after we introduced the browser for people to say, "I want my identity to be a standard part of this."
Chris Anderson:	And it took Mark Zuckerberg to figure out how to make it pay off.
Marc Andreessen:	It was really a generational shift – a group of young entrepreneurs, including Andrew Mason and Mark Zuckerberg, who weren't burned by the dotcom boom and bust. I came to Ning with all these psychic scars. They just looked at the Internet and said, "This stuff is really cool, and we want to build something new."[183]

Andreessen and Anderson reimagined embodied online discourse in teleological terms, as something "that was there from the beginning – as if the technology wanted it to happen." While technology "wanted it to happen," it was people who, until now, appeared to not have been "ready for it." Facebook's 2014 announcement that profiles could be registered only under proper names marked the apotheosis of this trend. "The name on your profile should be the name that you use in everyday life. This name should also appear on an ID or document from our ID list," the company explained on the website's "Help" section.[184] Identity, of course, is tied not

[183] Chris Anderson, "The man who makes the future: *Wired* icon March Andreessen," *Wired,* April 24, 2012, www.wired.com/2012/04/ff_andreessen/
[184] Facebook Account Policy, "What names are allowed on Facebook," https://www.facebook.com/help/112146705538576

only to a name but to social behavior. And so, rather than use cyberspace space as an escape from reality, blogs and social media encouraged writers to sync up their real lives with their virtual ones. Through this refocused digital lens, the original idea that "the Internet would be a place to escape social markers, identities, and inhibitions" began to seem only as a "paranoid fantasy."[185]

The coupling between digital communication and embodied identity has become so normalized that when Edward Snowden's breakthrough revelations of NSA's mass surveillance program of online communication hit the news, the public appeared to have been largely unmoved. Critics have roundly pointed out the blasé tenor of responses.[186] As a number of observers have noted, the general sentiment has been one of indifference, characterized by the expression, "I have nothing to hide." Others, however, have suggested that the reaction was less a mark of indifference than a sign of the role digital identity that was tied to one's real-world self has taken on in contemporary life. Online participation was no longer something reserved exclusively "for young people without jobs, families, and other social responsibilities" basking in the glory of "seeing and being seen," as Watts had suggested of Facebook ten years earlier, but for many has become socially and economically indispensable. In pointing to the social, economic, and even political repercussions many people increasingly face when abstaining from digital interaction, theorists have started to question the neoliberal paradigm of the self-choosing agentive subject who simply elects to be online. When being online has become essential for

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[185] Van Cleaf, "Blogging through motherhood," p. 35.
[186] See Luke Stark, "The emotional context of information privacy," *The Information Society* 32, no. 1 (2016): 14 27. doi:10.1080/01972243.2015.1107167

creating a livelihood, affecting, for one, one's ability to find employment, it is futile to speak simply of choice, of "opting in" or "opting out" of online communication.[187]

The mandate to make oneself visible online has put an additional spin both on the neoliberal self managed as a business and on the entrenched Enlightenment notion of selfhood as singular and coherent. The internet was initially heralded as a space where the coherence of the liberal self could give way to a productive multiplicity of personas and identities that belied the rigidity of one's embodied experience. Anthropologist Ilana Gershon's stresses that social media has only amplified liberal notions of selfhood. Continuity of identity is not only that which is transferred online but something that has to be orchestrated and continuously achieved:

> To brand oneself as a corporate person these days entails new media practices – orchestrating a single self-presentation across a personal website, Facebook profile, Twitter feed, blog, and so on – which ideally demonstrates that one is a recognizable, consistent, and employable self. To be employable these days is to appear coherent across media platforms.[188]

Yet, in the last several years, scholars have once again begun to complicate the link between online and offline identities. For example, Van Cleaf's dissertation work on "mommy blogs" directly challenges the view that online exchange constitutes anything like unfiltered speech that more accurately syncs up with real life.[189] Yes, for many of the mothers who blog online, blogging provides a way to subvert normative narratives about gender and motherhood. It opens a way for women to speak candidly about the hardships of parenting. This form of writing often becomes an occasion for many to offer a counternarrative to the endless parade of sleek,

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[187] Janet Vertesi, "Theorizing big data plenary discussion," presented at the *Theorizing the Web Conference,* April 2014.
[188] Ilana Gershon, "Selling your self in the United States," *Political and Legal Anthropology Review (PoLaR)* 37, no. 2 (November 2014): 281–294.
[189] Van Cleaf, "Blogging through motherhood."

effortless, and beautiful representations of successful parenting on popular media. "Blogging as a mother," as Van Cleaf cleverly characterizes the activity, can thus be seen as radical. Blogging is often understood to constitute a form of feminist critique that helps construct a position of power and authority from which women can speak. At the same time, this genre perpetuates rather than overcomes the very tropes against which women who take to blogging often speak. This is most evident in the discomfort mommy bloggers experience when monetizing their blogs. Here, financially successful blogging opens onto a paradox. On the one hand, the bloggers who have been able to turn their writing into a profitable career have inspired many women to follow suit. The economic success of these women has popularized the genre. Many women take up blogging not only to share but explicitly in the hopes of finding alternate streams of revenue. On the other hand, women repeatedly downplay the success of their blogs as an accident, as unexpected, or as a surprise.

The tone of authenticity and intimacy produced by mommy bloggers relies on the staging of blogging in terms similar to that of motherhood itself: as a labor of love outside or beyond monetary compensation. However, the demographic makeup of "mommy bloggers" as mostly white women with graduate degrees only further obscures the reality that blogging is "a distinct, digital form of labor that must stay cloaked in gender, class, and racial norms to achieve monetary success."[190] Ultimately, the aspirational figure of a successful blogger who earns a sustainable income blogging online so that she can be home when the kids return from school only further entrenches rather than overturns the gendered stereotypes and the normative ideal of the traditional mother. Whereas blogging was initially embraced as a site for unfiltered communication, the staging of authenticity online, as Van Cleaf suggests, has always been

[190] Van Cleaf, "Blogging through motherhood," p. 46.

intimately tied with capital whether directly through paid advertising or indirectly through the accretion of social capital through online engagement. Mommy bloggers perform rather than merely document motherhood online, packaging and conforming to their identities as mothers, constructing motherhood itself as a product to be sold and consumed. Marc Andreessen saw social media technology as something that merely opened up the inherent desire to "share." As Van Cleaf shows, however, that the performance of authenticity online disguises the mechanisms of publicity and self-branding that have regulated and expanded the role of identity, self-expression, and exhibitionism on the Internet.

Successful mommy bloggers exemplify only one kind of "micro-celebrity" that has increasingly come to define the online experience.[191] Although the term "micro-celebrity" describes individuals who were able to achieve celebrity status – and usually financial success or employment opportunities – through their social media presence, sociologist Alice Marwick notes that the accumulation of Facebook "likes," or Twitter "followers," or LinkedIn "connections" has also become a commonplace and even a compulsory feature of the digital experience more generally. Impression management is labor, albeit one that often goes unpaid, that many of us, especially young people at the beginning of their careers or those on the prowl for a job, are required to perform. As I will continue to explore in future chapters, and particularly in Chapter 4, Chris Dancy's vociferous self-promotion of his data tracking has as much to do with these cycles of "micro-celebrity" that have opened him up to new revenue streams, and that have transformed him from "an obsolete tech guy" to a celebrated speaker, as with any private interest in the personal data he collects or projects.

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[191] Alice Marwick, *Status Update: Celebrity, Publicity, & Branding in the Social Media Age* (New Haven, CT and London: Yale University Press, 2013), p. 117.

The branded identity composed for social media "likes" is not exactly the authentic, unfiltered, and genuine "self" that many early enthusiasts of blogging and social media platforms initially believed these tools helped to manifest. This self, instead, is artfully and even self-consciously composed and crafted. To articulate the form of selfhood that is performed online, Marwick proposed the term "edited self." Whereas early Internet enthusiasts valorized cyberspace as a site where people's more authentic identities could become manifest in digital form, Marwick's terminology points not only to the fashioned but also to the mediated nature of online experience. The "edited self" does not simply reveal that the self, digital or not, is a social construct. Rather, the terminology echoes with magazine or film editing, where a story is edited for effect, created not only ex nihilo but with a specific audience in mind. The "edited self" manufactures authenticity for effect; it is a self-aware performance of candor rather than an unmediated display of it.

Here the difference between authenticity and sincerity that anthropologist John Jackson had discussed in the book *The Real Black: Adventures in Racial Sincerity,* becomes apt.[192] Jackson locates race in the lines between the nuanced differences of the two adjectives. Authenticity, Jackson writes, presumes a top-down relationship of expert authenticator to inert thing, whereas sincerity demands intersubjectivity. Authenticity can be left alone and studied as an object, revealed as a social construction, as a cultural script to be embraced or derided. Sincerity, instead, makes claims on the body; it is more difficult to untether from messy materiality. Racial identity mixes authenticity and sincerity, he argues. To speak of racial identity as an authentic yet inert script that people follow overlooks, so Jackson claims, the degree to which people feel connected to these narratives. Thinking of race only through the lens of

[192] John L. Jackson, Jr., *The Real Black* (Chicago: University of Chicago Press, 2005).

authenticity dehumanizes its subjects: "[T]hey turn us all into mere objects of our own social discourse, less the actors who read and interpret scripts than the inert pages themselves."[193] Race, he insists, cannot be understood only as a social construct, as a made-up "script" that delimits one's possibilities and functions very much like "social incarceration."[194] Social theory that relies on allegories of confinement to imprison black bodies raises its own racialized specters. Instead, Jackson invites us to think of race in terms of sincerity to explore how race is not only socialized but lived and experienced. Sincerity marks the act, but it also points to forms of desire to perform the part. Acting demands sincerity on the part of the actor who is called upon to perform his roles faithfully, convincingly, without, albeit, also losing himself in the act. Rather than an authentic script that one can study, reject, or embrace, sincerity, for Jackson, helps get at some of the "hows and whys of racial living."[195] One can recognize race as artificial and still feel compelled to perform it. While rejecting essentialized notions of race, sincerity, Jackson suggests, helps push back on constructivist theories and open onto what these theories leave out. Sincerity, he writes, is "authenticity's excess."[196] It speaks to the claims these narratives make on individual lives and bodies as he considers race an embodied experience that one cannot simply step into or out of.

Earlier digital discourse revolved around question of authenticity, but it hinged on questions of sincerity, proposing that one can perform the self sincerely online only. If one recognized that all selfhood is constructed, then one could rewrite the narrative and live out a different identity online, one of their own choosing, but the crafting of which they embraced

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[193] Jackson, *The Real Black*, p. 15.
[194] Jackson, *The Real Black*, p. 13.
[195] Jackson, *The Real Black*, p. 15.
[196] Jackson, *The Real Black*, p. 13.

fully and genuinely. However, critics have pointed out that although the performance of this new online identity could be experienced as a sincere one, it also overlooked the lived experience of bodies that could never be so easily extricated from their social realities. Only certain kinds of bodies, in the end, could express identity sincerely online. Social media, blogs and sentiments expressed through Web 2.0, at first extended the original idea of a sincere performance that could only play out online. More recently, online interactions have been exposed not only as a theatrical ruse but also as an increasingly insincere performance, one that, as Van Cleaf and Marwick have pointed out, is performed only under economic duress; it's an actor playing a part "editing" their self for dramatic effect. Misgivings around motives have only intensified in the wake of what has become dubbed as "fake news" that widely circulated through social media platforms like Facebook during the 2016 presidential elections, a turn of phrase that has more recently acquired additional connotations of political posturing.[197] On social media everyone is in on the act – but who believes the performance now? Online, everyone seems an opportunist, only crafting an "edited self" for the right audience.

I argue that the current entrepreneurial faith in personal data has developed against this growing suspicion of digital identity as an insincere performance. Sincerity has become transposed onto wearable and sensor-enabled technology that produces personal data. "Facebook is a place where you put out an image, but wearables are where you reflect on who you are," reasoned one of my interlocutors, as I had noted in the previous chapter. In wider popular culture, the understanding of personal data as denuding has taken place against this initial reintegration of identity with online experience as well as the ensuing disenchantment with

[197] Zeynep Tufekci, "Mark Zuckerberg is in denial," *The New York Times,* November 15, 2016, www.nytimes.com/2016/11/15/opinion/mark-zuckerberg-is-in-denial.html

online forms of communication. As online communication is increasingly seen only as a staged act, personal data derived by "neutral" wearable technology is now increasingly staged both by data professionals and popular media as the only means of accessing the "real" self that may have been locked within us all along.

The notion that the self can be abstracted as a pattern of information outside of the body that only acts as its empty casing has been central to contemporary sciences, including, as Katherine Hayles had written, to cognitive science that has grown out of cybernetic theory even as cybernetics as a field of study has itself fallen out of fashion.[198] Research into DNA, brain imaging, developments in bioengineering, all have contributed to our commonsense notion that our bodies are not just made up of information – they are information.[199] However, as this chapter has shown, rather than as a direct descendant of cybernetic theory or positivist science, the Quantified Self and the contemporary suite of wearable and sensor technology have come of age in cybernetic theory's ebbs and flows. I also argued that the digital environment which first decoupled computation from embodiment, then recoupled it to it, and then broke the link once again, has made it possible to see personal data as a vital gateway to the "real" body and the self.

On the heels of these social changes, makers of wearable and sensor-enabled tools increasingly propose to see personal data as a window to the "real" self. In the shift from cybernetic self-as-information, to the fluidity of the virtual "second self," to the embodied figure of the blogger, and finally the "edited" social media self, personal data, in the popular imaginary, have emerged as the latest implements that give ourselves back in new ways, that reflect who "we really are." Despite the fact that these tools were available nearly two decades earlier, it is

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[198] Hayles, *How We Became Posthuman*.
[199] Joseph Dumit, *Picturing Personhood: Brain Scans and Biomedical Identity* (Princeton, NJ: Princeton University Press, 2004).

partly due to these changes in the social reception of technology that many entrepreneurs I have spoken with have only recently started to feel that wearable technology was "suddenly" something that the market and people felt "ready" for. The socio-technical dynamics I have discussed in this chapter, however, reveal that the digital *second skin*, much as Terrence Turner wrote of human flesh, is only a "symbolic stage upon which the drama of socialization is enacted."[200] The chapters that follow continue to explore additional dimensions of personal data as social skin – that is, as something that never fully bares, but always already bears, the imprints of social forces.

[200] Turner, p. 486.

PART II:

FLOW

Chapter 3: The (Moral) Economy of Gestures

Figure 25: A slide from B. Wilder's presentation at the 2015 WearableTech Expo.

"In the future," announces Plantronics executive Beau Wilder, "we will live in a frictionless world," as he flips to the next slide of his presentation deck with the words "The New Normal" emblazoned across an image of a crowded urban scene (Figure 25).[201] Wilder is delivering this talk at a regional conference for developers and marketers of wearable and sensor-enabled devices, one of myriad such events progressively landscaping the country. "The New Normal," in his opening commentary, hints both at the future directed by data and to the role Plantronics may play in realizing this vision. That role, Wilder suggests, is to create a "frictionless world," one marked in his photograph by two figures that come into clear focus, their gestures guided through the heavy photographic fog by sensor technology. The bright red

[201] Field notes, August 2015, on file with the author.

nodes dancing on the projected page like sunbeams, signal the connections "interoperable" sensors make, helping coordinate the movement of both data and of bodies.

Speaking in the language of systems theory, the "communication" and "connections" implied here are of a strictly mechanical kind, pointing to the infrastructure necessary to ensure that signals can be relayed between diverse locations properly. However, in discussions of technological possibilities, "communication" between data sets and devices often becomes conflated with communication between people, so it is people who, when powered by data, can be seen as effective communicators or are made to be instantly understood. This desired seamless transaction between data sets and bodies then appears to herald smoother personal and social connections, and at a higher level even to hold out the promise of a social world that itself functions without strife or friction. Beyond debates over transparency and privacy opened or foreclosed by personal data, in this chapter, I want to better understand the proposition that wearable devices can deliver this friction-free world. What is the appeal of such an imaginary and what is the social work of this construction? Moreover, what notions of friction and mobility operate in this conjuring? And what type of subject does such a vision hail? Rather than the mechanics, here I am interested in the poetics and the politics of data sets that are seen to flow, and in exploring the cultural shifts and tensions for which data friction and its desired elimination have become a placeholder.

Building on social theories of embodiment as well as studies of science and technology, this chapter explores the way biosensors that are increasingly embedded in clothing and in items of everyday use reflect ideological positions, shaping habitus while registering social values and goals at the levels of technology and of bodies. This chapter asks about the lessons from these

devices that users are asked to learn with their bodies and to interrogate the expectations of lives increasingly coordinated by frictionless data flows.

To think through the coordination of gestures, bodies, and lives by personal data, I propose the working phrase, the (*moral) economy of gestures.* The expression works within the liquid imaginary of data set to move without bounds. In this chapter, I use it to think about the wider circuitry of social and economic connections that many hope data free of friction can help establish. In part, the expression echoes film historian Oksana Bulgakowa's phrase "the factory of gestures," which she coined to explore ways technical innovation has altered the gestural vocabulary of early twentieth-century Russia.[202] The factory, in Bulgakowa's formulation, carries both a historical and an allegorical function. It operates both as a symbol of bodies manufactured by culture as well as a site of a specific series of techniques and technologies that have promulgated since the late nineteenth century, focused on streamlining and maximizing the movements of laboring bodies. On first pass, digital self-tracking appears to extend this administration of gestures. Rather than see contemporary techniques only as expressions and intensifications of period efficiency engineering, I will compare and contrast the contemporary discourse of "optimization" with the Progressive Era's notion of "efficiency" and the different relationship to waste and surplus that both concepts engender. I treat the earlier history of somatic monitoring as a departure point to think through not only connections but also the discontinuities between turn-of-the-twentieth-century projects of scientific management and contemporary personal data gathering.

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[202] Film: Oksana Bulgakowa, *Fabrica Zhestov* (Moscow: NLO, 2005). Book: Oksana Bulgakowa, *The Factory of Gestures: Body Language in Film* (Berlin: Potemkin Press, 2008). Her 2005 film and the accompanying book explore how new technologies, particularly photography and film of early twentieth century collided with social changes in the Soviet Union and often helped drastically rewrite the region's gestural vocabulary.[202]

I also adopt E. P. Thompson's concept of the "moral economy" to discuss how contemporary data-collecting practices act to intervene in rather than simply to co-opt the language of neoliberal economics oriented toward rational self-cultivation and self-improvement.[203] E.P. Thompson coined the expression to discuss how peasants advocated for a "fair price" for essential goods; their protests were motivated by ethical considerations rather than economic concerns. In part, I employ this expression to examine how self-monitoring devices similarly do no only promote the construction of more productive economic actors, but how people using and making these tools also see these devices as a tacit critique of capitalist logic. More generally, the term "moral" gestures to the wider way in which data collection operates today not just to constitute a "demoralized" and systematized economy and person, but instead to offer commentary on how even the language of rational economics is already laden with moral judgment.[204] The phrase "(*moral) economy of gestures*," as I use it here, thus allows me to tease out some of the moral imaginaries of virtuous data cycles that contribute to visions of the good life coordinated by data. In other words, I explore how data are seen to contribute to a broadly moralizing discourse directed at adumbrating the comportment most proper for contemporary life.

This moral imaginary offers the notion of "economy" in the (moral) economy of gestures, new valance. The discourse on personal data invites associations with conservation but also with the elimination of waste, setting up a tension between competing demands to save and to purge, to conserve and to cut back. The idea of the (*moral) economy of gestures* thus also builds on

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[203] E. P. Thompson, "The moral economy of the English crowd in the eighteenth century,' *Past & Present* 50 (February 1971): 76–136.
[204] Thompson, 'The moral economy of the English Crowd in the Eighteenth Century," p. 89.

George Bataille's discussion of excess and on Anna Tsing's term "economy of appearances,"[205] who think about capitalism's many performances, presentations, and screens. I explore the tension between savings and expenditure, between economy and waste that already lie at the heart of both self-tracking and capitalist production.

Lastly, the phrase, *(moral) economy of gestures*, speaks to the desired efficiency of the "friction-free" circulation, as Wilder had put it, of both people and data. In the final section of this chapter, I evaluate the way technology that today proposes to coordinate the flows of hands, limbs, and bodies models the plasticity and forms of mobility demanded by the "gig" economy that increasingly shapes the digital economy. Paralleling the hoped-for effortless and frictionless mobility of data, the "gig" economy increasingly calls for what Emily Martin described as the flexible and agile body, a body capable of going along with the flow.[206]

The Factory of Gestures

Contemporary tracking tools of course harken back to the regimentation of bodies associated with turn-of-the-twentieth-century scientific management and the European science of work. Today, for example, we can easily recognize prototypes like the sphygmograph (Figure 26) that measured pulse or the step-tracking tool that kept pace of gait, both of which were developed by Étienne-Jules Marey to trace and study locomotion in the nineteenth century, as precursors to modern-day tracking devices like the FitBit (Figure 27).

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[205] See George Bataille, *Visions of Excess: Selected Writings, 1927–1939* (Minneapolis: University of Minnesota Press, 1985); George, Bataille, *The Accursed Share: An Essay on General Economy, Volume 1: Consumption* (New York: Zone Books: 1991); Anna L. Tsing, *Friction: An Ethnography of Global Connections* (Princeton, NJ: Princeton University Press, 2005).
[206] Emily Martin, *Flexible Bodies: The Role of Immunity in American Culture from the Days of Polio to the Age of Aids* (Boston: Beacon Press, 1995).

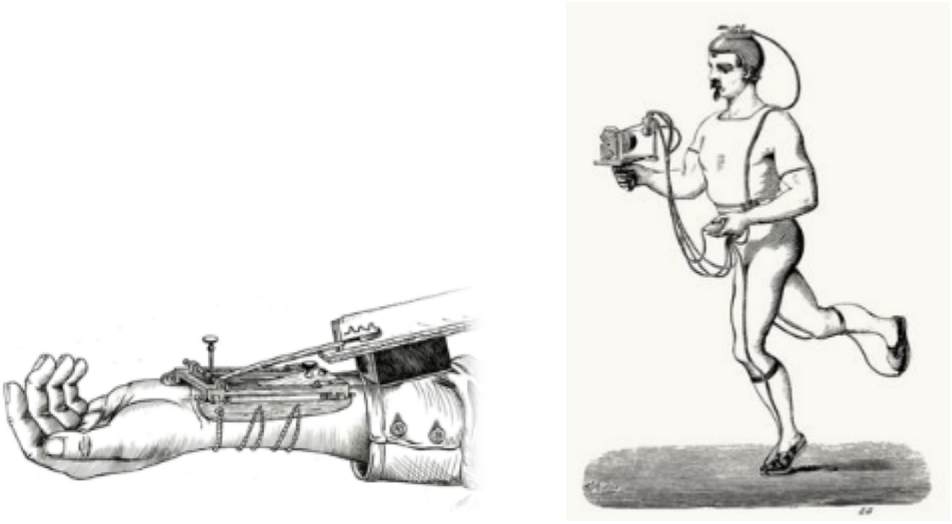

Figure 26: Sphygmograph and Step-Tracker developed by Etienne Jules Marey in 1860.

Figure 27: FitBit wrist-work heart-rate and step-tracker.

Beyond appearances, these devices at first seem to mirror each other in purpose. At least in concept if not always in practice, the goal of late nineteenth and early twentieth-century monitoring efforts was the isolation of standardized gestures.[207] In these earlier efforts, technology helped trace the contours of existing habitus so as to reconfigure and reassemble the

[207] For a discussion of stop-motion photography in Frank Gilbreth's work as PR that helped set him apart from competitors, rather than as a tool for analysis, see Elspeth H. Brown, *The Corporate Eye: Photography and the Rationalization of American Commercial Culture* (Baltimore: Johns Hopkins University Press, 2005).

body around an ideal type discovered through persistent analysis. Marey's studies of human locomotion, for instance, for which he invented the various measurement devices that kept track of heart rate, gait, or pulse, were undertaken on the model of the natural sciences. Just as there were laws of gravity regulating motion, Marey hoped to unlock natural laws governing proper comportment, believing that "the body could be analytically decomposed, broken down into its most discreet components."[208] Proponents of the field of study called the scientific management of work, one that applied engineering principles to bodies at work, such as Frederick Winslow Taylor and Frank Gilbreth, similarly used the stopwatch and stop-motion photography, respectively, as didactic tools that proposed to re-sequence action in a more efficient manner. Efficiency engineering of this period was both civilizing and normative, with the goal of developing or isolating a universal dictionary of gestures that could then become standardized across laboring bodies. Engineers and scientists like Marey, Taylor, and Gilberth believed that bodies that could be optimized in this way could be retooled into a more efficient labor force.

During the early twentieth century, when the ideal human body was modeled on the indefatigable machines, fatigue was seen as a technological problem to be eradicated from bodies.[209] A more efficient economy of gestures sought to minimize wasteful recovery time. Fueled by a mechanized vision of the body, the previously religious disdain for idleness had, in this era, taken on secular connotations. From a former discourse of sin, idleness became transposed onto a secular technical imaginary characterized by the cultivation in bodies of a

[208] Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Oakland: University of California Press, 1992), p. 87.
[209] Rabinbach, *The Human Motor.*

more productive "economy of energy."[210] Frank Gilbreth, in *Fatigue Study,* could thus speak ardently about the corrosive effects of wasted movement:

> In Motion Study we stated: "There is no waste of any kind in the world that equals the waste from needless, ill-directed, and ineffective motions." It is an aspect of wasted motions that we are discussing here. Wasted motions mean wasted effort and wasted time. One of the results of this waste is unnecessary fatigue, caused by unnecessary effort expended during time that must, as a result, be wasted. Time, a lifetime, is our principal inheritance. To waste any of it is to lose part of our principal asset.[211]

Fatigue also resonated as a fiscal shortcoming. Idleness became an opportunity cost. Moreover, abstracted from the individual performing it, labor could be conceived as a "national resource threatened by waste and inefficiency."[212]

On first pass, contemporary digital monitoring techniques, especially the ones oriented toward improving such things as sleep, diet, and health in the name of greater efficiency, appear merely as amplifications of these earlier projects of productivity training for which the factory floor acted in the late nineteenth and early twentieth centuries both as a test-bed and a metaphor. One of the Quantified Self events that I attended, for instance, opened with a three-word introduction where those in attendance rattled off the top three things they wanted to improve with the aid of digital data gathering. The answers rolled in, creating a list that efficiency engineers from years past would have heartily approved: sleep, productivity, nutrition, mental health, wellness, weight, mood, behavior. One of the event organizers diligently wrote down the terms on a large pad of paper as answers snaked around the room, quickly grouping the terms in a word-cluster cloud to spot developing patterns. "This is our way of quantifying the Quantified

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[210] Rabinbach, *The Human Motor,* p. 36.
[211] Frank B. Gilbreth and Lillian M. Gilbreth, *Fatigue Study: The Elimination of Humanity's Greatest Unnecessary Waste, A First Step in Motion Study* (New York: The MacMillan Company, 1919).
[212] Brown, *The Corporate Eye*, 89.

Self," the host of the night joked. A company that had advertised its wares at one of the Quantified Self events I attended later sent a promotional e-mail that announced a search for "productivity enthusiasts":

> We're looking for hardcore productivity enthusiasts to join us. If you're hyper-vigilant about time, if you create routines to drive maximum focus, if you automate tasks to make sure minutes don't leak out of your day, if you're determined to reach previously unimaginable levels of productivity, if you are trying to slay time itself – we want to help you get there.[213]

If earlier technologies of monitoring were intended to stimulate the productive capacities of bodies, the new class of devices indeed seems to have only amplified these effects. My interlocutors widely saw the process of collecting data as in itself economical, with lives informed and regulated through data being viewed as saving time, money, and effort.

The forms of personal accountability that so many device makers and data practitioners call for also echo in the more literal forms of accounting one is asked to run on one's life, coextensive with the neoliberal conception of the self as a business unit, of life construed as a balance sheet. This stance is particularly resonant in the administrative vocabulary of annual, monthly, or weekly "reports," "budgets," and "balances" that have become a commonplace feature on many wearable device platforms. It is also echoed in the regular invocation, among my interlocutors, of the well-known management expert Peter Drucker's aphorism, "What Gets Measured Gets Managed," further extending the framing of digital self-tracking as a broadly administrative and economizing activity.

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[213] Josh Catone, "How to become a Time Lord," blog post, December 7, 2017, https://x.ai/blog/how-to-become-a-time-lord/?utm_source=pd&utm_medium=email&utm_campaign=promo-2017-12-holiday&utm_content=30d-free

Optimization: The New Efficiency Craze

There are limits to seeing self-tracking simply as an intensification of historical trends as though contemporary devices oriented toward the collection of personal data represent merely the logical extreme of ideas first hatched more than a hundred years earlier. To appreciate the differences, it's important to consider that "efficiency" has an altered resonance today than in periods past. While echoes of modern efficiency still reverberate, today it is "optimization" rather than "efficiency" that has emerged as the au courant term. The new vocabulary points to an important shift. In the section that follows, I sketch out a few ways of thinking breaks and discontinuities in this genealogy so as to introduce a bit of friction into what is otherwise seen as a historically continuous *(moral) economy of gestures*.

Unlike efficiency, optimization goes beyond the tuning of bodies to an invoked ideal. Gary Wolf, the founder of the Quantified Self, even felt that the term "optimization," though ubiquitous in self-tracking discourse, itself missed the mark. Thinking back to that moment when he and Kevin Kelly came up with the term "Quantified Self," Wolf recalled that there was a reason they did not emphasize optimization in the group name to a greater degree. After all, he noted, "Quantified Self is not called Optimized Self or Perfected Self or, you know, Become a Winner."[214]

Many people I spoke with shared this ambivalence, variously expressing the way optimization is not simply a contemporary counterpart of the Progressives Era's "efficiency craze." Consider, for instance, Brandon's commentary, a participant of the Quantified Self group in Texas whom I met at the 2015 Quantified Self conference in San Francisco:

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[214] Gary Wolf, interview with the author, June 2016.

> My Quantified Self practice is just general self-optimization. I never really developed a good practice about self-reflection and self-awareness and all of that kind of stuff. … I lead a very complex life, I have many segments of my professional life, I've got different segments in my personal life. And to be able to kind of look across all of those and see where things correlate is, you know, not practical. So that's what I'm really looking for, to take all of these different data streams hopefully as they become less and less evasive, and to notice automatic things … So [self-optimization] essentially is finding the most efficient outcome I am looking for.[215]

While Brandon began by claiming that self-tracking for him is just "general-self optimization," he clarified what self-optimization meant with subsequent statements, explaining that it is a way of creating "shortcuts" in his already "complex life." And because he couches his approach in his role as an engineer, optimization, here, articulates a strategy of streamlining, of simplifying, of paring down life's clutter.

Safi spoke in similar terms. When we met at a Quantified Self Meetup in Boston, we chatted about the various steps he took to reduce anything that interfered with his "optimal" functioning in life. Safi took particular pains with managing what he called his "sleep hygiene," minimizing habits that proved disruptive to his sleep. After a period of self-tracking, he instituted rigorous measures to streamline his life for better sleep, and anything that interfered with sleep, including social interaction, was simply eliminated. As we spoke, he checked his watch. It was 8:45 in the evening and he needed to be home by 9 to put on special glasses that reduced his exposure to bright light three hours before going to bed. We agreed to continue our conversation another day, by phone.

Before parting, however, we stopped by a table of one of the device developers who was demonstrating his weight-training gadget during that evening's Demo Hour, the hour or so

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[215] Brandon, interview with the author, July 2015l

during the Quantified Self events dedicated to entrepreneurial showcase. The device on offer was designed to reduce, through regimes of rigorous data collection and analysis, any wasted gestures that did not contribute to one's weight-training goal. "You know," the developer nodded to us with a knowing look, your "Minimum Effective Dose." Safi responded with a broad smile of recognition. He was excited to hear the reference because it was exactly the type of thing he saw as the goal of his own self-tracking efforts, he later told me. I recognized the phrase too. It was an expression I heard frequently in my conversations with contributors to the Quantified Self. Originally coined by Tim Ferris, a popular author of "how-to" productivity improvement books, the notion of the Minimum Effective Dose, or MED, drove many of the self-tracking projects of my interlocutors, both in the Quantified Self "community" and in the broader work of device developers.

The idea of the MED departs from the concept of efficiency as it was understood during the Progressive Era. Efficiency was oriented toward maximizing productivity of factory workers and it expressed the idea that a specific set of gestures could improve the output of all working bodies. The goal was constructing a body, that, like an industrial machine, would work as much as possible with as little rest as possible. By contrast, Ferris's idea of the MED articulates notions moderation, not maximization of effort. The optimization he seeks is in fact a subtle critique of Progressive Era's efficiency craze. He is concerned with finding the least amount of expenditure necessary in order to discover the point at which one should stop to work. His litany of books, mostly published under the "4 Hour" title – *The 4-Hour Body: An Uncommon Guide to Rapid Fat-Loss, Incredible Sex, and Becoming Superhuman*; *The 4-Hour Work Week: Escape 9-5, Live Anywhere, and Join the New Rich*; *The 4-Hour Chef: The Simple Path to Cooking Like a Pro: Learning Anything, and Living the Good Life* – all echo this ethos of careful calibration rather

than unmitigated abundance, and promise a clever escape from the ever-escalating cycles of productively associated with capitalists economies, even as the books' range all but defeats the author's message of restraint. The books are how-to guides for rising above ordinary drudgery, but the choice of the title "4-Hour" resonates as commentary on the socioeconomic framework that demands one to be endlessly productive – to work without tiring or rest, twenty-four hours a day.[216]

The same day I met Safi at the Quantified Self event, I also visited Connor at the headquarters of a wearables start-up located at WeWorks, a coworking space where many developing companies and freelancers rent small offices but share common areas and services such as conference rooms and administrative staff. When we spoke, he explained that the wearable device he was working on likewise stemmed from his interest in Ferris's ideas. He hoped that the wearable he was working to promote would help people discover their own MED through data analysis. He had plans to discuss these ideas in a forthcoming blog tentatively titled the *Optimized Me*. Refracted through the lens of the MED, optimization meant the following to Connor:

> It's the smallest number of things you can do to get the best desired result. So, [for example,] if you think of it in terms of medicine. If you have too little medicine, it doesn't work. It has no effect. But if you give too much, you have side effects. So what is that happy medium, the smallest amount that you want with no side effects? And so you figure that out for most things. If you want to get tanned, do you have to sit in the sun for two hours? No, you're going to get burned. So maybe you just need to sit in the sun for twenty minutes to trigger the hormones that will get your skin to darken. For weight loss, it's figuring out the foods that you need to eat versus just eating vegetables all day long. So that is how I see all these different lifestyle hacking, happiness hacking,

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[216] Safi, interview with the author, April 2015.
[15] Timothy Ferris, *The 4-Hour Workweek: Escape 9-5, Live Anywhere and Join the New Rich* (New York: Crown Publishing Group, 2009); Ferris, *The 4-Hour Body: An Uncommon Guide to Rapid Fat Loss, Incredible Sex, and Becoming Superhuman* (New York: Crown Publishing Group, 2010); Ferris, *The 4-Hour Chef: The Simple Path to Cooking Like a Pro* (New York: Crown Publishing Group, 2012).

> supplement, sleep – just figuring out the smallest change you can do to create a disproportionally large result.[217]

For Safi as for Brandon, using data to determine their MED was not simply a means to rote productivity. Safi explicitly viewed discovering the MED through data collection as a critique of the expectation of endless productivity, a cultural demand that he viewed only as another extension of the "more is more" logic, a logic he saw as distinctly American. When we spoke again by phone, Safi explained his position to me at length. A former professional cyclist, he tracked his athletic performance since the early 1990s, when Polar first approached his cycling team with promotional gear.[218] Today he still collects a lot of data, but he says his approach has changed:

> I used to think, okay, if running a 10k is good, maybe I should be training for a marathon, and if running a marathon is good, maybe I should be running an ultra marathon. And I wasn't really doing anything health promoting in the sense that I may have been operating in a world where if a little of something was good, then more of it was better. And actually, that's a very American idea. If a little of something is good, then double of that must be double as good. If I have one scoop of ice cream, then double that is better. It's very logical in many cases. But I think for me, my personal feeling was that the more I did the better it was for me as an individual, and that led me down this idea that if I ran 10k then I can run a marathon, and if I ran a marathon, then maybe I should train to do more and more and more. It was just this idea that if something is good, then double that is doubly good. I laugh – even in Boston there is a Soul Cycle on every corner, I just laugh when I walk by that because this is so American! This is our thing: one cycle class is good, but I am going to take six! I can say it is a very American thing to do. If you are at an all-you-can-eat, well then you eat all that you can![219]

As paradoxical as it may appear, if Brandon, Connor, and Safi all point to the complexity of contemporary living that constantly asks for more, Ferris and self-tracking appear to offer

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[217] Connor, interview with author, April 2015.
[218] Polar was one of the first commercial gadgets to offer a wearable device for heart-rate monitoring.
[219] Safi, interview with the author, May 2015.

them a way to reduce the clutter, to find ways to escape the ceaseless logic of capitalist production and accumulation. Mark bridged this minimalist approach with an aesthetic project. During a talk he gave at the Quantified Self meeting in New York City, he described his meticulous attempts to reduce inefficiencies in his life by removing clutter from his home. For Mark, trimming his home of perceived extras helped cultivate a lean life, not just a fit body and mind. More importantly, maintaining a minimalist home allowed him to get out of the rut of working to support unfiltered spending – a process he meticulously tracked and documented on his computer – and instead to reprioritize his spending so that he could modify his work. For Mark, taking these measures was not only a matter of frugality, although he carefully calculated the cost and benefit of purchasing toilet paper online versus at the local store. Rather, he heartily believed that doing so meant the freedom to live a more meaningful life configured to things that give him maximum pleasure and devoid of those that, in his case, quite literally took up room. Sharon echoed this call for moderation: "[For me] it's not a level of control, it's more just knowing the baseline and then knowing what the system can handle. And then staying within those limits without driving myself outside of what my body could tolerate. And that's just really healthy to me." At times, these efforts, largely endorsed by professionals variously associated with the technology industry, also seemed directed straight at the image of the slovenly computer programmer who is popularly imagined as someone driven by excess: coding into the night, letting his hair and personal habits go, abdicating any regard for his physical body and social life. The contemporary modes of modulation and control were a weapon against this kind of excess.

In this discourse, notions of waste apply ideas about pollution and dirt to push against the social imperative to produce economic surplus. The contemporary discourse on self-tracking increasingly invites users to think of excess, broadly construed, as polluting to one's capacity to

live well. While self-tracking is often linked with disciplinary questions of control, the discourse of limits and limiting that I found in my conversation with those who track also expresses the desire not only for a moderated but for a moderate life as a challenge to the American, and in particular the capitalist, logics of more – more things, more work, more money. The desire to extricate oneself from this excess can be read as part of the blurry effect of the photograph in Beau's opening commentary. Device developers increasingly present their devices as mechanism that will help people to bring clarity to lives otherwise obscured by glut and wasted effort. This is not simply a rehearsal of a utopic imaginary that folds technology into visions of an effortless future, nor merely an expression of technological "solutionism," as Evgeny Morozov had characterized it.[220] Rather, the emphasis on "optimizing," as Brandon put it, or Safi, Mark, and Connor's persistent whittling down of their lives to the MED suggests, digital tracking is increasingly mobilized as a commentary on contemporary pressure to escalate desire.

A discussion that took place at the 2015 Quantified Self Conference during a session called Tracking for Progress fervently echoed these sentiments. Rather than eulogies to progress, many expressed frustrations with devices that simply require people to do more. "There is this constant ratcheting up," complained one attendee. They "want you to see data going up." Someone else took his anger out on Jawbone's constant reminders to "step up your game."[221] He mockingly snapped at the electronic prompts he receives: "Why don't you accept that I just want to sleep 7.5 hours [instead of the recommended 8]!" Said another: "If I'm exercising, I'd like to know if I'm doing it in an efficient manner rather than not knowing if I'm spending the right

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[220] Morozov claims that technology today is often sought as a solution to broader social dilemmas that technology in fact cannot address or easily rectify. He calls the belief that technology will solve societal issues, a widespread sentiment in Silicon Valley culture, *solutionism.* See Evgeny Morozov, *To Save Everything Click Here: The Folly of Technological Solutionism* (New York: Public Affairs, 2014).

[221] Jawbone is a sleep- and step-tracking device.

time doing the right activities." Describing a list of nearly eighty habits that he meticulously tracks on a daily basis, Colin insisted that keeping digital records worked best when it helped him to reorient his life around things that mattered most. During a talk he gave at a Quantified Self Meetup in New York City, he listed some of his accomplishments: "Stopped snoozing, stopped spinning out on news during work hours, stopped compulsively checking Facebook, increased average sleep to 7.75 hours, eliminated caffeine, meditate daily." Monitoring his life and habits with digital devices meant something more than adhering to mechanized notions of progress. Colin viewed digital monitoring in generative terms, calling the experience a "personal evolution" and routine tracking as a "check-in with myself" that has helped him continually reaffirm his intentions and priorities for the day and for his life more generally.[222] Self-monitoring and collecting data became a means of discovering life's meaning.

For these people, self-tracking emerged as a way to anchors things that matter; digital self-tracking has become a way of surfacing those behaviors that may have otherwise become masked by the barrage of the day-to-day. More: the very act of monitoring singled out the activities entered under observation as in themselves important. Rather than tracking to discover a problem, as a doctor might have done in measuring weight or blood pressure, the very choices about *what* to focus on took on significance. In a sea of options about information to collect, the choices made a statement. Today's efficiency is about removing the excess, as Wilder noted, "that right now doesn't need to be there." The cultivation of lean and fit bodies that figures so prominently in projects of self-measurement can thus be read not only as normalizing slender body types but as a broader critical commentary on a life increasingly driven by surplus for which physical obesity, many feel, has itself become a sign. Refracted through the lens of the

[222] Field notes, April 2016, on file with the author.

MED, the contemporary discourse on optimization is simultaneously part of the capitalist framework that always demands the body to produce more, and yet it subtly offers commentary on, if not full resistance to, the pressure to endlessly manufacture (fiscal) surplus. Measuring promises to deliver a more *measured* – that is, more even-keeled – life. Self-tracking quite clearly lends itself to a specific historical genealogy: as an expression of a bureaucratic calculative rationality that ever stronger evokes Weber's iron cage, as another peg in the perpetual ratcheting up of the "financialization of daily life."[223] Contemporary self-tracking, however, also resonates with a distinctly late-capitalist pathos in which concepts of efficiency and optimization both participate and push against the logic of incessant accumulation. Self-tracking, in other words, is presented by many of my interlocutors as a technology of prioritizing. The desired strategies of data's efficiency and seamless interoperability speak to a quest for a world not only of improved connections but one of resurfaced meaning and purpose, where one's actions have become reconciled with their ends rather than blindly obscured by overlapping commitments that drain one's time and energy and pull one in thousands of competing directions.

It is important, then, that these efforts to streamline correspond to a broader area of study called "peak performance" dedicated to cultivating what is alternatively referred to as the state of "flow." "Flow" was so named by psychologist Mihaly Csikszentmihalyi in his 1990 seminal work, *Flow: The Psychology of Optimal Experience.*[224] It describes a state of maximum focus, a

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[223] For connections between contemporary technology and bureaucracy, see: Ben Kafka*, The Demon of Writing: Powers and Failures of Paperwork* (New York: Zone Books, 2012); Adam Clair, "Rule by nobody: Algorithms update bureaucracy's long-standing strategy for evasion," *Real Life Magazine,* February 21, 2017. For a discussion on the "financialization of daily life," see Randy Martin, *Financialization of Daily Life* (Philadelphia: Temple University Press, 2002).

[224] Mihaly Csikszentmihalyi, *Flow: The Psychology of Optimal Experience* (New York: Harper Modern Classics, 1990; 2nd ed., 2008).

moment where distractions fade away and one can enter a zone of heightened concentration and productivity marked by absolute absorption. Contemporary self-tracking technologies are today largely seen as the very tools that can facilitate, through proper feedback and data, a descent into a state of flow, not least because these tools often themselves become connected with principles of Ubiquitous Computing where flow at the technical level has been marked as the industry's stated goal.[225]

It is due to this sense of a life that is otherwise seen as weighted down by an almost existential excess, that wearable tools are often presented by devices developers as crucial mechanisms that can restore dynamism to life on a larger level. This, too, was part of the "frictionless" and seamlessly "interoperable" world Wilder both anticipated and promised in his opening commentary. At the conference discussed at the beginning of the chapter, Wilder made this connection more explicit when he explained why Plantronics, a company best known for headsets, began incorporating biometric sensors in their technology. On first pass, the progression to wearables seemed merely a logical technological step. The ear, after all, he calmly reasoned as he held the floor, gesturing to the PowerPoint slides that played behind him in lock-step with his business pitch, is not only an effective conduit for music but is also a medically recognized site from which to take measurements of body temperature and pulse. However, the connections between earphones and biometrics that powered a data-driven life made sense given the company's roots in flight navigation. First developed for airline pilots at the dawn of aviation

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[225] Ubiquitous Computing is a concept in computer engineering organized around making access to computers and a connection to the internet accessible at any time and form any place. For a discussion on the value of mobility in Ubiquitous Computing, see Paul Dourish and Genevieve Bell, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing* (Cambridge, MA: MIT Press, 2014). The "freedom" to circulate and to share information has also been a central tenet of technology activists who have long adopted the slogan "Information wants to be free." For an anthropological treatment of the open-source movement in which this sentiment flowered, see E. Gabriella Coleman, *Coding Freedom: The Ethics and Aesthetics of Hacking* (Princeton, NJ: Princeton University Press, 2012).

and later used in the control-and-command infrastructure of the Apollo mission, Plantronics headsets have long been associated, Wilder notes, not just with music but with "mission critical" radio dispatch. By incorporating biometric sensors in their headsets, Plantronics has restored connections to navigations, this time offering a suite of "mission critical" technology that is helping steer and guide one throughout one's entire life. The expression *the (moral) economy of gestures*, as I have used it here, has helped me trace some of the contours of this new imaginary of the good life modeled by conflict-free data flows where data sets free from friction have become both metaphors and conduits of a life itself devoid of unnecessary clutter or obstructions. This framing reflects and effects the way makers of wearable and sensor-enabled technology regularly present tracking devices not only as so many trinkets, bracelets, necklaces, or rings but also, as Wilder suggests, as "mission critical" technology that helps organize and mobilize one's entire life.

Visions of Excess

While contemporary technologies of self-tracking continue to be enlisted in regimes of elimination and conservation, albeit to different social effect than their Progressive Era counterparts, it bears noting that these tools are also profoundly riddled by excess. For one, contemporary wearable and sensor-embedded tools often create the very excess targeted for removal by these devices. Much as electronics more generally, wearable computing continues to create novel and even more alarming environmental strains while promoting ideas of moderation and economy of effort.[226] Moreover, simply looking at the extraordinary amount of extra work

[226] See, for instance, Jennifer Gabrys, *Digital Rubbish: A Natural History of Electronics* (Ann Arbor: University of Michigan Press, 2011).

and time that data monitoring often requires, of which my interlocutors endlessly complained and wished to be rid of, excess has of course not been eliminated from the system, but has only proliferated. If anything, in part echoing George Bataille's body of work predicated on re-inscribing waste into the modern imaginary, the digital tools reveal the conventional modernist pretension that we have rid ourselves of waste as yet another baroque masquerade, itself a kind of exuberant excess.[227] These devices propose to reduce waste only through first stimulating it. In their sheer variety and the new forms of (self) work these tools now require, wearable and sensor-enabled devices often create the very waste to be removed, while moralizing excess as the thing to be excluded from the contemporary life and body.

In the excess broadly construed that these devices produce, they may in fact not be so different from their Progressive Era counterparts. Historians have questioned whether the efficiency craze of the Progressive Era ever managed to produce the rational and standardized subjects it sought to create. Historian Elspeth H. Brown, for instance, has argued that strategies proposed by Frederick Taylor and his contemporaries were common promotional techniques of industry consultants. They were sales tactics advertised by competitors whose varying approaches proliferated and conflicted with one another, leaving questionable impact on the professional spaces they touched. Their very variety ultimately defeated the possibility of creating the singularly efficient subjects they proposed to generate.[228]

The streamlined optimization today offered by self-tracking technology is likewise undermined by contemporary market demands, creating additional forms of excess as well as surplus value that this time also echo with David Harvey's notion of the "spatial fix."[229] In recent

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[227] Bataille, *Visions of Excess*.
[228] Brown, *The Corporate Eye*.
[229] David Harvey, *The New Imperialism* (New York: Oxford University Press, 2003).

years, scholars have turned attention to the way people's bodies, their very biology, not just the productive labor to be derived from bodies, has become a financially expedient resource, particularly notable in the pharmaceutical industry.[230] "Taking care of our bodies" has thus increasingly become reframed, as Ed Cohen had noted in a slightly different context, as "the cultural equivalent of maintaining our capital."[231] Theorists have also started to note that the fiscal logic has become extrapolated to self-monitoring tools, where the bio-information that individuals collect with the aid of self-monitoring devices has emerged as a critical monetary resource that companies seek to capitalize on, the fiscal incentives one of the key things that are driving the self-tracking industry today.[232] These devices turn the bio-information that individuals produce into a monetary resource that companies seek to capitalize on. The fiscal incentives the tools offer in turn emerge as one of the key factors that are motivating the self-tracking industry today.[233] In one of my conversations, a device developer had even noted that step-counting and sleep-tracking have become one of the most widely measured outputs because these are the things that everyone does: everyone sleeps and walks. The market of people interested in these devices thus potentially includes everyone. Anson Rabinbach observed that the efficient and tireless motor was a key metaphor of the ideal model of the laboring body.[234] Today, the more suitable metaphor of the body may perhaps be the meter to characterize the way

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[230] See Kaushik Sunder Rajan, Biocapital: The Constitution of Postgenomic Life (Durham, NC: Duke University Press, 2006); for additional treatment of financial instrumentalization of everyday life, see also Melinda E. Cooper, Life as Surplus: Biotechnology & Capitalism in the Neoliberal Era (Seattle: University of Washington Press, 2008).
[231] Edward Cohen, "A Body Worth Having?" *Theory, Culture & Society* 25, no. 3 (2008): 103–129, p. 104.
[232] For example, Chris Till has discussed the way data generated by users of devices like the Fitbit amounts to free labor on behalf of companies who are later able to profit from the data collected by their users through selling or exchanging this information with third parties. See Chrs Till, "Exercise as Labor: Quantified Self and the Transformation of Exercise into Labor," *Societies* 4 (3)(2014), p. 446-462. Also see:
[233] See Deborah Lupton, "Personal Data Practices in the Age of Lively Data," in *Digital Sociologies*, edited by Jessie Daniels, Karen Gregory, and Tressie Mcmillan Cottom (Bristol: Policy Press, 2016).
[234] Rabinbach, *The Human Motor.*

developers produce bodies that are constantly running up data which can be converted to monetary value.

However, self-monitoring devices do not only enclose the body as a fixed commodity. They perpetually create new bodily enclosures through which profit could be *continuously* extracted. At one Quantified Self conference, for example, I walked up to a display set up by the company Scanadu that was advertising its wares to attendees. A sales representative greeted me warmly, eager to demonstrate to me how the gadget, slick and round and the size of a hockey puck, neatly glides across the forehead, scanning temperature, blood pressure, and heart rate with one fluid swipe. I rolled the device around in my hand as I patiently listened to her practiced talk about the major artery that runs along the forehead, which, she initially explained, helps make Scanadu's unique swiping gesture just the right motion with which to take the readings, an action moreover reminiscent of a caretaker's soothing touch. The name Scanadu spoke directly to the device's function: to scan the body for information and to produce quick results. "We are the last generation to know so little about our health," promised the large slogans that was set up next to the display tables, while oversize monitors kept a running tally of the "9 billion 355,789,002" data points collected by Scanadu to date (Figure 28). The sheer scale of that number, further stressed by the fact that "billion" had been written out as a word, not as a number to ensure that those walking by would not overlook the magnitude of that figure, were submitted as evidence in service of Scanadu's ambitious claim.

Figure 28: Monitors at the Scanadu display at the Quantified Self conference. Photo by author.

After this formal presentation was over, I remained unconvinced and explained to the sale associate that I was a researcher studying self-tracking practices, and that I was looking to better understand what made Scanadu so focused on the forehead. Abandoning the sales pitch for just a moment, she bent in a little closer. "The wrist has become busy real estate," she explained as she threw a knowing look about the room. Many of the people swarming the hall were sporting bio-devices on their wrists in the shape of a bracelet, a watch, or a charm. Vendors set up next to Scanadu were likewise promoting a range of wrist or hand-worn tools. Speaking to me now not as a potential customer whom she needed to convince, but as an insider who shared her pragmatic point of view, the sales agent lowered her voice: "We had to invent a new gesture." The name Scanadu suddenly felt slightly sinister, its purpose seemed less intended to produce knowledge and information, and more to scan bodies as though they were goods at a general store.

That the "wrist has become busy real estate" is something that I had heard repeatedly throughout research. This statement meant that the market was already flooded with wearable

devices that could be worn on a person's wrist. To continue turning a profit, entrepreneurs searched for something new to monetize – new bio-outputs, new locations on the body, as well as new gestures to record. Yet, in approaching the body as figurative "real-estate," Scanadu and others do not simply propose to commodify biology, but, on the model of Harvey's "spatial fix," to manufacture surplus through continually creating additional bodily enclosures that reanimate cycles of profit. The "spatial fix" articulates a much more layered understanding of the process of enclosure, in principle pointing to infinite capacities for the extraction of surplus from the same space. In Harvey's theory, perpetual cycles of dispossession through the manufacturing of cycles of booms and busts drive fiscal opportunity and the possibility of new enclosures. In settings where wearable technology is developed and sold, the body is not dispossessed the same way as space to create new profit opportunities. Nevertheless, it is posited by marketers as a site of endless layering and enclosure, as signaled by the phrase "the wrist is busy real-estate" and the retort that Scanadu simply had to "invent a new gesture." In fact, continuous dispossession is not necessary to create a bodily spatial fix – only continuous enclosure. To extract profit from the body requires seeing it as capable of being infinitely stratified rather than that which can be stabilized and divided up.

This is where the social or physical improvement purportedly advanced by digital tools also intersects with the logic of improvement that was originally grounded in notions of financial gain. To improve land, as Ellen Wood had noted, originally meant to render it profitable, not simply to make it better.[235] The principle of improvement was used in the English countryside to first enclose land specifically for the purposes of profit. Most notably, this reasoning was later used by John Locke to justify the usurpation of native lands as a moral right. "Unimproved land

[235] Ellen Meiksins Wood, *The Origin of Capitalism* (London and New York: Verso, 2002 [1999]).

is waste, and a man who appropriates it to himself in order to improve it has, by increasing its value, given something to humanity, not taken it away," Locke wrote.[236] In turn, "the failure to improve could mean forfeiting the right of property." The forms of fiscal improvement offered up by the self-tracking industry thus still echo with a moral imperative for profit even as the physical forms of improvement these tool promise to procure still remain largely at the level of corporate ambition. One has to "improve" the body, if only by making it profitable. Progressive Era techniques and technologies sought to turn the body into a perfect instrument so that it could produce as efficiently as a machine. Today, the body has itself increasingly emerged as the object of production. The *(moral) economy of gestures* is a phrase that articulates the body as a site of this productive activity.

As a final way to see that the new data-driven *(moral) economy of gestures* only thrives through the incessant production of surplus – both economic and digital, I turn attention to some of the industry dynamics in which contemporary self-tracking tools are produced. Classically, success in the business world is predicated on the persistent generation of surplus and its cyclical, efficient, and rational reinvestment – on a careful cultivation of excess that makes its own excess. The generation and the reincorporation of excess grease the wheels of the market. Similarly, companies selling wearable and sensor-embedded devices often stage anticipated sales increases in the language of economics – as a straightforward response to "consumer demand" that naturally rises in response to obvious benefits of emergent technology. However, the contemporary wearable and sensor-embedded industry is driven by an excess also meant to be wasted rather than reincorporated.

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[236] Wood, *The Origin of Capitalism,* 157.

The idea that the wearables industry is driven by the dramatic displays of spending once again reverberates with Bataille's work, this time, however, with his concept of the "general economy.[237] In theorizing the excess that classic economics leaves out of consideration, Bataille was inspired by Mauss's description of the potlatch. In particular, Bataille noted that the potlach, which hinged on a distribution of goods, functioned as a central mechanism of power. Particularly when the potlach was destroyed, the destruction created something new out of the wasteland. If Bataille was so attracted to the native experience of the potlatch, it was to highlight and to dwell on the majesty, the threat, and the power of audacious destruction that sent an entire personal universe up in flames. The potlatch characterized an important destructive impulse that Bataille called "dépense," one that depends on the double movement of accumulation, on an exuberant accretion of an intoxicating excess and on its dramatic demise, on the ability to dispense, to waste at the moment when one seems to have it all.[238]

The dynamics driving the market of self-tracking tools can be partially read through this destructive impulse. Entrepreneurial power at times seems to derive from an ability to similarly extravagantly waste and destroy. "Investors want it to look big because if it looks big, there is a chance it will be big," one wearables entrepreneur explained to me.[239] This desire of investors to see and imagine size creates its own paradoxes where fledgling businesses with little evidence of success but with large promises for the future routinely receive greater financial investment from venture capital firms than do established businesses with a more modest but proven record of performance. On the promise of growth, developing businesses often have an easier time raising money. Most importantly, once procured, investment needs to be spent – even wasted - to be

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[237] Bataille, *The Accursed Share.*
[238] Bataille, *The Accursed Share.*
[239] Field notes, January 2016, on file with the author.

justified. Typically, firms receiving early venture capital money invest the bulk of the funds in larger office space and marketing to magnify appearances and show that the investment is being spent. Working to look big before actually becoming big, these firms tend to burn through their capital, inevitably requiring even more funding to sustain the growing operation. Where size of investment and size of the operation precede and are even understood as that which produces results, a business has to be seen to expand, my interlocutors have explained to me, if only in scale of investment and spending rather than in actual revenue, the latter often framed as forthcoming and even contingent on the demonstration of such cycles of expenditure. As a result, many developing firms quickly move through multiple cycles of investment, often in the millions of dollars, all before having produced any meaningful technology or sales results. Many businesses figuratively go up in flames before ever realizing this investment all the while continuing to feed an industry ethos characterized by dramatic spending driven by cycles of booms and busts.

The orchestration of success through extravagant expenditure also recalls Anna Tsing's concept of "economy of appearances."[240] Tsing's expression addresses the need for spectacle, for the theatrical, excessive rehearsal of hard-to-realize business futures, which, she says, regularly attends the gathering of investor funds. One may say that the dramatic as well as the spectral quality of such summoning can be read in what many of my interlocutors call the tech "visionary," a quality often assigned to those entrepreneurs who Tsing likens to spirit mediums who can conjure an idea seemingly out of thin air, "like a spirit to draw an audience of potential investors."[241]

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[240] Tsing, *Friction,* p. 57.
[241] Tsing, *Friction,* p. 57.

The excessive performance demanded by capitalism to bring about the funds that will help realize the future thus conceived additionally connects with Kaushik Sandar Rajan's discussion of marketing "vision and hype," particularly as they relate to Silicon Valley venture capitalism.[242] Sunder Rajan brings in an analysis of vision and hype to think through the differences between contemporary speculative high-tech capitalism and older forms of commodity capitalism, the former particularly characteristic of the technology industry aligned with Silicon Valley but symbolically reproduced in sister tech-centers across the nation such as New York City's "Silicon Alley" where I conducted a large portion of my fieldwork.

Sunder Rajan differentiates the excess that is produced through this form of capitalism from the more conventional notion of surplus value because, unlike the latter, the former is not based exclusively on the "generation of infinitely greater amount of things that already exist," but also on "creative" ability. He links creativity with both artistry – the ability to generate spectacular scenes as Tsing suggests – and productive capacity. In other words, surplus is not linked only with the generative capacity of laboring limbs creating commodities, but with the crafty manipulations associated with the swift gestures of a magician's hands that are "able to pull rabbits out of hats," making much ado about nothing.[243] Still, for Sunder Rajan, the speculative and the spectacular business pitch is different from a lie, or rather it does not exist within the binary epistemic regime of lie/truth. A business pitch epitomized in a formal corporate forward-looking statement, Sunder Rajan suggests, "cannot be a failure to calculate correctly,

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[242] Kaushik Sunder Rajan, *Biocapital: The Constitution of Postgenomic Life* (Durham, NC: Duke University Press, 2006).
[243] Sunder Rajan, *Biocapital*, p. 114.

because the future it promises is precisely *incalculable.*"[244] At stake is "credibility" rather than calculability – the sincere desire to make plausible rather than to make possible.

Whereas Sunder Rajan locates the speculative thinking in documents such as the forward-looking statements, in the professional spaces that I inhabited, hype was often an explicit topic of conversation, albeit made manifest in a different way. Hype and speculative thinking entered my research in the form of the Hype Cycle developed by the prominent management consulting company Gartner. "Have you heard of the Hype Cycle?" my interlocutors repeatedly wanted to know, because it centered their own experience with the technology industry. The Hype Cycle is a map of sorts: it proposes to track the progress of "emerging" technologies. Updated yearly, Gartner's Hype Cycle has five stages: Innovation Trigger, Peak of Inflated Expectations, Trough of Disillusionment, Slope of Enlightenment, and Plateau of Productivity (Figure 29). The dramatic, even poetic terminology notwithstanding, the Hype Cycle is meant to plot new technology trends across time. The first two phases of the cycle are marked, according to Gartner, by heavy competition and participation, but successful products must survive the steep drop-off of the Trough of Disillusionment. Only those trends that will coast into the Slope of Enlightenment will, Gartner proposes, stand the test of time. Business developers track the progression of these trends on Gartner's Hype Cycle voraciously, often sourcing legitimacy and credibility from their position on the map.

[244] Sunder Rajan, *Biocapital*, p. 133 (emphasis in the original).

Figure 29: Gartner Hype Cycle for Emerging Technologies, 2015.

To Sunder Rajan's idea of "credibility," I add the notion of confidence. Product makers strive not only to make their claims sound plausible but also to *engineer confidence*, marked by their ability to put on airs that will carry forth the future they conjure. Beau's confident and strident delivery of his company's vision for wearable technology that I discussed at the beginning of this chapter is an important part of inflating both investor and consumer confidence that rhetorically seeks to smooth out the friction that necessarily attends technology in the works so as to jump-start the virtuous cycles of "consumer demand." Wilder was a practiced speaker who no doubt felt that his effortless take on a data-driven future resonated in the room. When a female entrepreneur nervously rushed through her presentation following Wilder's own talk, he cavalierly endorsed her speech during the Q&A portion of the presentation instead of posing a question. "May I just say that if this is your first speaking engagement, you did a great job," he commended her as he stretched out in his chair with a self-satisfied air. She flashed an awkward smile in return as she shrank back into her own seat. Wilder also saw the technology Plantronics was developing as a potential future partner in manufacturing such confidence. Correlating

comfort with confidence, Wilder suggested that digital tracking would help monitor sweat, heart rate, or dips in tone of a speaker making a business pitch to an important client. He imagined that in a future conference room, these biometric outputs would link to other technology spread throughout the room: the telephone, the lighting, the sound system, the air-conditioning. Continuously adjusting the physical environment based on biometric readings would help Plantronics modulate speaker comfort levels and thereby boost confidence – and the speaker's credibility – on the spot.

At the Consumer Electronics Show (CES), the technology industry's most esteemed annual conference that seems to have taken on the symbolic work of representing technology as exotic and futuristic, a role once performed by World's Fairs, massive marketing displays in the conference's main halls at times seemed intentioned to orchestrate the confidence in wearable and sensor-embedded technology that is as yet lacking from the market itself.[245] I have attended the CES in 2015 and 2016, and these years were one of the first few when wearables and sensor-embedded tools were allotted a massive exhibition hall all their own, itself a sign of confidence in the future of these tools. While the displays in 2014 were suitably large, I was blown away by the colossal exhibits set up by marketers in 2015. To demonstrate how a device measuring jump-height works, one company constructed a full-size basketball court. Another built a two-story

[245] The last grand U.S. World's Fair took place in New York in 1964 where the computer was exhibited to the public for the fist time and IBM had a large presence. World's Fairs were originally key sites of spectacularized innovation. Science-fiction author Isaac Asimov even wrote a piece in the August 16th issue of the New York Times titled "A Visit to the World's Fair of 2014" in 1964, where he speculated about what one may encounter in a Word's Fair in 2014, that is 50 years from the 1964 New York affair. Asimov predicted that advances in computing first showcased in 1964 would continue apace. "By 2014, electroluminescent panels will be in common use. Ceilings and walls will glow, and in a variety of colors that will change at the touch of a button" he wrote. In 2014, a World's Fair was not organized anywhere in the world, but the CES proceeded with fanfare. The future he anticipated was on high display there. Since 1967, instead of the World's Fair, executives have turned to showcases like the CES to stage the technical future. In 2014, the CES dedicated an entire hall to wearable and IoT technologies for the very first time, signaling where the industry anticipated trends in technology were heading.

display filled with rooms one could walk through, taking advantage of the scale of the conference space. Many others erected oversized showrooms filled with celebrities and glitzy add-ons, likely spending hundreds of thousands of dollars to promote products that were largely still in prototype phase.

Figure 30: Displays set up at CES. Photo by author.

The desired confidence in a market yet to be realized was likewise on full display at the day-long FitnessTech Summit hosted during the CES, dedicated specifically to wearable technology. In a conference of more than 150,000 attendees, the seminar taking place in 2015 was held in a small room attended by fewer than a hundred people. Presenters stood at the head of a grand ballroom cordoned off by folding walls on all sides to create a room a fraction of the size of the hall itself, and speakers could be easily heard in the back without a microphone. By 2016, although actual attendance of the FitnessTech Summit appeared to have hardly increased, the same seminar was now held in a grand auditorium many times the size of the conference space it occupied a year earlier in anticipation as well as in performance of increased demand. At

one end of the room, a large elevated stage now bathed speakers in bright theater lights while three projection screens broadcast PowerPoint slides to audiences located at great distances from the stage. A full video and audio crew manned the stage under the dimmed lights of immense chandeliers dripping with crystal. All this in a time still marked by ambivalence about the future popularity of self-tracking devices in the general market where many industry trends, at least according to Gartner, were yet to move past the crucial Trough of Disillusionment.

In the wearables industry, companies that make fantastic and overinflated claims are often derisively called "vapor ware." These products, full of empty promises and hot air, serve as cautionary stories of ideas that flew too high and, like the legendary Icarus whose wings were burned when he came to close to the sun, fell to their deaths. In the context of wearables and sensor-embedded technology, however, hype is not simply hot air. Hype and confidence in the wearables industry as I had encountered them are not only conjured to sell a future yet to be realized; they represent a way to mortgage a future so as to stay afloat long enough to make it past the steep and crushing Peak of Inflated Expectations. Little wonder that some of the most breathless predictions are typically issued by companies perched atop this precarious graphical height. While "trend forecasting," the type that Gartner engages in, is often staged as a large part of business success where visionary companies are able to "spot" developing trends and "get ahead of the curve" as though these trends were indeed a rising tide that they are hoping to surf to completion, success is in fact premised not on prognosticating powers per se, but on the fiscal and social authority to actually spirit forth the very future one conjures, authority earned through Bataillean cycles of exuberant spending of resources and effort, so that only in hindsight will one have turned out to have been a true visionary.

Although the collection of personal data is popularly predicated on a logic of elimination, the excesses of the technology industry frustrate the stated efficiency and instrumentality of these tools. While fetishizing the removal of excess, its theatrical evacuation by the wearables market depends on the successful production of excess characterized by the dramatic displays of spending, of both time and of effort. Building on these articulations of market(ing) conjuring, the *(moral) economy of gestures* thus also refers to the excessive gestures, that is to the overtures that have become necessary to bring a wearable or a sensor-enabled product into being, into the market, and into economic and social circulation.

The Movement of the Crowd

It was near the close of business day at the CES 2016. I stood in the middle of an open rotunda at The Venetian hotel in Las Vegas where the event was being held, waiting for my friend to arrive as I watched conference goers pour out of the hotel's every crevice. Throughout the day, I allowed myself to become swept up by the swarm, succumbing to the seductive roar of the crowd. Carried along as though by some mechanism, I eagerly rushed to and fro, keeping pace with the group that flitted from display to display exhibiting new inventions and grandiose pronouncements of a data-driven future. Facing the traffic now as I searched for my friend's familiar face, I realized that this was the first time that I could truly appreciated some of the scope of the reputed 170,000 people that descended on the Vegas strip for the CES that year, the commercial curiosity enthusiasm surrounding wearable and sensor-enabled tools bolstering attendance to unprecedented levels. White shirts glistened like foam in a sea of undifferentiated blue and black business attire. The momentum of the crowd called me to keep moving, but I stood my ground. A guard standing nearby directing traffic eyed me periodically and asked me

several times if I knew where I was going. I nodded an "I'm fine" as I continued to wait. For a moment, facing the crowd like this as it swirled and swooshed all about me felt exhilarating and even slightly defiant. Just then, I made out the familiar face of my New York friend, head bobbing above the crowd like a buoy. "I'm beat," he puffed as he approached, and together we rejoined the flow, spilling out onto the casino floor to find some room in bars already filled to the brim with small groups just like ours, huddled around colorful drinks languidly splashing around in trendy glasses, and mulling over the day's events.

When Gustave Le Bon analyzed crowds in 1896, he concluded that one of the characteristics of crowds is that "crowds are in consequence extremely mobile."[246] Early documentary filmmakers often made use of this inherent dynamism to show off the new medium to full effect by filming crowds leaving the factory at the end of a workday.[247] At the CES, the efficient momentum of the crowd not only mirrored the imagined circulation of data that many developers saw as gushing from the body and into a slew of self-tracking devices but also reflected the "frictionless" mobility, as Wilder had put it, of the future data-driven person. Many of those waging their bids on that future were right here, ushering this vision in, either from the inside of their stalls or rushing through the halls of CES.

Although device developers and data enthusiasts often refer to wearable technology as that which will open up a mode of efficient and effortless comportment, these tools also simultaneously acclimate bodies to movement and change. I intend the phrase that I have developed in this chapter, *the (moral) economy of gestures,* lastly to refer to this type of desired circulation of data-driven bodies, ones set to move ferociously forward, like the crowd, jumping

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[246] Gustav Le Bon, *The Crowd: A Study of the Popular Mind* (New York: Dover Publications, 2002 [1896]), p. 57.
[247] See, for instance, *La Sortie de l'Usine Lumière* by Luis Lumière.

hurdles and impediments in their way. As I will conclude, this vision also sets the tone and the pace for the digital economy that increasingly expects its professional class to keep moving, whether they want to or not.

One can see a version of this mobility advanced in popular books like *Lean In: Women, Work, and the Will to Lead,* by Sheryl Sandberg, Chief Operating Officer (COO) of Facebook.[248] Sandberg sees her book as a rallying cry for the modern career woman. In effect, women, she worries, are still playing catch-up with men. Observing that women today graduate at similar rates to men in a variety of disciplines, but are still woefully underrepresented in senior management, Sandberg encourages women to "lean in" to opportunities – that is, to take initiative, and to pursue their ambitions unapologetically. In addition to undeniable structural and cultural factors, women, she contends, often take a back seat or timidly resist asking for what they want or need, but the modern woman has to face her goals head on. Passive women lean out and recoil from opportunity. The modern woman leans in to it. Sandberg endorses this forward-directed posture as the contemporary power pose, one that also confronts the stiff and macho posture popularized by decades of black-suited men. Leaning in, Sandberg argues, is the key to challenging male hegemony in the corporate workplace, one still dominated by the bold confidence represented by businessmen like Wilder.

Sandberg's posture of forward-facing engagement and momentum that women in particular, she says, have yet to master echo in the feminized disposition toward change increasingly entrained by self-tracking technology. Several theorists writing about the Quantified Self and self-tracking more broadly have considered, as I will quickly review, the way these tools produce a new notion of the body: the endlessly iterable body. The type of pliability and

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[248] Sheryl Sandberg, *Lean In: Women, Work, and the Will to Lead* (New York: Alfred A. Knopf, 2013).

mobility engendered by digital technologies that I have in mind builds on as well as departs from these views. For me, the mobility implied points to additional parallels: they are signposts for other dynamics that increasingly shape not only business ventures but individual lives around principles of continued mobility and agility. In particular, while critical commentary has often focused on the way digital technology produces pluralized bodies, I want to consider the rhetoric of mobility and agility in the context of the "gig" economy that increasingly requires people to be ready to move – especially for a job opportunity – at a moment's notice, the very dynamics that shape the commercial environment that produces these technologies in the first place.

A broader embodied disposition toward change has of course been variously theorized by earlier thinkers. While Charles Darwin had originally emphasized the pliability of bodies at the species level across the long durée, anthropologist Marcel Mauss in his seminal study, "Techniques of the Body," examined how history and culture produces variations in the way people experience and carry their bodies.[249] For a generation of authors, Donna Haraway's cyborg had signaled the ultimate flexible body no longer confined or defined by restrictive binaries or rigid social norms.[250] In *Liquid Modernity*, sociologist Zygmun Bauman had proposed to think post-modernity as itself a period marked by an epistemic shift toward fluidity and flexibility.[251] Characterized by a general abandonment of grand categories, society has become restructured, he suggests, around ideas of instantly mutable and infinitely alterable and fluid forms. Similarly, anthropologist Emily Martin had traced the shift from bodies treated as static

[249] Marcel Mauss, "Techniques of the Body," in *Economy and Society 2* (1934), p. 70-88.
[250] Donna Haraway, "A Cyborg Manifesto: Science, technology, and socialist-feminism in the late twentieth century," in *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1984).
[251] Zygmut Bauman, *Liquid Modernity* (Oxford: Blackwell Publishers, 2000).

fortresses under attack to a more fluid and elastic concept of the body over the course of the last century.[252]

Technologies of self-tracking, several authors have suggested, only further amplify the invoked variability and pliability of bodies. Dawn Nafus's research has suggested that the Quantified Self helped amplify and elevate this view. Many of the early adherents, she has noted, were chronic sufferers of disease or medical conditions considered too marginal to factor into research and who were thus often left out of traditional medicine simply as outliers. Their self-monitoring efforts have come out of a frustration and the realization that the "one size does not fit all, and so figuring out what new 'healthy' thing actually works for you, and what is realistic for you, is a very real problem."[253] Anne Wright, who came to Quantified Self horribly ill with a condition no doctor could diagnose, has experienced the pain of being seen as a medical oddity, too singular for research. When we talked, I suggested she might be interested in Ian Hacking's *The Taming of Chance*.[254] At the Quantified Self Conference in San Francisco, in a conversation with Dawn Nafus on stage, Wright, a former computer scientist at NASA, challenged the doctors, engineers, statisticians, and data scientists who were in the audience that day: "Today we accept as common knowledge that standards normalize at population levels. This is the foundation on which statistics are done. This ideological debate has been cemented into [scientific] law." Yet, she challenged the audience: "We need to know ourselves and not just be shoved into a box." Of course, many self-tracking efforts remain sutured to normative ideals,

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[252] Emily Martin, *Flexible Bodies: Tracking Immunity in American Culture from the Days of Polio to the Age of AIDS* (Boston: Beacon Press, 1994).
[253] Dawn Nafus, Data, Data, Everywhere, but Who Gets to Interpret It, EPIC May 5, 2015, www.epicpeople.org/data-data-everywhere/. See also Dawn Nafus and Jamie Sherman, "This one does not go up to 11: The Quantified Self movement as an alternative big data practice," *The International Journal of Communication* 8 (2014), p. 1784-1794.
[254] Ian Hacking, *The Taming of Chance* (Cambridge: Cambridge University Press, 1990).

particularly as they often concentrate on the level of nutrition, sleep, productivity, or fitness level proper to a healthy body. Nevertheless, the idea of "my normal" points to a shift away from static forms that one endeavors to discover and toward an appreciation for the fact that norms themselves, even at the individual level, continue to constantly shape and evolve.

At the Quantified Self conference held in San Francisco in June 2015, this idea resonated as conversation often turned to the authenticating factor of data. Repeatedly, I heard people claim:

> "Everyone isx so unique, everything you do … different data means different things for different people."
>
> "What does it [data] mean to *you?*"
>
> "Data must determine what is normal *for you.*"
>
> "If I said to you, 'I burned 2,300 calories today' and you said, 'I burned 2,300 calories too,' does that make us the same? Of course not. But people might think that if you are only looking at numbers, you overlook what makes us unique."

A few months later, at CES 2016, presenters similarly proclaimed from the stage at the *FitnessTech Summit,* the day-long seminar focused around wearable technology: "Everyone's body is different so making recommendations to people is a unique challenge."

Working with Emily Martin's concept of the "flexible body" and Joseph Dumit's insights into the shifting notion of health, Greenfield's dissertation research has focused on ways digital self-tracking has even further shifted the conceptualization of disease away from a static and binary model of disease/health and toward a more elastic somatic imaginary.[255] The line

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[255] Martin, *Flexible Bodies.*
Dana E. Greenfield, "Homo experimentus: Digital selves and digital health in the age of innovation," PhD diss, University of California, San Francisco and Berkeley, 2015.

separating health and sickness, Greenfield suggests, has become increasingly pixelated through incessant data collection; that is, the border has become both magnified and blurred. The perpetual, embodied readiness for change also approaches what anthropologist Natasha Dow Schull has called "the nudgeable subject," which likewise points to the slow-drip modulation of lifestyle and of behavior self-tracking technology promotes.[256]

Despite the similarities between earlier theories of somatic mutation and mutability and contemporary concerns around digital technology, these ideas also feel different from the tactical and continuous adjustments produced by "feedback" modeled and demanded by modern self-tracking tools that current authors write about, particularly scholars like Greenfield and Schull point to. Theorists like Donna Haraway, for instance, still saw flexibility as a loosely liberatory project aimed at dismantling rigid social categories. In the work of present-day theorists that I highlight, one can instead read the management of change as a burden. Schull's "nudgeable subject" is so called particularly because it is a subjectivity entrained to take small steps toward a Sisyphean project of continually renewed goals, endlessly "nudged" and prodded along by technology. In self-tracking tools, the utopic modernist notion of progress returns as a never-ending burden – a trap. Progressive Era techniques sought to stabilize and standardize the body; to discover a perfectible form that can be decisively calibrated to concepts of efficient production. Contemporary technology offers promotes only continual change.

I contend that the entrainment toward change does not only play out at the somatic level; it also takes place at the social level. When I ask people why they track, I often herd explanations

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Joe Dumit, *Drugs for Life: How Pharmaceutical Companies Define Our Health* (Durham; Duke University Press, 2012).

[256] Natasha Schull, "Data for life: Wearable technology and the design of self," *BioSocieties* 1–17 (New York: Macmillan Publishers, 2016).

of discipline and control; it is that which keeps people on track. Yet, "the need for control is such a paradox," a friend noted astutely as we walked from one Quantified Self meeting together.[257] "People talk about tracking as something that makes them more disciplined. But don't you already have to be pretty disciplined to track?" Of course, self-tracking helps many people set parameters within which to function, but the activity of self-monitoring also produces a broader sensitivity toward movement and change that is both often verbalized and escapes attention. Keeping a tight focus on one's life has helped people I have spoken with to know how to maneuver, how to not sit still; it has helped open up rather than inhibit movement. Mike perhaps put it the most starkly. Remembering his own experience of tracking ferociously while training for his first Iron Man event, he said that at the time he was "measuring nine things at the same time just to keep it all going."[258] Then, pondering the experience for a moment, he confessed that more than anything else, he did it more to "give himself confidence" that he will keep going. Self-monitoring helped him to make sure that he will continue moving through with his goal; it was a sign of the visible commitment he has made to the event. Digital monitoring, he said, helped him make sure that he got to the Iron Man competition itself. But devices that constantly remind you to keep walking, to not sit still, to watch your sugar and your posture also quite literally both shape and register the value of a life constantly on the move; they become both instruments and metaphors of a life attuned to constant momentum and change.

The necessity of staying open to change and mobility is nowhere more visible than in the professional arena, something that was often made patently obvious to me at the Quantified Self events themselves. At one gathering that I attended, I sat across the table from Tom. We

[257] Field notes, March 2016, on file with the author.
[258] Field notes, September 2015, on file with the author

introduced ourselves and exchanged pleasantries. Tom explained that he came to hear the evening's presentations because he recently left a corporate job. Now a consultant in his fifties, he struggled to create the structure that he was accustomed to when he had a steady office job. From the talks, he hoped that he might learn about strategies that can help him better adjust to his new unmoored status, ideas that could keep his life and profession on track. But he was also here in search of connections that may lead to a job. "I'm a data scientist," he explained to me as he slipped me his card. Maybe I might know someone at Columbia University?[259] Others were there to make connections too. Speaking about her interest in sleep-tracking, Esther gave a brief presentation about her dissatisfaction with three of the devices she has trialed. But as she spoke, "for full disclosure," she casually mentioned that she was an early investor in Basis, a once-popular wearable device that tracked steps and heart rate. "I don't know if anybody would want to do a scientific study on sleep?" she coyly asked, wrapping up her talk. There was. Another person talked about his habit tracking. "I liked it so much, I'm actually making a software version of it," he concluded his talk with a soft sales-pitch. That evening, we met in the office of a small start-up, but other events were most frequently hosted by a variety of coworking spaces that have become increasingly popular in New York City for those working outside the bounds of a traditional corporate job. I also often noticed that the people I had met during the Quantified Self events would cite their involvement with the group in their LinkedIn profiles. You never know, after all, if it may trigger a lead for that next gig.

Contemporary discourse on self-tracking runs parallel to the discourse on flexible labor. The self-tracking market has helped take Zygmun Bauman's "liquid modernity" and Emily Martin's "flexible bodies," characterized as both of these projects were by their attention to the

[259] Field notes, April 2016, on file with the author.

dissolution of the corporation as a durable form of employment, to their logical extreme. Karen Ho's ethnography of the financial industry of the late 1990s gives an additional way of thinking about the liquidity – that is, of mobility of both data and bodies – that underwrites the contemporary economy of self-tracking tools. Ho considers how the high stakes and volatile environment of investment banking has slowly been adapted as a model for other professions, like the technology industry, to disastrous effects. The title of her book, *Liquidated: An Ethnography of Wall Street,* resonates as a double entendre. It refers equally to money, to the presumed liquidity of capital, as to the liquid nature of investment banking employment that makes money flow, a business culture characterized by extreme employment instability. Ho explores the way investment banking had helped elevate professional instability as a symbol of business acumen. This is one of the reasons that the swinging-pendulum style of work characteristic of investment banking, where "reckless expediency is the generalized norm," has become a model for American corporate culture more generally.[260] Investment banking, however, is not only a model of an ideal work culture resonant with the Protestant ethic to be emulated. Ho notes that Wall Street, increasingly predicated on manufacturing dramatic market booms and busts, also sets the strategy for the rest of corporate America – even the world – to follow. As Ho explains, "Wall Street's financial values, in particular its understanding of temporality which privileges employee liquidity and compressed time-frames to measure corporate performance, have not only encouraged rampant downsizing through corporate America, but also realigned corporations that once operated according to their own product and development clocks, to the expectations of Wall Street."[261] In other words, where business

[260] Karen Ho *Liquidated: An Ethnography of Wall Street* (Durham, NC: Duke University Press, 2009), p. 284.
[261] Ho, *Liquidated*, p. 292–293.

practices are increasingly molded to and modeled on market highs and lows, investment bankers have helped both routinize and celebrate job insecurity. Of course, the difference between investment banking and other industries is financial. Outside of the high compensation of Wall Street that allows investment bankers to ride out the ever-shifting fluctuations they themselves produce, downswing is often a catastrophic experience elsewhere. The latest was a 2008–2009 financial crisis, an event that gave rise to a new term: the "gig economy."[262] It is a term that has come to characterize the shifting and mobile forms of work marked by instability and lack of proper benefits. However, the phrase gestures to the way gigging, particularly in the digital economy, has itself become a more generalized form of employment rather than an occasional supplement to income.

Today, many of these trends have come to maturity. Contemporary tech culture, in particular, is both symptomatic of these trends and is organized around them. During the course of my research – roughly between May 2014 and May 2016 – companies like Uber and Airbnb have further destabilized existing industries and replaced them with an economy grounded in freelance labor, giving the term "gig economy" renewed resonance and urgency. These dynamics have also become all too apparent in the professional environments where many of the self-tracking devices I have encountered are produced. These tools are often created in small start-ups funded through flexible crowdsourcing platforms or supported by temporary "start-up accelerator" programs; companies that increasingly fill the sea of flexible office spaces like WeWork that have risen up to accommodate both a growing number of freelancers and a greater

[262] "Year in a word: Gig economy," *Financial Times,* December 29, 2015, www.ft.com/content/b5a2b122-a41b-11e5-8218-6b8ff73aae15

numbers of entrepreneurs working outside of fixed, corporate settings.[263] Moreover, start-up shops working on wearable and sensor-embedded technology frequently employ data analysts, computer developers, and data visualization specialists trained at one of the many coding camps and academies that have become vital career retraining centers for a rapidly shifting work culture. In these settings, management philosophies like *Lean* and software development frameworks like *Agile*, dominate.[264] Lean and Agile emphasize attunement to change, cultivating an organizational and management style that is marked not only by a lack of heavy corporate structure or intransigent business plans but by a constant orientation toward contingency, modification, and fluidity of motion.

Constant job instability and ceaseless mobility between "gigs" characterize the business environment in which contemporary wearable and sensor-embedded tools are produced. As I conducted my research, several of the wearables makers pegged for success, such as Basis, Jawbone, and Zeo, have all but gone out of business.[265] These closures have sent shock-waves through the self-tracking circles as people mourned the sudden discontinuation of their favorite gadgets and faced frustration over the reality that the data they collected will no longer be accessible or supported by the original parent company. The closures were widely experienced as a surprise. However, both the user and the industry expectation that data sets will be organized

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[263] Crowdsourcing platforms like Kickstarter.com, where regular people can invest money in a rising venture (often in exchange for a finished prototype, not equity), have become an increasingly popular supplement to more formal venture capital money. Many venture capital firms only invest in companies that have first gathered sufficient popularity and money through a crowd-funded campaign. For many institutional investors, these early money-raising schemes act as initial "proof of concept." Start-up accelerators are temporary programs often hosted by larger companies. Companies typically invest "seed money," often taking an equity stake in the fledgling business, and provide financial, administrative, and marketing support to a "class" of such entrepreneurs for a period of one or two years.

[264] See: Eric Ries, *The Lean Start-Up: How Today's Entrepreneurs Use Continuous Innovation to Create Radially Successful Businesses* (New York: Crown Publishing Group, 2011); Robert C. Martin, *Agile Software Development: Principles, Patterns, and Practices* (New York: Pearson, 2002).

[265] Jawbone is still operational but has recently announced that it will shift corporate attention and funds away from consumer-focused wearable technology for which it has become known.

and gathered together in the "cloud" in ever more comprehensive forms to be stored for posterity are antithetical not only to cycles of technological innovation pegged to the market but also to the business climate in which many of the self-tracking tools presently operate. The financial success of FitBit, which in the course of my research has grown from a tiny, eccentric Silicon Valley company to a publicly traded corporation, offers hope that small companies could really blossom into full-blown businesses. FitBit, however, is an exception rather than the rule. The greater number of the companies I've been in contact with or whose story I followed during research, have closed shop. Many others work, raise money, develop, and toil in the hopes of a large corporate buyout. That is the "exit strategy" for the greater portion of self-tracking entrepreneurs. Therefore, "moving on," as Ilana Gershon posits in a new book on the perpetual mobility of contemporary work, has become "the new normal."[266]

In this context of heightened (employment) flexibility, insecurity, and instability, in a work culture all but defined by perpetual change, a person stiffened by experience or circumstances resonates both as a contemporary reality as well as a cautionary example. Instead, people are enjoined to "lean in," as Sanberg had counseled, to remain flexible in the face of contingency, to adopt and remain open to change and perpetual mobility rather than struggle against it. Leaning in – the modern power pose, the aerodynamic posture of least resistance and maximum forward momentum – characterizes what I have called *the (moral) economy of gestures*. This, too, is part of Beau's hopeful image of a frictionless universe, the "New Normal," as he had labeled it. It is a world marked not only by a lack of obstructions but also by the absence of personal resistance to change. Hard numbers today increasingly condition soft, pliable

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[266] Ilana Gershon, *Down and Out in the New Economy: How People Find or Don't Find Work Today* (Chicago: University of Chicago Press, 2017).

bodies. On the one hand, technology suggests itself as a steward toward change and improvement; on the other is self-tracking, which only marks the need to keep pace with perpetual iteration**.**

Some social critics worry that contemporary tracking tools only reinstate the forms of corporate surveillance that characterized the Progressive Era. I agree that, like the tactics of scientific management consultants like Frederick Taylor or inventions of Etienne-Jules Marey and the European scientists of work, self-tracking is once again implicated in corporate training of bodies, and not simply because corporate Wellness departments are among the biggest consumers of wearable technology such as the Fitbit.[267] However, unlike the techniques of the former, the goal of this contemporary form of oversight is not just the manufacturing of a more productive and efficient workforce that tunes its gestures to the rhythms of the clock, nor is it only about a new and more pervasive form of corporate monitoring. As I have tried to demonstrate, self-monitoring tools today also articulates and promote principles of flexibility and agility that are more generally demanded by the gig economy.

This embodied attunement to endless movement, adjustment, and change constitutes a different *(moral) economy of gestures* than its Progressive Era counterpart. These devices are developed by burgeoning entrepreneurial community that both reflects and typifies the iterative, flexible subjectivity contemporary self-tracking devices help nourish and engender. The lessons these devices ask us to learn with our bodies are precisely those of the agile gestural vocabulary that aims to synchronize digital flows with the flows of hands, feet, limbs, and bodies now

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[267] Corporate Human Resource offices and Wellness departments have emerged as the key consumers for wearable devices. Many companies see the corporate office as the true customer. One of the companies where I had conducted fieldwork openly stated this as their business strategy. FitBit made headlines, to the frustration of my interlocutors, when they announced a deal with Target to give out FitBit devices to each of their 10,000 plus employees. “That should have been us!” the CEO railed. They have since gone out of business.

increasingly demanded by the “gig” economy. The next chapter will continue to explore the relationship between the technology market, flexible labor, self-tracking, and the Quantified Self.

PART III:

COMMUNITY

"The Quantified Self is a real community, with real people all over the world, [who] are doing a thing – which is talking about themselves using data," explains Gary Wolf as we talk over the phone about the Quantified Self. There was that word again, "community." Although it felt ordinary now, it wasn't always apparent that the Quantified Self would indeed become recognized as a community. When Wolf and Kelly first coined the name "Quantified Self" as they took stock of the growing numbers of digital monitoring tools they saw around them, they did so without a qualifying descriptor that would signal more readily that for which the term stood. At the time they crafted the expression, it was no more than a journalistic flourish. In authoring the term, they were not even certain in which format precisely the Quantified Self would appear, whom it would appeal to, or in which direction it would evolve. Would it be the label of a technology trend, the name of a blog, the headline of a magazine article, or the title of a set of events, and would it gain public attention at all? With an imagined audience still left vague at its inception, the Quantified Self was an expression initially developed as a thought-starter as much as a placeholder.

Today, the name "Quantified Self" often feels stymied by its own linguistic "ambiguity," as Wolf had once characterized to me what he and Kelly saw as the expression's original appeal. So, participants now reach for additional descriptors like Meetup, group, movement, and most commonly, community to ground the seemingly amorphous concept in more specific terms and routine practices like meeting regularly to talk about one's use of self-tracking tools and personal data. On first pass, all of these terms appear interchangeable, articulating little more than the reality of the Quantified Self as some kind of organizing body. Community can thus be read here as a generic term, as simply one more noun for group unity. In conversation about the Quantified Self, the term "community" is indeed often used as though it were comparable to any other. It's

frequently strung together with its linguistic substitutes in a single sentence as a staccato of modifiers.

Despite the casual way in which the term "community" is used to qualify the work of the Quantified Self, there is value in looking at the term more closely, especially given that during my research, "community" seemed to have appear with greater regularity than other labels appended to the tail end of the Quantified Self. In the two chapters that follow, I dwell on the particularity and the specific social function of this modifier. In thinking about the conditions for and the significance of community in the context of the Quantified Self, I explore what community represents as well as what it occludes.

Rather than take the commonplace characterization of the Quantified Self as a community for granted, Chapter 4, Searching for Community, evaluates what this turn of phrase says about the relationship of the Quantified Self to the self-tracking industry. The Quantified Self is also frequently hyped as a community that is quickly expanding around the globe. Chapter 5, United in Difference, will explore the conjuring of the Quantified Self as that which is at once limited, circumscribed, and open-ended, even limitless. I examine the way the Quantified Self conceived as a community is seen to both stress and transgress limits, to different ends. Doing so, I argue, reveals larger dynamics and organizing principles that shape contemporary digital self-tracking.

Chapter 4: Searching for Community

The concept of the Quantified Self as a community that I will unpack in this chapter can be expressed in terms similar to the ones set up by the following *New Yorker* cartoon (Figure 31). On first pass, given that the scenario is set in a space with an office desk, a computer, and documents scattered throughout, it may seem obvious that the image depicts two colleagues at work, one pausing in the doorway to speak to another, perhaps just before departing to a space that is set in a binary relationship to the office: the home. The caption under the drawing

Figure 31: David Sipress, New Yorker Cartoon, May 2017

throws the scenario off balance. "I can't remember – do I work at home or do I live at work?" it reads. Whether this is a domestic or a professional scene suddenly becomes unclear. If the boundaries of the space initially appeared to be well defined, the instability between the office and the home suddenly takes on an uncanny quality. Moreover, who is speaking? As the referent of the caption remains unmarked, whether it points to the speech of one of the characters, to their internal dialogue, or even to the thoughts of the readers at large is left ambiguous. For the reader of the magazine, the uncertainty of the scene is meant to feel familiar. Like the duo featured in

the illustration, many of the readers have likewise likely become simultaneously loosened from the rigid confines of an office – and often, in the contemporary flexible work environment that I described in the preceding chapter, even from the stability of a reliable job – and fastened to their computers that keep them in constant embryonic connection to their job, or in search of one.

For many participants and observers of the Quantified Self, it likewise at first appears self-evident that the Quantified Self constitutes a community of self-tracking enthusiasts who gather to share and discuss their mutual interest in data, and where the boundaries of that community lie. The framing of community offers to see the relationship between the Quantified Self and industry as a binary one, presenting the Quantified Self as a hobbyist space for tinkerers with gadgets and data that is set apart from wider market concerns. I argue that the Quantified Self is instead structured by the same double move as the one that animates the *New Yorker* illustration: by the desire to set and imagine sharp boundaries between the Quantified Self as a community and the professional world, but also by their dissolution. Construed as a community, the Quantified Self sets up but ultimately collapses the distinction between the Quantified Self as a space for play rather than work, revealing the boundary between the two domains to be a porous one.

I will begin by examining how this binary is produced and the kind of labor and social logic uphold the view of the Quantified Self as a separate, bounded site located to the side of commercial interest. I insist, however, that Quantified Self has to be seen as a group that is as much a product of Silicon Valley neoliberal tech-entrepreneurialism as an integral part of it. In addition to group rhetoric, contemporary forms of capital promote a particular idea of a community as both a social group and an experimental site productive of the tech industry. The porous relationship between the Quantified Self and the market defeats the possibility of seeing

the Quantified Self as a segregated idea. The "search" in the title of this chapter is therefore meant to resonate as a double entendre. It indicates the desire of observers and participants to see and discover the Quantified Self as a specific kind of community for enthusiasts of self-tracking, but it also names my own search for a stable community whose parameters invariably dissolve on closer analysis.

The Limits of the Quantified Self Community

The framing of the Quantified Self as a community may feel familiar, even nostalgic. The investment in developing the Quantified Self as a community can, in part, be placed in the context of a wider role the notion of community has acquired in recent years, one that sees community as a new and bounded social unit. The idea that the Quantified Self constitutes just such a distinct social form is influenced by the recent surge in communitarian thinking, which I will presently discuss. Although in the second half of this chapter I will challenge the idea that the Quantified Self as a community can be abstracted, as is often claimed, from wider market forces, first I want to consider how it is drawn up as a distinct and bounded site, and how the parameters of what may constitute the Quantified Self are repeatedly defined for participants and observers alike.

Contemporary interest in community can be attributed to the work of authors like Robert Putnam and Sherry Turkle. Read widely in and beyond the academe, Putnam and Turkle are among the category of critics who have raised a rallying cry over what they perceive as a marked decline in American forms of community.[268] These authors, writing largely in the 1990s to early

[268] See also: Robert Bella, *Habits of the Heart: Individualism and Commitment in American Life* (Berkeley: University of California Press, 2007 [1985]); Amitai Etzioni, *The New Golden Rule: Community and Morality in a New Democratic Society* (New York: Basic Books, 1996).

2000s, have evaluated a variety of shifts in the post–World War II United States to find a progressive degeneration of group ties as evidenced by a transformation in American public life, forms of communication, leisure, housing patterns, and even the destabilization of the traditional family. For Putnam, a renowned Harvard political scientists, the loss of community has become particularly well expressed in the gradual disengagement from membership in religious, civic, or social groups over the course of the last few decades. In his work, *Bowling Alone: The Collapse and Revival of American Community*, the trend away from community crystalizes around bowling.[269] The decline in participation in bowling teams since World War II emerges both as a metaphor and as a sign, representing a more generalized retreat into solitary individualism, which, Putnam feels, has reached an alarming tipping point by the end of the twentieth century.

Sociologist Sherry Turkle's large body of work has similarly focused on diagnosing a contemporary withdrawal from social connections. Across several books published in the last two decades, titles that now also include her 2015 book *Reclaiming Conversation: The Power of Talk in a Digital Age,* she turns her ire on digital technology, which, she proposes, has helped people become practically more connected to one another, but also to become more emotionally disengaged from one another.[270] Correlating in-person communication with authentic social ties, Turkle laments the continuing spread of social media platforms and smartphone technology as a sign that people have by and large retreated behind their phones and away from social interactions that help build community.

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[269] Robert D. Putnam, *Bowling Alone: The Collapse and Revival of American Community* (New York: Simon & Schuster Paperbacks, 2000).
[270] Sherry Turkle, *Reclaiming Conversation: The Power of Talk in a Digital Age* (New York: Penguin Books, 2015). See also, Sherry Turkle, *Alone Together: Why We Expect More from Technology and Less from Each Other* (New York: Basic Books Group, 2011); *Life on the Screen: Identity in the Age of the Internet* (New York: Touchstone, 1995).

However, even work that seems to challenge Putnam and Turkle's findings that American society has experienced a fundamental loss of community in recent decades does so largely to propose an alternate direction, suggesting instead that forms of community have become amplified in the postwar years. For these authors, the evidence lies not only in the social movements of the 1960s but also in the emergence of a wide range of new forms of solidarity that have cohered around political and social identity, including gender, sexuality, and race.[271] These new collectivities have been buoyed, rather than stymied, many critics contend, by digital technology, allowing people, in the manner of Ben Anderson's "imagined community," to view themselves as part of new aggregates even as they are spread across greater and greater distances.[272]

Both the mourning of contemporary loss of community and the celebration of its growth largely take place against the background of neoliberal policies that have, in recent decades, heaved more and more responsibility onto the shoulders of individuals. In the face of declining federal or private forms of support, community is thus oftentimes conceived as an interstitial network, as that which has formed (or, as Putnam and Turkle worry, has failed to form) in the space opened up by neoliberal policies, globalization, privatization, and the accompanying retreat from social welfare programs. So much has the greater social fabric frayed that sociologist Nikolas Rose wondered whether the notion of "society" itself "has begun to lose its self-evidence."[273] As social groups become increasingly reorganized in and by localized

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[271] David Meyer and Sidney Tarrow, *The Social Movement Society* (Lanham, MD: Rowman & Littlefield Publishers, 1998).
[272] Benjamin Anderson, *Imagined Communities: Reflections on the Origins and Spread of Nationalism* (New York: Verso, 1983). For new forms of social aggregates formed in the shadows of technical work, see Chris Kellty on "geek" as a new affinity group: Christopher M. Kelty, *Two Bits: The Cultural Significance of Free Software* (Durham, NC: Duke University Press, 2008).
[273] Nikolas Rose, "The death of the social? Re-figuring the Territory of Government," *Economy and Society* 25, no. 3, 327–356 (1996), p. 328.

communities, not in societies united by governments or geography, Rose asks whether his home discipline of sociology has itself entered "something of a crisis of identity."[274] Formally a territory of government, society, Rose notes, has now become reconfigured around community. Rose suggests that many now look for society to become "regenerated, and social justice to be maximized, through the building of responsible communities, prepared to invest in themselves."[275] These theorists propose to see community as an important interstitial network that has filled in the gap evacuated by government or produced by bureaucracy and mass society.[276]

When conceived as a tertiary and bounded site, the notion of community also revives Jurgen Habermas's earlier conceptualization of the role of nineteenth-century salons and cafes as third spaces, environments he saw as crucial intermediary sites that operated outside of direct influence of politics or commerce.[277] As mediating spaces, cafes and salons, in Habermas's view, were able to act not only as meeting grounds but also as more neutral and objective venues where critical discourse and political consciousness could flourish. Much like Putnam and Turkle who are writing in Hagerman's wake, Habermas laments what he sees as the progressive substitution of critical third spaces where people could meet in person, debate, and mingle, with solitary, passive, and uncritical media consumption. In fact, for early theorists of the internet, online communication held the promise of reversing the passive media consumption promoted by other mass media like television, which Haberams had criticized. Internet forums and blogging platforms were originally hailed by critics and enthusiastic early users as platforms that

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[274] Rose, "The death of the social?," p. 328.
[275] Rose, "The death of the social?," p. 333.
[276] Rose, "The death of the social?," p. 328.
[277] Jurgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry Into a Category of Bourgeois Society* (Cambridge: MIT Press, 1991 [German original, 1962]).

would help revitalize thirds space of this kind, helping create new communities of engaged citizens.[278]

These are precisely the terms through which the Quantified Self is often framed as a community.[279] Participants, pundits, and even social theorists generally refer to the Quantified Self as a community formed in the space opened up by neoliberal policies, particularly in the gap left open in medical care and health; as a "community" that increasingly organizes patient advocates, tinkerers, and motivated individuals eager to take their health into their own hands.[280] In turn, the Quantified Self events are largely viewed in the manner of Habermasian salons, as sites that offer a privileged and separate third space for participants to gather and discuss their interest in personal data free from the influence of power, sites that help cultivate both individual critical capacity and a mutual ability to speak back to power through a consolidated front.

The sense that the Quantified Self constitutes a community set apart from power or that it has cohered in a vacuum of power is not simply produced rhetorically. It derives largely from an organizing framework developed by Wolf and Kelly, which has visually bifurcated the Quantified Self events into two parts: The Demo Hour and the Show and Tell. This separation sets the tone for the way the Quantified Self activities are both narrated and structured. I will challenge this dichotomy in a later portion of this chapter. Before I do so, I first want to explore how opposing the Quantified Self to commercial interests in this way only helps advance the

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[278] Aaron Barlow, *Blogging America: The New Public Sphere* (Westport, CT: Praeger, 2008).
[279] Sociologist Whitney Erin Boesel, for instance, has suggested to separate between the Quantified Self in the title case and the "quantified self' in the lowercase, the former designating the members of the organization the Quantified Self and the latter referring to the companies creating self-tracking technologies. See Whitney Erin Boesel, "What is the Quantified Self now," *Cyborgology*, https://thesocietypages.org/cyborgology/2013/05/22/what-is-the-quantified-self-now/
[280] Dawn Nafus and Jamie Sherman, "Big Data, Big Questions: This One Does Not Go Up To 11: The Quantified Self Movement as an Alternative Big Data Practice," *International Journal of Communication*, Vol 8 (2014); Tamar Sharon and Dorien Zandbergen, "From data fetishism to quantifying selves: self-tracking practices and the other values of data." *New Media & Society*, March 9, 2016

language of "us" and "them," and thus defines for participants where the boundaries of community lie – parameters that establish the idea that the Quantified Self constitutes a distinct, bounded community.

The Quantified Self events generally either open or close with the Demo Hour. During the Demo Hour, vendors stand behind desks presenting products as people trickle in and mingle, casually moving between tables as they sample business ideas on display that night. Given that the Demo Hour takes place either at the start or at the tail end of the evening, during this portion of the night, lights are kept on and refreshments are generally available, amplifying the atmosphere of the Demo Hour as a precursor or the finale to the main event. During this time, tools and technologies are served up as a sideshow, along with wine and appetizers (Figure 32).

Figure 32: Demo Hour Showcase

In contrast to the more abstract socializing of the Demo Hour, the Show & Tell talks are staged as the explicit site and purpose of community organizing. Only when lights are dimmed, and everyone sits down in chairs or tables arranged in theater-style rows to listen to a set of three or four presentations about self-tracking approaches delivered by the participants of the Quantified Self do the meetings formally begin. To further mark the start of the presentations as the proper site of Quantified Self organizing, leaders of the local groups typically use this time to make formal introductions and announcements. A brief explanation of the Quantified Self often

follows for the benefit of those who are in the room for the first time, remarks that often review for the newcomers the story of the Quantified Self as a community on the rise organized by dedicated members the world over invested in the possibilities of self-tracking. Although by this point people have already had the chance to meet, organizers also frequently use this time to lead a small icebreaker exercise to further stimulate a sense of conviviality within the group. Following the example of the original meeting convened in Kelly's home, the icebreaker exercise typically involves expressing in a few words what drew someone to the Quantified Self that night. Given that any one meeting has a large number of new visitors, something that is frequently noted as an icebreaker exercise is introduced, this activity renews the sense of community that may have otherwise become frayed as people cycle in and out of the Quantified Self over months and years. After these formal greetings, speakers are introduced and take their turns at the head of the room to talk about their experiments and experiences with self-tracking and personal data (Figure 33).

Figure 33: Attendees seated for a Show & Tell presentation

That the personal stories and experiments of group members rather than the showcase of tools developed by commercial vendors are seen to constitute the central activity of the Quantified Self is further highlighted through the different formats of the Demo Hour and the Show & Tell talks. Unlike the Demo Hour, which features companies openly hawking their wares and inventions, the Show & Tell presenters are always asked ahead of time to speak in the first person and to discuss their experiences with data collection as a personal discovery rather than as a general sales pitch, even if, as often is the case, that activity has also led the presenter to develop a service or a tool that the talk surreptitiously promotes. Couching the presentation in personal tones helps maintain the desired partition. Although making a presentation about one's self-tracking experiences is not a requisite part of engaging with the Quantified Self, one may simply sit in the audience and listen, in distinguishing the style of delivery between the Demo Hour and the Show & Tell, the Show & Tell is thus further marked as a site for members, while the Demo Hour is distanced as a space for vendors.

The specific language used at Quantified Self events is another critical element of the performance that both anticipates and produces Quantified Self as a community set apart from the market. In particular, participants in the Quantified Self are most commonly described as "members." The language of membership is especially interesting given that Quantified Self, for one, has no formal recruitment process. "Joining" the Quantified Self simply involves attendance at one of the many events. Membership is itself interesting terminology, considering that there are no formal membership dues. On occasion, organizers of local events do ask people to contribute a few dollars to help offset small expenses like food and drinks, and conferences put on by the Quantified Self charge an admission fee largely to subsidize the venue rented for the

occasion. By and large, the language of membership and friendship is symbolic, helping produce rather than merely describe the sense of unity in the group.

By thus separating events into the Demo Hour and the Show & Tell, the Quantified Self events establish a hierarchy where entrepreneurial activity is not only visually separated but also practically marginalized and made subordinate to individual experiences with data. Through the opposition, the self-tracking industry is constructed and experienced by participants as the other against which Quantified Self can build its sense of unity, and as the negative against which the feeling of community can cohere.[281]

Wolf and Kelly present the internal division between vendors and members both as a natural partition and as a guide. And in theory anyone can create a Quantified Self event in their area. In practice, actively maintaining and endorsing this binary acts as the condition of participating in the activities of the Quantified Self. New chapters are vetted by senior leaders like Wolf and Kelly, and organizers are explicitly asked to adhere to this organizing framework, the guidelines for which are set out on the Quantified Self website.[282] During conferences, organizers are often additionally mentored to support this structure. In soliciting or evaluating talks, participants and presenters are similarly asked to respect these rules and parameters. Modeling a conversation an organizer might have with an interested presenter, Wolf explained to me:

> As long as they want to give a talk in the first person, that's kind of our rule. So if they want to talk about self-tracking, they can get up and talk about it. [But if they say,] "I have an idea for how I can help millions of people with my inventions though of course I never tried it and it's not really me that I'm talking about," then usually we try to say, "Look, there are a lot of Meetups for tech entrepreneurship. Maybe that's a better place

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[281] Judith Butler, *Bodies that Matter: On the Discursive Limits of "Sex"* (New York and London: Routledge, 1993).
[282] http://quantifiedself.com/how-to-start-your-own-qs-showtell/

> to go and give that talk." But if someone wants to talk in the first person about what they are doing with their own data, we're open.[283]

Although there are no strict penalties for either the organizer or the presenter who bends the rules, Wolf regularly censors the public use of the term "Quantified Self" to ensure that it matches with activities that support the presentation of the Quantified Self as extra-market activity.

> Having this kind of thing [the Quantified Self], that's kind of a 'non-proprietary' trademark is how I would call it. Like it's clearly a thing. And we can search for it, and we can know, "are you identifying yourself as part of Quantified Self?" But we don't like to send people letters – if they do something with it that we don't like and say … well actually we do, but they are not legal letters. I might send them a note and say, "I don't see that as very similar to what other people are doing in Quantified Self. Is there another name you can use that would be less confusing?" …
>
> If someone wants to do a Meetup "Getting More Productivity Out of Your Employees Through Wearables: Quantified Self as a Tool of Management" – this is a meshing together of real examples; it's a synthetic example, but stuff like that happens – I might send them a note and say, 'That seems very much like a managerial, administrative kind of technology, an enterprise thing. It's all very much – there is a lot going on. But Quantified Self is a real community, with real people all over the world, [who] are doing a thing – which is talking about themselves using data. And when you call How Do You Get More Work Out of Your Employees Using Wearables, Quantified Self, you're just inviting a lot of friction and confusion. So what if you didn't?"

Furthermore, at conferences hosted by the Quantified Self, Wolf accepts corporate sponsorships, but in the manner of Demo Hour/Show & Tell split, frets about sponsors setting up oversized displays (something otherwise standard, even expected at technology conferences, as I had discussed in the previous chapter), worrying that by emphasizing tool makers he would inadvertently take attention away from tool users. By collapsing the distinction, he fears, the Quantified Self would also become just another trade show.

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[283] Wolf, interview with the author, June 2016.

Power, especially modern power, as Foucault has argued, is diffuse rather than centralized.[284] The framing of the Quantified Self as something that is indeed naturally split along these binary lines rather than purposely divided has become so internalized and accepted in the Quantified Self circles that members often police one another. When the founder of the company *Emberify* (self-styled as a "Contextual Quantified Self & Life-logging Platform"), a regular contributor in Quantified Self online forums, shared a report his company had put together on the "State of Quantified Self in 2016," he explained the project thus: "We crunched some statistics around the Quantified Self and covered some interesting products from 2016." Another contributor to the group promptly intervened with a suggestion: "Interesting blog. However, I would change the title to 'The State of Wearables in 2016.' But still, many QS-ers use wearables." If people at times complained about Wolf's and Kelly's formidable influence and their structure's strict parameters – Chris Dancy, in one of our conversations, even calling it an "iron grip" – participants mostly felt that it was doing necessary work. Everyone accepts Silicon Valley [Meetup that Wolf and Kelly organized] as the "mother ship and respects the directives that came out of it," explained one participant to me, a sentiment that seems to have generally been echoed throughout.[285] By and large, their curatorial efforts were welcomed as having a purifying influence.

I thought back to the friction-filled conversation I had with Chris over drinks with my acquaintances from the Quantified Self with which I opened this dissertation. On the one hand, an ardent interest in gathering personal data for many seemed like a qualifier for membership. Continuous, uninterrupted self-tracking, the kind that Chris engaged in, clearly operated as the

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[284] Michel Foucault, *Discipline & Punish* (New York: Vintage Edition, 1995).
[285] Field notes, January 2016, on file with the author.

authenticating image of a "true" QSer, as participants were often pithily called. When I approached people for a conversation about self-tracking at Quantified Self events, many immediately claimed exception, saying that they are not really "true" QSers because they, after all, only tracked sporadically or strategically.[286] Or perhaps they were there to meet the "true" members who may take interest in the technology they have made. Still, to some, Chris' often theatrical display of his interest in personal data started to feel unreal. What seemed especially troublesome was his opportunistic peddling of his digital explorations. "Although I am an avid self-quantifier," Bob Troia, a frequent contributor to the Quantified Self in New York, wrote as a disclaimer on his website, "I make no claims about being the 'most quantified' person in the world (nor do I desire to be), nor would I ever claim to be the first person to share my data publicly, as folks like Beau, Buster, and Naveen have been doing so for some time."[287] The words "most quantified" had a hyperlink embedded within them connecting readers to an article about Chris.[288] Chris's pseudo-celebrity status and self-promotional evangelism made others question if his interest in self-tracking could be genuine, if it could even be taken seriously. Wolf's close involvement was thus mostly seen as a useful intervention that only helped push back capital's opportunistic and covetous gaze.

And frequently, the framing of the Quantified Self as a bounded community helped foster the sense of the Quantified Self as a united front through which members can start to make

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[286] QSer is a common shorthand for someone involved in the Quantified Self group
[287] Bob Troia, "Introducing BobAPI – a personal API to collect and share all of my life data," *QuantifiedBob.com,* October 27, 2016, www.quantifiedbob.com/2016/10/personal-api-bobapi%E2%80%8A/
[288] The hyperlink connected to the following article about Chris Dancy: Samantha Murphy, "Meet the 'Most Connected Man" in the World, *Mashable.com,* March 13, 2014, http://mashable.com/2014/03/13/most-connected-man-in-world-chris-dancy/#Hutt_lx1Dqqz

demand on corporations, like advocating for companies to make personal data more accessible. Noted one participant:

> I've been part of the conference and I've done some Show and Tell talks. And I just meet people this way. And people I've interacted with, I just know some of their software. And then just hearing more about the data and the access challenges. And realizing, you know, I've encountering these and I could maybe be an advocate for some of these tools that don't have a data export. And because that's sort of a global initiative of the Quantified Self community, it's given me a little bit more confidence to be like: "Hey, Fitbit, fix your data export because this is ridiculous. You can't make people do this a month at a time." Or to tweet at a company that doesn't have data export when I am using their product and tell them – this is killing my joy at using their product. I feel a little bit more behind me than just me complaining. I feel more justified in complaining about the lack of access to my own data.[289]

Blurring the Lines of the Quantified Self Community

The tenaciousness with which the boundary between the Quantified Self community and commercial ventures is policed and reinforced already puts the neat division between the Quantified Self and the market under duress. Just as the critique of the relativist concept of culture has exploded the possibility of seeing the distant lives of others as though they were figurative islands set apart from larger forces, so the Quantified Self cannot be read as a community divorced from the very forces that shape it. Rather than simply ask about the forms of solidarity Quantified Self as a community congeals, I want to think about that which the notion of community conceals.

In doing so, I follow a challenge issued by Michel-Rolph Trouillot to dispense with the term "culture" altogether – here, substituting "community" as the term to be momentarily suspended. Forgoing the word "culture," Trouillot argued, serves not to disregard the various

[289] Interview with the author, April 2015.

ways in which human activity becomes patterned, but instead to expose and expand the types of patterns, particularly those shaped by power, capital, and history, that are shielded from view by a reified notions of culture.[290] In the context of the Quantified Self, the term "community," has a similar blinding effect: it obscures more than it reveals. If we then momentarily dispense with the term in considering the Quantified Self as an organizing body, what other patterns and connections could surface to evaluate the makeup and the social influence of the Quantified Self? The Quantified Self is more than an interstitial site that has emerged in the gap between private and public networks of support. While construed as a bounded community explicitly situated to the side of the self-tracking market and at a critical distance to it, it is important to recognize that the Quantified Self has in fact been profoundly shaped by, but also itself helps shape, the very same economic and cultural forces that the Quantified Self as a community formally holds at a distance.

Rather than accept that the Quantified Self does indeed constitute a community whose boundaries are apparent from the start, I ask about the forms of power that authorize the stratification of the Quantified Self as a hobbyist activity divorced from the market, in the first place. Indeed, for Max Weber, who saw capitalism as fundamentally rooted in a Protestant work ethic that requires a form of arduous, continuous labor that borders on the devotion of a religious "calling," the separation between the private and the commercial spheres under capitalism was less pronounced than it may at appear, from the start.[291] Marxist scholars have further argued that the separation between leisure and work, just as between home and office as the nonproductive

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[290] Michel-Rolph Trouillot, *Global Transformations: Anthropology and the Modern World* (Palgrave Mcmillan: New York, 2003).
[291] Max Weber, *The Protestant Ethic and the Spirit of Capitalism* (New York: Penguin Group, 2002 [1905]).

domain and a productive sphere, respectively, is an aftereffect of capitalism rather than its precursor.[292]

The invoked separation between the Quantified Self as a hobbyist community and the market, I argue, has to be read in similar terms. Despite the self-styling of the Quantified Self as a community that exists aside from, or at least moves in parallel with, contemporary forms of tech capitalism, the Quantified Self has to be seen as a concept that is as much a product of Silicon Valley neoliberal tech-entrepreneurialism as it is an integral part of it. Arguing – and searching for – community as a sight removed from the market obscures the porosity between the Quantified Self and the technology industry. Even though the Quantified Self constructs its identity, and indeed sources its sense of community, from the distance it performs from industry concerns, the Quantified Self is fundamentally structured by and also structures industry practices. In this section and the section that follows, I examine how the form of community that the Quantified Self makes possible does not simply represent the colonization of leisure by commodity value. Rather, community here is something that becomes established in the service of tech-capitalism and that which originates from within it.

The fusion rather than the distance between the organizing work of the Quantified Self and the technology industry at larger is visible, for instance, in a modern office that sets itself as a site of both personal and professional pursuits. Taking a lead from large conglomerates such as Google, corporations have increasingly begun allotting time for private interests in an

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[292] It is in this vein that feminist critics have proposed to collapse rather than to uphold the distinction between labor in the home and the market. Rather than view the home and the office in fundamentally binary terms, these scholars insist on recognizing the continuity and the connections between women's labor in the home and men's labor in the market. Doing so, these scholars propose, only helps reframe and reclaim family life – and women's labor – in productive, economic terms. See, for example, Eli Zaretsky, *Capitalism, the Family, and Personal Life* (New York: Harper and Row, 1976).

employee's workweek. Often this involves allocating a certain day (say, Friday) or a given number of hours per month for personal development. Companies employ this strategy to entice young professionals looking for a better work/life balance, ostensibly offering rising employees the chance to pursue hobbies on company time. However, this approach is also intended to benefit the organization that hopes that employees' personal pursuits will open opportunities for new business ventures. As a result, the passions that employees end up pursuing during these periods often strategically align with their professional goals.

The Quantified Self plays a central role in this dynamic. On the one hand, its self-presentation as a purely hobbyist space recommends the Quantified Self as a suitable preoccupation for someone to peruse in their off-work hours. On the other hand, many in fact flock to Quantified Self events precisely because they present an opportunity for professional development that could be well leveraged at one's place of work. Therefore, while my interlocutors first situated their attraction to the Quantified Self in their personal interest in engineering or data science, many also later revealed in conversation that they in fact became involved with the Quantified Self because doing so helped them both leverage and expand their professional selves. For Sharon, her interest in personal data bled directly into her professional life as a product manager for a data company:

> It's helpful for me on the personal side but also now on the professional side too because I understand the process of cleaning up data and using the tools we actually are developing actively and offering feedback back to the developer. So it's almost been this marriage of my personal and professional life. To the extent that it's part of my job to play with data to some extent.[293]

[293] Sharon, interview with the author, October 2015.

For Ben, an engineer, his interest in the activities of the Quantified Self originated not only in his love of data and engineering but the expectation that employees at his job cultivate interests that may contribute to the company's bottom line:

> They have what they call a white space program where you can kind of go off and work on your own thing – either for professional development or to experiments with new products that may help the company. And there are a few of us here that are experimenting with how self-tracking applies to small business, which is one of our key customer segments. And how that tracking can improve their business – a lot of Internet of Things (IoT)-type stuff. But because most small businesses are sole proprietorships, the business is the self. So we think about how it [IoT] can help improve efficiency or make a small business more effective. Good for small business. So, [there is a] small amount of crossover.[294]

Aaron, who works for a large database company, saw the Quantified Self as a new direction in which he could help push his firm, and at a Quantified Self conference we both attended he was particularly impressed with stories of self-tracking projects that turned into full-fledged commercial tools. Right now, he explained to me, the company he works for is

> in a business-to-business sort of scenario. The whole company is designed around that. We really do not have any business to consumer expertise. … Which kind of leads me to think that maybe a partnership with another company or having a subsidiary company kind of take on something like this would be pretty good.[295]

The blurring of the lines between the personal and the professional can also be seen at the level of infrastructure. Again, following the early lead of companies such as Google, it has become an industry standard, if at times only at the level of expectation and desire, to incorporate elements of fun and entertainment into office settings to the point of cliché, offering sites for relaxation and socialization over yoga or a game of Ping-Pong to overtaxed professionals. By

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[294] Ben, interview with the author, June 2015.
[295] Aaron, interview with the author, July 2015.

offering stress relief and entertainment, the setup is thus also meant to encourage people to remain at the office longer and longer, to use the office as a site of both work and play. As I visited various start-ups throughout my research, I was constantly surprised to hear people apologize to me when such amenities were lacking, as though worried that their absence would be perceived by me as some kind of flaw.

The professional settings of most of the Quantified Self meetings I've attended is largely framed by this view of the office as a mixed-use space. Some of the first Quantified Self events were occasionally held in organizers' garages or living rooms, the first event most notably organized in Kevin Kelly's home. Most of the more established events that I attended, however, have long transitioned to corporate settings, to offices, moreover, that were in one way or another associated with technology and entrepreneurialism. In Boston, meetings were generally held at the Microsoft's Cambridge NERD (New England Research and Development) Center. Microsoft not only offered free use of their conference space but also generously catered an impressive, healthy set of snacks for attendees. In New York and in Washington, DC, events were often held in WeWork locations, a popular coworking site were entrepreneurs and freelances rent offices and share facilities. Quantified Self participants who rented office space from WeWork and had access to shared conference rooms made it possible for WeWork to serve as the occasional site where the Quantified Self events could come together and organize. At other times, space was made available by WeWork or related co-working sites to organizers of the Quantified Self free of charge, using the event as an opportunity to showcase its offices to entrepreneurs and freelancers who were likely to be in the audience.

While providing a space for after-hours socializing seems to endorse the office as a space for entertainment, not just work, this setup also proposes to see events that take place during off-

work hours only as an extension of office activity. That the Quantified Self events not only typically take place after-hours and during the work week but are also generally hosted in corporate offices in metropolitan centers, with convenient access for the urban professional elite, only further stresses the professional rather than simply the hobbyist nature of the Quantified Self. Even when events took place in private homes, doing so only leveraged the lore of the garage or the home as the premier site of creative entrepreneurial activity. And while my interlocutors occasionally felt nostalgic for the more intimate feel of these earlier gatherings, many also remarked that sleek professional venues like WeWork made the Quantified Self feel more "real," even more important. In the context of these commercial settings, the Quantified Self could be seen as something more legitimate, no longer just a "bunch of geeks getting together," as one person noted with a mix of wistfulness and pride.[296]

Even as the Show & Tell talks propose to distance the Quantified Self from the work of tech-entrepreneurialism, in their emphasis on the personal they also recall the format of the business pitch that often mandates that budding entrepreneurs frame their inventions and interventions as extensions of personal rather than fiscal goals. Many of the entrepreneurs I have spoken with have thus become both accustomed to and adept at framing their business ideas in personal terms – as an outcome of life experience, as a by-product of crucial epiphanies, or as matters of personal concern. When the business environment in which many of the self-tracking tools are produced requires that people relate to their work as though it were indistinguishable from a deeply engrossing and rewarding hobby, it is not so unusual that Wolf encourages participants to frame their ideas during the Show & Tell talks as something more than just a business opportunity. Rather than sequestering these presentations from the work of the

[296] Field notes, May 2016, on file with author.

technology industry, doing so already mirrors a common business practice that demands that the professional become expressed as a personal calling. These dynamics only extend the pervasive commitment to work that Weber saw as foundational to capitalism. The Quantified Self is fundamentally structured – and itself helps structure – these demands undermining any fixed separation enacted by the Quantified Self at the level of form.

The popular narrative of the Quantified Self as a community that stands to the side of the market as a hobbyist space also disregards the role the Quantified Self plays in stimulating the market. To consider the Quantified Self exclusively as an amateur community intended to organize people around innovative approaches to personal self-tracking would therefore be to miss the central role the Quantified Self plays as a pseudo-professional gathering that helps to socialize an increasingly fractured and isolated professional audience – an audience that has also coalesced in response to neoliberal entrepreneurialism that fetishizes the business owner or inventor as a solitary hero. In particular, in the contemporary work environment where many people have become unmoored from the security of a stable job and "freed" to peruse their passions in a flexible labor market, the Quantified Self is only one example of the environments that have emerged to mitigate this instability and isolation, and to offer people access to communal resources, work spaces, as well as opportunities for networking and professional development beyond the bounds of a corporation. The online platform Meetup.com through which the Quantified Self announces its events, coworking locations like WeWork where many Quantified Self events are hosted for free, and the Quantified Self itself that offers entrepreneurs, data scientists, and engineers a space for fellowships and a place to build connections, are all part of a larger framework that has emerged in response to massive instability of the labor market of the recent decades.

Looking at the Quantified Self as a critical site of professional networking inverts the hierarchy between the Demo Hour and the Show & Tell discussed earlier. Whereas in formal narratives of the Quantified Self, the Show & Tell is seen as the locus of community organizing, it is the pre- and post-presentation socializing that now can be seen as the more important raison d'être of the Quantified Self. Not only do the Quantified Self events function as important sites of networking for people looking for connections that could lead to a business partnership or a job, but people often take on the unpaid duty of delivering presentations at events or the time-consuming work of organizing local meetings in order to expand their professional credentials. Assuming this labor has become a crucial strategy for establishing oneself as a thought leader in the technology industry, rather than as a way of distancing oneself from it. There is growing prestige associated with this personal investment, and people often mark their participation in the Quantified Self in professional profiles listed on web portals like LinkedIn. In many ways, the Quantified Self thus acts as a gateway or even as a foundation to the very industry that the Quantified Self formally holds at a distance.

Participating in the Quantified Self is not the only way through which to build these professional networks, nor to network in the technology scene. Online platforms like Meetup.com have reduced the burden of organizing events by making it simpler to invite people and announce and promote gatherings. Over the course of my fieldwork, I attended dozens of data and technology-themed Meetups: events put on by venture capital firms and entrepreneurs, engineers and data developers, programmers and marketers, around topics related to data, wearable technology, and sensor-enabled tools. While announcing these events has become simplified by companies like Meetup.com, producing events and sustaining interest remains a challenge. Putting a successful Meetup together is a formidable task. It requires one to develop a

theme, establish credibility, cultivate an audience, and consistently offer quality content that attracts participants. Doing so takes effort, motivation, skill, and most importantly – a strong name. The right Meetup name will help the event become noticed by an audience that relies on search engine optimization algorithms to become discoverable online.[297] Structuring the Meetup name to speak to computers and readers alike is therefore a small art (and business) where the Quantified Self has become a useful search term –a key reason why Gary Wolf finds it necessary to censor and monitor its use. Inevitably, the most successful Meetup events that I have come across were developed by those with established names in the technology industry. It takes the right name to attract speakers and an audience, each willing to take the time to attend. A credible name promises that the effort will not be wasted, and it holds the promise of launching other names to prominence.

Among these, the Quantified Self is a success story and an opportunity, in no small part due to Wolf and Kelly's own names. As a founding editor of *Wired*, a popular technology magazine, Kelly is a celebrated figure in the tech arena, known also for his involvement with the *Whole Earth Review* that aimed to revive the iconic *Whole Earth Catalog* first published by Stewart Brand, magazines that have laid the cultural groundwork for *Wired* magazine, if not popular computing culture itself.[298] In the spirit of the *Whole Earth Catalog*, Kelly has also become known for his running list of "Cool Tools" that he publishes through his personal website kk.org. These were the affiliations that Wolf and Kelly teased on their "inaugural"

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[297] The process of optimizing one's website, occasionally with the aid of an outside vendor, by tagging or connecting the name to be searched with frequently used/searched keywords to ensure that one's website appears at the top of online search results. The terms "Quantified Self" is often used alongside popular and common terms like "wearables," "data," "self-tracking," and "IoT" to improve searchability.

[298] See Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago and London: The University of Chicago Press, 2006).

announcement of the Quantified Self Meetup. When I asked people how they first learned of the Quantified Self, quite a few have explained that they had followed Kelly's work from the start, and learned about the Quantified Self from his personal blog. And while Wolf was then the lesser known of the two, over time, in part owning to his own affable and relatable manner, his ease and even graciousness in person and on stage, he has secured a strong, loyal following. In forming and formalizing the Quantified Self, Wolf and Kelly did not simply aggregate distinct practices under one common roof; they attracted an audience based on their personal reputation and status.

As former editors, both Wolf and Kelly also brought their skills as writers and content curators to the table. "Kevin and I have some experience with cultural – the way things evolve culturally online – so I think we did have a little bit of a head start on how to keep things interesting for ourselves," Wolf explained to me when I asked about their early success.[299] This reflects in the stylized format of the Meetups and conferences as well as in the curated content featured on the quantifieself.com that creates continuity and a sense of scale between Meetups. Wolf's professionally crafted and well-circulated *New York Times* editorial that was published in 2010 on the heels of his 2009 write-up for *Wired*, as well as his 2010 TED talk about the Quantified Self that, according to one source, has since been viewed a total of 835,868 times online, have over time created additional visibility and excitement around the concept of the Quantified Self and brought more people into the fold.[300] The Quantified Self, in other words,

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[299] Wolf, interview with the author, June 2016.
[300] Gary Wolf, "Know thyself: Tracking every facet of life, from sleep to mood to pain, 24/7/365," *Wired,* June 22, 2009, https://www.wired.com/2009/06/lbnp-knowthyself/; Gary Wolf, "The data-driven life," *The New York Times,* April 28, 2010, www.nytimes.com/2010/05/02/magazine/02self-measurement-t.html; Gary Wolf, "The Quantified Self," September 27, 2010, www.ted.com/talks/gary_wolf_the_quantified_self/up-next

started not simply ex-nihilo, out of someone's home – following the mythology of Silicon Valley start-up culture – nor simply buoyed by unbridled enthusiasm for data and self-tracking tools, but by two experienced, well-connected media professionals already skilled at gathering people and conversation. The popularity and growth of the Quantified Self from a single event convened by Wolf and Kelly to a global community of self-trackers is often presented by members of the Quantified Self as well as by the press as a testament to the growing popularity and value of self-tracking itself. It must also be seen as a function of the successful rubric that Wolf and Kelly offered.

Here, the Quantified Self functions much like a franchise: under the banner of the Quantified Self first cultivated by the credentials of Wolf and Kelly, the Quantified Self offers no-name organizers and participants who may otherwise have not been able to go it alone and build sufficient interest and attention around data an established, easy-to-replicate format as well as a credible name under whose halo to build their own name, grow a following, and organize. This is a key reason why Quantified Self chapters have grown so rapidly and why organizers and presenters willingly adopt Wolf's and Kelly's rubric, aesthetics, and language that situates the Quantified Self on the outskirts of the market. The name necessary for commercial success is forged, in part, through the credentials and connections established in forums such as these.

Whether the Quantified Self is a hobbyist space or a professional endeavor becomes even less clear when one looks at its administrative and legal framework. The Quantifies Self website, conferences, and events are all largely subsidized by a separate entity Wolf and Kelly have formed, called the QS Labs. Not many of the people I spoke with seemed to know or draw clear distinctions between the Quantified Self and QS Labs, however. The website (quantifiedself.com) further made the difference between the two entities ambiguous by offering

a definition of the Quantified Self in its "About" section devoted to QS Labs, thereby all but collapsing the distinction.

Effectively, QS Labs is the administrative arm of the Quantified Self whose key goal, per the website description, is to serve "the Quantified Self user community worldwide by producing international meetings, conferences and expositions, community forums, web content and services, and a guide to self-tracking tools." This description presents QS Labs as a pseudo-philanthropic initiative whose key mission is to "support the community." Nevertheless, QS Labs is registered as an LLC (Limited Liability Company), not as a nonprofit. QS Labs maintains a small staff that includes Gary Wolf and Kevin Kelly, and even has a formal board of directors that it lists on its website. Whether the quantifiedself.com is a corporate website for the QS Labs or a blog maintained to "support" the community, as it formally states, therefore remains vague.

The terminology "labs" is itself instructive. On one level, the abbreviation "labs" works to situate QS Labs, and by extension the Quantified Self, within the legitimizing discourse of science as the terminology resonates with an exploratory sensibility of the scientific laboratory. The term "lab" thus appears to mark QS Labs as a generative space to investigate ideas, as though shaped by little more than a common ethos of curiosity and scientific rigor. The laboratory-like, almost clinical aesthetic is further emphasized through the white-and-blue color palette of the Quantified Self design elements that appear on the website, on social media profiles, on billboards at events, and in video vignettes (Figure 34). On another level, the qualifier

Figure 34: Quantified Self Logo

"labs" also strongly resonates within a start-up environment, likewise so full these days of industry "labs," "incubators," and "accelerators." The industry adaptation of scientific terminology seeks to situate corporate activity within the prestigious work of generative and speculative science, albeit oftentimes without the attendant rigor and know-how. These terms also describe the contemporary investor environments in which emergent ideas today come into fruition. Labs, incubators, and accelerators are names of new forms of investment entities, ones that allow companies to take stakes in fledgling businesses as investment partners while insulating the organization from liabilities or heavy responsibilities that might accompany a more conventional corporate buyout, which is increasingly reserved only for companies that have successfully tested their mettle – or at the very least have demonstrated their desirability – through these earlier forms of investment.

The porous boundary between the personal and the professional raises questions about proper compensation and labor. On the one hand, echoing Weber, business ideas appear to acquire value only when they are framed as expressions of intimate, personal concerns, as all but products of a life's work. On the other hand, the staging of work as a hobby devalues labor. This dynamic underwrites the cycles of affective labor that have become the hallmark of digital space,

oftentimes enabling corporations to leverage unpaid work as a form of amusement.[301] Hackathons (a combination of hacking and marathon) that are increasingly sponsored and organized by corporations are a glaring example of the way unpaid labor today increasingly becomes disguised as entertainment. Initially largely self-organized by computer programmers as a forum of creative and collective problem solving and knowledge-building, hackathons have taken on a significant corporate presence in recent years.[302] While still leveraging the cachet of the hackathon as a pseudo-social event, many such functions have progressively become ways for corporations to simply gather large swaths of computer developers to solve technical problems or to build out prototypes cheaply.

Often promoted as "friendly" competitions or sold as corporate endorsements of "fun" and "creativity," particularly for young people in search of a job, the effort on the part of participants often amounts to little more than free labor, with only a handful of prize recipients compensated for their work. At one event that I attended, a larger media company soliciting computer programmers to join them at a company-sponsored event balanced the idea that only several cash prizes will be awarded with an enthusiastic promise that a hackathon sponsored by an entertainment company will at the very least be entertaining for everyone. "We are trying to create an environment where, really, we can all just have a lot of fun," the executive crooned from the stage, "because this after all, what entertainment is all about."[303] The situation is exacerbated by a growing industry mandate that budding computer engineers participate in hackathons as part of their resume-building activity, as a way of both cultivating programing

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[301] See, for example, Tiziana Terranova, "Free labor: Producing culture for the digital economy," *Social Text* 63, Vol. 18, No, 2, Summer 2000, Duke University Press.
[302] Gabriela Coleman described the early thrill of hacker gatherings in *Coding Freedom: The Ethics and Aesthetics of Hackings* (Princeton, NJ: Princeton University Press, 2013).
[303] Field notes, May 2015, on file with the author.

skills and testifying to their commitment by demonstrating that programing is a personal passion that exceeds occupation.

The use of the term "community" by Facebook, which, as Boellstorff noted, has given the word its additional contemporary salience, has similar effects.[304] For Mark Zuckerberg, the term's connotation of the communal and the commons not only characterizes the forms of organizing that Facebook hopes to power but also repackages the labor of users who endlessly create content and generate data for Facebook in the charitable language of "sharing," presenting Facebook as little more than a voluntary community structured by a gift economy predicated on equitable exchange. "Community" thus productively distracts users from examining too closely the forms of revenue into which Facebook has turned their labor.

The framing of the Quantified Self as a community is a distraction of a different kind, but a distraction nonetheless. The staging of the Quantified Self as a friendly hobbyist community of committed self-trackers and creative tinkerers draws on similar presentations of self-tracking as only entertainment. In so doing, it helps obscure the way in which the Quantified Self is not excluded from the demands of the market and self-tracking industry more specifically, but instead participates in (re)producing the very conditions of their existence. Not unlike the insidious nature of corporate hackathon or the community building of Facebook, the supposed hobbyist camaraderie and not explicitly business-oriented nature of the Quantified Self events

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[304] Tom Boellstorff recently noted a move away from the language of networks and networking and toward community. The shift is evident, Boellstorff suggests, in Mark Zuckerberg's recent public address that the the social media mogul had issued to the present and future users of Facebook, a message suitably titled "Building Global Community." Although the 2010 Hollywood film describing the rise of Facebook was still titled *The Social Network*, Zuckerberg himself has chosen the word "community," which, Boellstorff calculates, he used in his published "manifesto" a grand total of eighty times. See Tom Boellstorff, "Zuckerberg and the anthropologist: Facebook, culture, digital futures," in *Culture Digitally,* February 27, 2017, http://culturedigitally.org/author/tomboellstorff/.
See also, Mark Zuckerberg, "Building global community," February 16, 2017, www.facebook.com/notes/mark-zuckerberg/building-global-community/10103508221158471/

thinly veil the fact that people often pursue these events as part of professional development, while developing a product, or even while searching for a job, but also that participants oftentimes display their labor to interested journalists, market researchers, and, yes, curious anthropologists, free of charge. This free labor is often assumed to pay dividends in other ways and at later dates: in the form of knowledge or insights learned, connections made, resume credits procured, or business leads prospected.

The Enclosure of Quantified Self as a Community

Questions of labor return the discussion to the social work of community with respect to the Quantified Self. If the Quantified Self is in fact more fused with commercial concerns than its self-presentation initially suggests, how else, then, to evaluate the closure of the Quantified Self as a community set apart from the self-tracking market? That closure, I would suggest, is performed or at the very least endorsed and sustained by the market and not simply by members of the Quantified Self. Theorists have long pointed out that capital does not just discover borders; it produces them.[305] The closure of national and cultural boundaries that gave rise, among other things, to a racialized imaginary grounded in a reified biology, no less than the notion of culture as a circumscribed geography, is part and parcel of the capitalist enclosures produced in the last few centuries now often enough taken as irrevocably natural. Similarly, it is vital to consider the fiscal imperative that renders the Quantified Self a static, bounded site.

The reification of the Quantified Self as a separate community drives the self-tracking industry in several ways. "Investors are social creatures" explained one venture capital executive

[305] See Rosa Luxemburg, *The Accumulation of Capital*, Section III (New York: Routledge, 2004 [1913]), www.marxists.org/archive/luxemburg/1913/accumulation-capital/index.htm

at a workshop for computer engineers and device developers looking to take their ideas public.[306] "If you want investors to pay attention, you have to first engineer interest," he guided the eager crowd. The continuous staging of the Quantified Self as a community set apart from the market and as one that could thus be discovered by the market, plays a key role in "engineer interest" in self-tracking tools writ large. The semblance of coherence and unity gives developers and investors something to point to as kernels of desire "out there," as signals of budding consumer demand when justifying the investment of both effort and money to be spent on creating self-tracking tools. For market researchers and members of the press, the appearance of stability, in turn, provides a set of concrete beliefs and practices that can be witnessed and described so as to be emulated and replicated for the market at large. Talk of a community as something to be accessed and discovered by industry as though it constituted an uncontaminated space populated by exotic others, marking out the "lunatic fringe" or the "bleeding edge" as I often hear, activates a familiar colonial imaginary. Trading on this border-making rhetoric allows the Quantified Self to function as a static site filled with technology eccentrics and aficionados as though the Quantified Self constituted an uncontaminated place where the future of consumer trends can be marked, visited, and spied as though in utero, rather than produced as such in the here and now.

Although Chris appears to have a somewhat strained relationship with the organizers of the Quantified Self, he often operates in the press as a token of exactly this type, his self-tracking interests widely seen to exemplify the future of digital self-tracking. In one example Chris shared with me, a man once accosted him at a speaking engagement, handing him two coins. One looked old, rusted, and appeared stained with age, a clear relic from the past. The other, shiny and silver, with tiny beads arranged around the perimeter of the disk, was hard to place. It was a

[306] Field notes, October 2015, on file with the author.

coin from the future, the man told Chris earnestly. He wanted Chris to have both. Chris held on to the two coins half as a curiosity, half in memory of this unusual encounter. When a reporter later visited his home, Chris showed him the coins. The reporter politely smiled at the old one but stared at the coin from the "future" transfixed, holding on to it a little too long. Chris was amused by the experience. "He kept looking at it," he told me, "as though it could be real."[307]

Chris himself, however, brazenly participates in the making of this lore. "I sometimes feel like I am patient zero in some experiment" he explained to me when we spoke. In a well-circulated interview with *Mashable* that focused on Chris's self-tracking habit, he put the matter even more directly: "I'm just like you, but in the future."[308] A fixture on the tech media and conference circuit, Chris is regularly treated both as visionary and as a specimen, invited to rehearse a vision of the world that is yet to come. Rather than a group that exemplifies the contemporary form of tech capitalism, the Quantified Self is similarly held up in journalistic or media representations as a privileged space filled with advanced users just like Chris, with their fingers on the pulse of the future, as an insular group of participants who stage the future of data for the rest of us in granular form.

This process is circular. The industry's need to discover the Quantified Self as ground zero of the future is precisely that which helps shape its apparent stability and peripheral status as a community, also thereby constituting the separation that Wolf and company propose and endorse. In other words, the very community observers seek to discover is the thing that is also produced and sustained by industry and the popular media. On the proposition that social aggregates like the Quantified Self have the shape of a coherent phenomenon on the rise, money

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[307] Chris, interview with the author, April 2015.
[308] Samantha Murphy, "Meet the 'Most Connected Man' in the world," *Mashable,* March 13, 2014, http://mashable.com/2014/03/13/most-connected-man-in-world-chris-dancy/#Hutt_lx1Dqqz

is invested, and the fiscal expenditure drives further curiosity in the Quantified Self, once more calcifying the notion of the Quantified Self as a specialized community whose habits, approaches, and practices could be meaningfully observed, replicated, and usefully exploited for future profit. “Engineering interest” is also a key part of the work performed by those who contribute to the Quantified self as organizers and presenters. As they produce content, display enthusiasm, and model an interest in digital self-tracking methods and tools, these participants continue to stimulate the cycles of industry and public curiosity that ultimately promise to render their labor – both in the community and in the self-tracking industry – productive.

While the process may indeed be more recursive than it appears, conceptualizing the Quantified Self as a community located ahead or on the fringes of the industry, rather than at its core, frames industry investment through the linear imaginary of extraction or through a developmental language of progress where the growth of the market is seen as predicated on making available to a broader world ideas and technologies first hatched in intimate or circumscribed locales like the Quantified Self. Rather than that which the market itself produced, through the prism of community, the growth of the self-tracking market is thus often staged as a liberation, even as a moral imperative, where entrepreneurs and developers often see themselves as “empowering” consumers with ideas set free from rigid confines of insular communities like the Quantified Self and brought out into the wider world. In turn, industry actors are often placed, and see themselves as located, on the outside of the community looking in rather than as important members of the cast.

Conjuring the Quantified Self as a community occludes the very forces that both bolster its status as a hermetic entity and mark and elevate the activities of the Quantified Self as symbols of the future. The designation of the Quantified Self as a community, however, has to be

seen as a product of the technology industry rather than its antecedent. Framing the Quantified Self as a community enables it to be perceived as a test-bed for innovative ideas filled with advanced users for the sake of whom the industry could aspire to create, and as a concrete form into which the market could seek to expand. The internal fission between the Demo Hour as the symbolic terrain of capital and the Show & Tell as the proper location of the Quantified Self only stages as it rehearses this fiction.

Chapter 5: United in Difference

The miscellany of approaches, the sheer "breadth, the variety" of things to track, was what Sharon noted to me when I asked about her first impressions of the Quantified Self, an array that suggested to her that the Quantified Self was in itself diverse:

> I was kind of surprised to see the *breadth, the variety of topics* that people track. Sometimes there would be something weird where I would go, "Oh that's a really weird thing." Totally would love to do that. I wish I had been collecting dream data for the last 18 years. Do I want to start now? Eh, not really, but it's really cool. And then another time I may see something and think, "Why would you care to track that?" And again it comes back to what personally interests you, what are the areas you want to work on in your own life. So for some people, it's like, "Oh wow, I'm going to track my productivity at work, where am I spending my time." But I thought it was cool to see the *diversity*.[309]

If Sharon noted the broad range self-tracking methods and tools, Sagan emphasized the array of people that he encountered at the Quantified Self, staring with his very first event:

> I went to a Meetup and I didn't know what it would be like. But I thought it was just so interesting, the first Meetup was just so interesting *because it was an interesting combination of engineers, self-trackers, entrepreneurs, scientists, sceptics, philosophers*. … In that first Meetup, there was one person who gave a talk about what was the point of tracking anything, and if you are tracking anything you are wasting your time. And it was so embraced by the community, this discussion. I was really surprised.[310]

Listing what he felt were an incongruous group of people gathered in the room that day – scientists alongside data skeptics, philosophers alongside entrepreneurs – Sagan was invigorated by the variety. While he attended that first meeting simply out of curiosity, what drew him in was that people with different views appeared "so embraced by the community."

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[309] Sharon, interview with the author, July 2016. Emphasis added.
[310] Sagan, interview with the author, September 2015. Emphasis added.

In the previous chapter, I examined how the language of community helped stage the Quantified Self as a closed group to be discovered by the market, camouflaging the ways the Quantified Self is shaped by Silicon Valley entrepreneurialism. This chapter is still motivated by the framing of the Quantified Self as a community. This time, however, I focus on the notion of diversity and inclusivity that operate in the assertion that the Quantified Self is a community primarily to ask: How does thinking about the Quantified Self as a space for difference inflect the understanding of the Quantified Self as a community and, relatedly, what additional social function does the notion of "community" then take on?

I pay particular attention to the echoes of relativism and multiculturalism that draw the Quantified Self together. Viewed through this lens, the Quantified Self is often cast as a capacious idea that assembles a kaleidoscopic array of people and approaches. The cumulative notion of difference does not shape group activities alone. Central to this chapter is the idea that the view of diversity that structures the Quantified Self represents a token of a type; the Quantified Self functions both as a model and as a staging ground of larger trends. I see a parallel between ideas that shape the Quantified Self as a community and the way concerns about diversity – or lack thereof – increasingly frame technical settings where data are produced. Ultimately, the relativist modality is important to consider not only for what it can say about the makeup of the Quantified Self or the composition of corporate offices, but more importantly, for what it reveals about how personal data are viewed in the wider social and technical imaginary as singularities that can be compounded into complete forms.

That data resonate with a relativist notion of difference can be heard even at the level of grammar. In the second half of this chapter, I will consider the grammatical shift of the word "data" from a conventional plural to the singular. While the term "data" has for most of its

history been used as the plural form of the singular "datum," in recent years, editors and dictionaries have ratified the term as a singular noun in response to popular usage. I argue that this is more than a grammatical shit. The move toward using "data" as a singular noun is emblematic of wider ways in which the plurality of data has become merely a problem to be resolved rather than an idea to be embraced. I show that accepting the singularity of data also makes it more challenging to conceive of data in the plural, that is in ways that do not posit data as materials that can be linked together or niftily summed up.

The Global Everyone

In the casting of the Quantified Self as a diverse community, the international presence of the Quantified Self looms large. With active chapters not only in the United States but in several European centers as well as in Asia, Latin America, and Australia, the global span and appeal of the Quantified Self is something that is frequently touted in public presentations and on the community website. Although most of the meetings that gather regularly generally take place in the United States or in Europe, international events, particularly those that appear culturally and geographically far from the United States, like Bangalore, India, are often highlighted in write-ups on the Quantified Self website as though to reinforce the idea that the Quantified Self transgresses any firm national or cultural boundaries. The international character of the Quantified Self is also reproduced rhetorically through the titles and locations of the two conferences that take place annually in San Francisco and Amsterdam. Perhaps because it started organizing first, and likely due to the symbolic significance of Silicon Valley as a staging ground for the global technological elite, the annual gathering in San Francisco bears the qualifier

"Global." The conference that convenes in Amsterdam was subsequently dubbed "European," suggesting it as a more localized and circumscribed event.

Some see this invoked variability as a natural consequence of the Quantified Self organizing, perhaps even as a testament to the growing appeal of self-tracking itself. Others recognize Wolf's influence in helping perpetually enlarge the audience that may take interest in self-tracking and in helping build an "open community."

> My perception is that he [Wolf] really focuses on how he can help support an *open community*. … He doesn't want to force, to limit Quantified Self to the idea of "here is the gadget that will tell people what to do" and so forth. He wants to be open to those people but not limited to those people. At the same time, *he wants to be open to people who have very broad views and some would say ridiculously broad views of the value of self-observation*. He doesn't want to say no to them either. Present your views. Present what you are learning. But don't tell people what to do. One thing you might have seen just from the nature of Show & Tell talks is that the emphasis is very much on the first person – What did you learn? What did you do? – as opposed to more dogmatic about telling others what to do. So again, [there is] *this spirit of encouraging an open community respectful [of] many points of view*.[311]

Indeed, Wolf, as I mentioned in the previous chapter, exerts strong influence over public representations of the group and often approaches the Quantified Self as a skilled editor. He regularly arranges the narratives of data analysts alongside those of artists, of chronic disease patients alongside productivity experts, experiments of people working on specific goals alongside those who are interested in digitizing their entire lives. The staging of the Quantified Self as an "open community" may be a practical outcome of Wolf's approach of intentionally not setting limits on the kinds of tracking activity that could be included under the banner of the

[311] Gary Wolf, interview with the author. June 2015. Emphasis added.

Quantified Self, as well as his eagerness to incorporate unconventional views in order to push out and to expand that which can be formally subsumed under the title of the Quantified Self. [312]

Wolf saw things a bit more poetically. In our conversation, he suggested that the diversity to be found in the Quantified Self events is a consequence of the inherent "ambiguity" of the Quantified Self name itself. This idea came through as we talked about the differences Wolf perceived between biohacking and the Quantified Self. Biohacking and the Quantified Self are terms that today both express a cyborgian intersection between biology and technology. They are also names of events that explore this intersection. Although the Quantified Self is largely used, or is steered for use by Wolf, as a proprietary name, biohacking is employed as a more generic term, often co-opted by a wide spectrum of event organizers. Wolf viewed the two terms and the types of ideas and people they brought together as distinct, and felt that the differences between them were a function of the names themselves. He thought of "Quantified Self" as the more malleable name, capable of standing for many different things to different people, while the term "biohacking" was restrictive and more precise.

> Wolf: I think the Quantified Self invites work around what it really is, whereas biohacking doesn't. That is a signal of the two different types of naming that are being done. I don't think there are very many conversations being done around "What do you really mean by biohacking?" … You can say one is a much better name than the other because it doesn't create as much stress or friction around its supposed referent. Or you can say in reverse, Quantified Self is a better name because there is more stress or friction around its meaning.
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> Author: How does biohacking close the conversation that the Quantified Self opens up?

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[312] In her dissertation work, for example, anthropologist Dana Greenfield describes how her unorthodox self-monitoring became a feature experience at several Quantified Self events, even securing her a keynote speaker spot at one of the Quantified Self conferences. She kept a digital record of each time a memory of her mother, who passed suddenly appeared to her, as a way of processing her grief. In thinking through her own experience with the Quantified Self, she notes that Gary and Ernesto [another organizer] have gone "out of their way to recruit speakers who break out of the mold, challenge the themes of optimization, athleticism and performance that can so easily overwhelm the scene, with exercise trackers and athletic performance at the center of many wearable design." See Dana E. Greenfield, "Homo experimentus: Digital Selves and digital health in the age of innovation" (PhD diss., University of California, Berkley, 2015), p. 22.

Wolf: I think it [biohacking] is in a way a simpler term and refers to altering the body with technology. And normally, the way I see it used, there is an optimization element through installing technology. And it has some power because there are people who are afraid of this technology. So the biohacking community adopts a posture of fearlessness. Kind of cyborgean fearlessness in relation to technology. I think it is a provocation in the way that it's meant to be. Certainly the actual practice and the reference are much closer at hand. Its purpose seems to be much more affirmative and demonstrative.

Author: How is that different from the Quantified Self?

Wolf: People who declare themselves interested in the Quantified Self come to Quantified Self meetings all the time and present what they are doing and what they are learning. But *they are not the only ones there*. And so I think the Quantified Self has that *ambiguity* in it. *Even if you're not into biohacking, you might still come to a Quantified Self meeting. And you may discover that you don't see things the same way. And that's part of the work.*[313]

Despite claims of variability and difference, the Quantified Self is not as diverse or as inclusive as the above characterizations may suggest. The group has a distinctly Euro-American bend, something highlighted both by the locations in which the conferences take place and by the fact that English remains the common language in which the community comes together and organizes. Although the global conference is often touted as a meeting hub for those affiliated with the Quantified Self the world over, the majority of those who attend this event travel either from the United States or, more commonly, simply from the Bay Area. Further undermining the centrality of the San Francisco gathering as a "global" affair is the fact that the European Quantified Self Conference that takes place yearly in Amsterdam originated as a more convenient destination for those who are located in and around Europe and are not willing or able to travel to the United States. For participants like Sagan and Sharon, who see the Quantified Self as a capacious idea, the breadth of styles and individuals that can be found at the

[313] Wolf, interview with the author, June 2016. Emphasis added.

Quantified Self on any given day suggests something promising: it frames the Quantified Self as a great big melting pot of ideas and people that continues to grow. The repeated claims of the heterogeneity of people, approaches, and gadgets within the Quantified Self notwithstanding, the composition of the group remains fairly homogenous in its makeup, primarily attracting participants who are white, male, English speaking, and from a professional middle class – in other words, an audience for whom the conference and the Meetup format itself are both comfortable and familiar.

I draw attention to the frequent valuation of the Quantified Self as a diverse and inclusive community, particularly to moments when it is conflated with a global presence, to point to the notion of difference that organizes these views. The version of difference that I found at the Quantified Self appears to mirror the premise of relativism from which multiculturalism later sourced its cultural force. In its time, relativism played an important role in challenging hegemonic ethnocentrism. The basic premise was that the world was not only hierarchically ordered, but laterally assembled; relativistic scholarship produced a sense of the world as united through its many differences. Scholars have since roundly critiqued this idealized version of unity; arguing that it belied practical reality. In particular, they have examined how relativism occluded important dynamics of power that produced both the sense of unity and the view of difference as "object-like phenomena" as Akhil Gupta and James Ferguson have noted, where difference became landlocked, viewed only as "occupying discreet spaces."[314] Terrence Turner

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[314] Akhil Gupta and James Ferguson, "Beyond 'culture': Space, identity, and the politics of difference," in *Cultural Anthropology* 7, no. 1 (February 1992), p. 35.
For an example of a work critiquing multiculturalism, see Elizabeth Povinelli, *The Cunning of Recognition: Indigenous Alterities and the Making of Australian Multiculturalism* (Durham, NC and London: Duke University Press, 2002). Informed by her work with indigenous people of Belyuen, an Aboriginal community of the Northern Territory of Australia located in the middle of the Cox Peninsula, Povinelli explores the struggles the Australian indigenous population faced in claiming legal recognition of land titles. This analysis embeds a larger critique of the politics of recognition that implies the construction of the very thing to be recognized. In exploring the competing

called multiculturalism that took inspiration from this relativist modality, "difference multiculturalism," where difference was presented merely as "accretive – a shopping mall of world cultures."[315] In the technical environments that I have conducted my research, relativistic ideas have not disappeared. Rather than being challenged, they continue to power the organization of both people and code. The attention to diversity in the Quantified Self and the concern over those who are absent from the community expresses precisely the "accretive," Lego-like understanding of social variability. Difference – different people as well as different kinds of data – emerges here as something to be patiently recognized and gathered together into a single, all-encompassing whole; into a community united in difference.

These ideas were expressed particularly well at the Global Quantified Self Conference that took place in San Francisco in June of 2015. At the close of the second day, I walked up to Gary Wolf as he chatted outside with Peter, a participant whom I met earlier that day. We had all just completed viewing the screening of the documentary film *Personal Gold*, which focused on the miraculous finish of the American female cycling team during the 2012 London Olympic games. Cycling, dominated by greats like Lance Armstrong, is not a sport known for its female athletes. During the London games, the female American team was the clear underdog. Despite the odds, the team managed not only to take the silver medal but to steal attention away from male cycling, then rocked by scandals of drug abuse. In *Personal Gold*, the audience learned that the team was led to victory by a stringent regiment of self-monitoring. With the help of their

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Western and indigenous categories through which an idea of indigeneity is formed, Povinelli examines the material and legal repercussions of the dueling social classifications; a contest that also complicates the construction of a national narrative of Australia premised on inclusive and equitable multiculturalism. Her work thus exposes the degree to which multiculturalism is driven by power and ends up repeating the injustice it is meant to correct.

[315] Terrence Turner, "Anthropology and Multiculturalism: What Is Anthropology That Multiculturalists Should Be Mindful of It?," *Cultural Anthropology*, Vol. 8, No. 4 (Wiley on behalf of the American Anthropological Association, Nov., 1993), pp. 418

coach, the women diligently assembled data of their blood pressure, food intake, sleep quality, air purity, and even mattress firmness to craft what the cyclists perceived as a complete picture of their daily routine. They made continuous adjustments in response to the data they collected. "Data, Not Doping" became their rallying cry. Data gathering emerged as a wholesome means of maximizing the team's performance, as a more natural alternative to traditional medicine and drug use that had hitherto scandalized male cycling.[316] If excessive drug use seemed prohibitive and unethical, as shortcuts that gave competitors unfair synthetic advantage, excessive data gathering was instead seen as healthy and organic. The more data the team collected, the more they felt that they were advancing toward their goal. They yarned to increase the number of outputs they monitored on their computer screens just as they aimed to hit high marks on the scorecards of the race.

The film had another role to play than just to glorify data monitoring. Capping off two days of conference sessions and presentations, the inclusion of the film that focused on the turn of female athletes toward data into the conference lineup represented yet another way through which to infuse difference into group organizing that remained, not unlike professional sports, largely dominated by male participants. The film joined other efforts to make room for women in the space of the conference. For instance, to improve navigation around the conference halls, the smaller conference session break-out rooms were each given a name, and the organizers were careful to incorporate the names of influential female computer scientists such as Grace Hopper

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[316] This equivalence is not without precedent. Fred Turner has already explored some of the interconnections between hallucinatory drug use and computer technology that originated in the 1960s counterculture. The New Communalists first explored frontier living and drug use as modes of achieving a more authentic state of being, ideas that later became transposed onto personal computing as well. See Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago and London: University of Chicago Press, 2006).

among the more familiar nods to male inventors and engineers. On panels and in presentations, the team also made sure that women maintained a strong presence. That year, the entire event concluded with Wolf presenting a first-time award – a shiny blazer – to Sam De Brouwer, the founder of Scanadu, for being a "trailblazer" in the field. The bedazzled jacket that the team presented to De Brouwer was baggy and oversized, yet in its flashiness already seemed to awkwardly prefigure a female host. Showing surprise at the honor, the elegantly dressed De Brouwer accepted the jacket with grace and humility. "We're up to something … let's do this," she proclaimed quietly from the stage and, after a bit of a pause, slipped on the shiny, ill-fitting coat.

Following the screening, the audience spilled outside, quickly reforming into small lines queuing up for the craft food trucks Wolf had arranged for the occasion. Generic sandwiches served with cans of soda or bottled water was the standard fare at technology conferences, if any food was provided at all. This setup was an unexpected and welcome treat. The choice of the mom-and-pop food trucks with local and ethnic menus appeared to be yet another attempt to model through the vibrant display of ethnic foods, the variability that still seemed missing at the composition level of the Quantified Self. Surveying the throng of people that gathered on that bright yet windy summer San Francisco day, Wolf lamented to Peter and me with surprising candor, "You know, the self-tracker in Bangalore probably has more in common with those in Silicon Valley than with others from Bangalore."[317] Wolf continued to take in the regrettably uniform crowd, "This conference has the largest number of fit people I've even seen."

Not everyone agreed that the Quantified Self had to be diverse. Some wanted to protect the group's specificity and restrict its range, at times feeling uncomfortable by Wolf's persistent

[317] Field notes, June 2015, on file with author.

enlargement of what the Quantified Self could stand for and whom it could appeal to. Disagreements occasionally erupted as participants protested that the Quantified Self as an organizing unit was becoming too inclusive. As Wolf worried that the Quantified Self still seemed too homogenous, Peter grew concerned. “Isn’t that going to dilute the QS values?” he finally interjected. “If I will lose some of the paleo-entrepreneurs focused on optimization, I’m ok with that” Wolf calmly stood his ground, pushing in this conversation, as in his organizing efforts, to expand the Quantified Self beyond the terms that narrowed its scope. Wolf did not want redundancy – the self-tracker in Silicon Valley who was identical to his counterpart in Bangalore. He wanted diversity. The conversation had momentarily stalled. As Peter processed Wolf’s comments, I took a bite out of a juicy taco I had purchased at one of the food trucks. Wolf wistfully eyed the stylish and slender young professionals taking sips of local craft beer, making note of the gaps as he considered how his efforts to expand the membership of the Quantified Self still had not gone far enough.

Wolf’s desire to open up the community is genuine. Nevertheless, his comments and efforts continue to echo with the ethos of “difference multiculturalism” that helps structure the Quantified Self as a community united in difference as though it was simply an organization of variegated parts to be assembled into an ever larger, more complete whole. As I will continue to explore, the aspirational global “everyone” who may eventually participate in the modes of self-tracking favored by the members of the Quantified Self thus mirrors another imagined totality: the “everything” that an expanding kaleidoscope of gadgets are one day expected to be able to stabilize and capture. The “global” Quantified Self community effectively becomes shorthand for this desired totality; a collective of radical and differentiated singularities that could be

recomposed at the level of individual bodies, cities, nations, and – as some audaciously hope – the world.

Diversifying Bias

I am interested in the multicultural logic that organizes the Quantified Self because it has a parallel in how the technology industry thinks of difference, regulating both the Human Resources and staffing practices as well as how digital data are managed and viewed. The Quantified Self thus both models and reflects the ideas that today often shape both the data and the spaces in which they are produced.

The cumulative notion of difference that structures the Quantified Self organizing efforts is increasingly mirrored in corporate concerns over diversity, particularly marked in the technical arena's growing attention to gender. Although STEM (Science, Technology, Engineering, and Math) fields have long been fairly homogenous, in recent years, in response to long-term critiques, executives have made well-publicized pledges and concerted efforts to attenuate the uniformity of its technical elite.[318] As the lack of female representation in engineering and computer science roles has garnered attention, women have been welcomed into technical spaces with growing alacrity. In a veritable theater of inclusion, women are now increasingly paraded in conference sessions and coding camps, singled out for specialized accolades and interviewed for articles, as well as extoled on panels devoted to "women in tech" – much like Scanadu's De

[318] For example, during his 2015 CES keynote address, Intel CEO Brian Krzanich announced that Intel has pledged $300 million to improve staff diversity by 2020 by hiring more women and minorities. Firms like Facebook have gone as far as instituting "diversity training" programs intended to "manage unconscious bias" in hiring. See Facebook, "Managing unconscious bias," Facebook.com, https://managingbias.fb.com/

Brouwer had been when she was selected to receive the trailblazer award at the Quantified Self conference.

Whether programs of gendered "inclusion" attenuate bias in the industry is a matter of debate. In more casual conversations, women often reveal how these strategies do not practically dismantle the social fissures they are meant to attenuate, but either hide or amplify them. The ongoing gender disparity, even when women are technically incorporated as employees, can be seen at the level of dress. Women working as computer engineers or data scientists have often shared with me the pressure they feel to model the normative appearance of their male counterparts, foregoing makeup, certain hairstyles, and dresses in favor of what is seen as "gender-neutral" attire of jeans and a t-shirt. Showing up in a dress, one risks being taken for an intern or an assistant, an experience that has become frequent enough for some to joke that jeans have become their new "power suit." Conventional gender norms may at times appear blurred or easier to surmount in technical settings peopled, as popularly imagined, by nerdy engineers themselves often viewed as on the outskirts of traditional masculinity or femininity. The casual wear favored by male programmers, epitomized by Facebook's Mark Zuckerberg's fondness for hooded sweaters, may even appear to neutralize or to democratize attire as it replaces older, more conventional and formal codes of corporate apparel. Nevertheless, as women's commentary readily reveals, approaches that seek merely to add women to the corporate pool as undifferentiated bodies conceal the uneven gender dynamics that continue to structure corporate programs of inclusion.

In replicating and even solidifying the underlying inequality, corporate diversity programs can appear to operate in the modes of tolerance that Wendy Brown has written

about.[319] Without attending to the broader gendered milieu of the technical arena, inclusion, much like tolerance, does not simply negate the disparity, but helps mark and perpetuate an unbalanced dynamic of power, only further "inscribing essential otherness within the commons."[320] Just as tolerance still maintains, and perhaps even strengthens, an internal power hierarchy between the tolerated and the tolerant, the women "included" into technical spheres remain marked, perhaps now even singled out with greater force, because the discrimination becomes more opaque, as unequal bodies. Summarizing this reality to me, one person with whom I spoke plainly remarked: "I never realized I was the only woman in the room until I was selected for a Woman in Tech Leadership role. That's when I realized I'm a 'woman' in tech."[321] The multicultural notion of "inclusion" that still narrates corporate diversity programs effectively discounts the dynamics of power that preclude an easy fusion and assimilation. As I will touch on in the chapter that follows, formal ways of including women often mask other, more routine ways in which the technical arena remains hierarchically ordered by gender, obviating any easy incorporation of women into the technical field as equal participants. As corporate diversity programs continue to focus on seeking women out largely as corporate bounty to be counted, they often bolster and even help entrench rather than overcome existing gender tropes and hierarchies at the level of infrastructure and corporate policy.

The understanding of diversity as difference to be added does not only shape the hiring practices of technology companies or the organizing efforts of the Quantified Self. The notion of diversity operative in these arenas is of a kind with ideas that organize personal data, particularly

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[319] Wendy Brown, *Regulating Aversion: Tolerance in the Age of Identity and Empire* (Princeton, NJ: Princeton University Press, 2006).
[320] Brown, *Regulating Aversion*, p. 46.
[321] Field notes, July 2015, on file with the author.

concepts of "bias." Bias in data, I argue, is likewise viewed through a multicultural, additive logic. This came across as engineers and developers with whom I spoke repeatedly stressed to me that bias in a data set results from failure to account for a sufficient range of variables. In this view, machines are not simply seen as superior to human observation by default as they would be in a logic coextensive with the principles of "mechanical objectivity."[322] Rather, there is a growing feeling in the fields of data science and in machine learning that algorithmic accuracy results from human capacity to eliminate mechanical bias.

In that sense, the data science and machine learning communities are currently experiencing something of their own "reflexive turn," where human biases programmed into the data set are increasingly acknowledged and sought out. There are crucial differences, however, in the anthropological and the technical treatment of bias. In anthropology, the reflexive turn attempted to attenuate some of the injustice of an observation that pretends to take the writer out of the picture or to put him in charge of it. Anthropological writing that challenged this premise sought to make the presence of the author known and even to incorporate the author into the story aimed to acknowledge the way the observer both affects and is herself affected by the world she analyses.[323] In computer engineering, bias has taken on its own specific tenor**.** Just like in anthropology's reflexive turn, there is increasing awareness of the role people play in generating certain knowledge**.** But in contrast to the anthropological position, attenuating bias in technical fields often becomes about filling in the missing pieces, a product = – as engineers at

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[322] Loraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007).

[323] For instance, Ruth Behar, in a collection of essays titled *The Vulnerable Observer*, insists on the importance of including the anthropologists into the picture, intertwining an exploration of her personal experience with the stories relayed to her by others. Besides looking to bridge the gap between self and other, theirs is also primarily an attempt to humble the superior 'I' of the anthropologist that hitherto hovered protectively and authoritatively over the narratives told by others. Discovery, all of these perspectives suggest, is never stable, disinterested, or isolated; it is deeply social and heavily crisscrossed by power and politics. See discussion in Ruth Behar, *The Vulnerable Observer* (Boston: Beacon Press, 1996).

times explained to me – of "building diversity into the data set."[324] Bias, in effect, emerges as gaps, as holes encoded in a data set, holes that misrepresent a partial picture as a complete one, thus offering a skewed, biased view rather than the desired, well-balanced, whole. The work of combating bias is perceived as the work of filling in those gaps. In anthropology, the reflexive turn sought to acknowledge that any perspective that analysis offers will inevitably be skewed. Rather than absolute or universal knowledge, there are only situated perspectives. In technical settings, sufficient diversification of data offers hope that bias can be overcome – that it can be written out of the data set.

Consider, for example, the process of training a computer algorithm to recognize and count "steps." While what counts as a step may appear obvious to a human eye, it is a significant if basic technical challenge. Among other things, algorithms that "learn" to read individual "steps" have to account for variability of terrain (staircases, steep slopes, level ground), modes of comportment (walking, marching, feet-dragging, climbing, jumping, running), and body types (factoring for, among other things, age, height, and weight), to say nothing of the cultural modes of carrying the body that variously correlate with cultural construction of gender, the latter representing something that technology producers rarely think about. Suggesting a collaborative atmosphere, the production of accuracy in digital devices is often staged as deriving from different variables and scenarios systematically being added by committed engineers as precision were only a matter of a patient and meticulous incorporation of missing pieces into larger and more coherent system of linked parts; work that produces increasingly more accurate self-monitoring devices that are attuned to an expanding range of scenarios, circumstances, and body types. The relationship between a cumulative notion of difference and accuracy can be echoed

[324] Field notes, October 2015, on file with the author.

even in Scanadu's bragging about the "9,355,789,002 data points," an abstract quantity, as I previously wrote, that was used as a stand-in by Scanadu for the gadget's invoked precision and quality.

The image of an industry collaboratively marching toward accuracy in such a way defies the existing fractured reality. For instance, given that the wearables industry in the United States today is still largely unregulated, even set parameters for what constitutes metrics such as a step are absent from the field. Further complicating the possibility of counting something that is on the surface so simple as a step is the fact that steps are not that which are generally measured. Most devices on the market rely on vibrations produced by movements of the hand during walking (if taking measurements at the wrist) or by the foot (if taking readings at the ankle), vibrations that are then further correlated with heart rate to produce a metric named a "step." Strictly speaking, then, steps are not even the gestures and actions that are being tracked. Segmenting the various movements of individual bodies from the irrelevant jerks and twitches into a pattern of readable "steps" to produce an accurate account of walking is not only a challenging but also a discordant and loosely coordinated technical activity. "Steps are easy; it's walking that is hard," summarized an engineer when I wondered if measuring walking (versus recognizing faces, for example) is a technical problem that is relatively straightforward.[325]

Nevertheless, the cumulative notion of accuracy that relies on ever greater variables to be factored continues to mediate both the public and the professional staging of algorithmic performance. Thinking of data in this way creates the image that algorithms are increasingly being perfected and refined. Truth claims are seen to be produced here not through power – for instance, through the influence of companies who set the terms for ways something like a "step"

[325] Field notes, April 2016, on file with the author.

may even be defined – but simply through a technical process that allows one to continuously refine an algorithm, calibrate metrics, and incrementally improve devices and algorithms by systematically incorporating "diversity into the data set." This notion of accuracy approaches "different" data in the same terms as "difference multiculturalism." This notion of algorithmic accuracy hinges on the same appraisal of difference as something cumulative, as that which simply needs to be gathered together, as "difference multiculturalism" Where accuracy is thus viewed to be the product of singularities being added, it also reflects the understanding of "inclusion" modeled on a display of ethnic food or on an incorporation of women into a homogeneous corporate pool. In effect, this model of accuracy is the digital equivalent of the "accretive" concept of social variability and the "inclusion" policies practiced in corporate offices. When bias is understood simply as a failure to diversify, combating homogeneity through active incorporation of missing parts promises to bring forth greater fairness and precision both at the level of staffing and of data.

Are Data Singular or Plural?

The contemporary view of data as singular links in ever more diverse and complex information chains resonates even at the level of grammar. Derived from the Latin *dare*, meaning "the givens," grammar and history instruct that the term "data" was originally used as the plural form of the singular "datum." Alexander Galloway has helpfully noted that the word's original plural sense can still be read in the French translation of data as "les données," meaning "the given."[326] The plural connotation is likewise preserved in other languages like Russian, where

[326] Alex Galloway, "From data to information," *Culture and Communication,* September 22, 2015, http://cultureandcommunication.org/galloway/from-data-to-information

the word *danniye* echoes the plural construction of the French. In the English language, however – the language that continues to unite computer professionals – the proper usage of the word "data" has become a topic of some debate, as the word has been employed with growing frequency as a singular noun. "Data is," announce countless articles and industry conference sessions before launching into wild or dire predictions about a world driven by digital information.

Etymology isn't law. Language moves; it perforates rules. Rationalizing the shift of the term "data" from a plural to a singular noun, some grammarians have posited that today usage tends toward the singular because of a common confusion: as a term of Latin origin, the "a" at the end of the word appears an unnatural plural to English-speaking ears, inciting would-be users to falsely deem it singular and so meeting the fate of other Latin imports like "agenda" or "stamina," and often "media." Or otherwise data as a *mass* noun rather than as a *count* noun permits this substitution. As the knowledge of and reverence for Latin has itself abated, so has the consistency of Latin's use. [327] The Merriam-Webster dictionary has long taken a decisive position. Offering a secondary definition of data as specifically computerized information – "information that is produced or stored by a computer" – and not just as a synonym for facts, the dictionary advises that today, "data leads a life of its own quite independent of datum, of which it was originally the plural." Assuming the haughty tone of a teenager scoffing at her parents' dated ways, the dictionary contends that the remaining plural construction, if used at all, is nothing but a relic, "an anachronistic pandering to fading tradition … more common in print, evidently, because the house style of several publishers mandates it."[328]

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[327] See Simon Rogers, "Data are or data is," *The Guardian,* July 8, 2012, www.theguardian.com/news/datablog/2010/jul/16/data-plural-singular

[328] Merriam-Webster, "Is 'data' singular or plural?" www.merriam-webster.com/dictionary/data

Though slip-ups persisted ever since the word's entry into the English language some centuries ago, "data" has largely been employed as a plural noun throughout its technical and editorial history. The term's singular identity has only recently entered wider debate as its general usage escalated in direct proportion to the term's widening circulation and use in connection with a growing array of data-producing digital tools. Curiously, the term "data" has more fully dropped its pluralist pretensions precisely in the age that the Silicon Valley futurist Ray Kurtzweil has hyped is fast approaching a radical *Singularity,* a decisive moment when a compendium of knowledge, ushered in by massive quantities of information, will come together into a singular machine intelligence too great for humanity (taken as a whole) to process.[329]

Parallels often made in technical settings between data gathering and outer space offer additional ways to evaluate the invoked singularity of data. Take, for instance, the marketing materials of the Consumer Electronics Show (CES) (Figure 35). In 2015, the annual technology showcase welcomed attendees with massive banners that directly referenced the familiar iconography of the bygone Space Age, while the online ads were set against a star-studded

Figure 35: Online banner ad and event display at the CES 2015.

[329] Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York: Penguin Books, 2006).

background of a galactic nebula. Or the Qualcomm X Prize, for which telecom giant Qualcomm planned to give away a $10 million prize in 2017 to top three companies to develop a real-life "tricorder."[330] For years, Scanadu has been a running favorite in this contest.[331]

Beyond the presumed affinity technology producers often claim to have for science fiction, allusions to space travel in these instances can be seen to perform the work of the air pump in Bruno Latour's analysis of nineteenth-century laboratory science. [332] Writing about the air pump invented by Robert Boyle as a model of the modern laboratory, Latour drew an explicit parallel between the air pump as a space without air, effectively without atmosphere, and outer space. The air pump, in other words, announced the kind of science that saw itself as at once in the world, outside of it, and also above it, reflecting the broader scientific rationality that increasingly interpreted and shaped the world, all the while pretending to hold the world at a distance.

The air pump did more than encode scientific positivism at the level of form. It also prefigured a certain globalism, a desire to see the world as a singular, unified, coherent whole. Similarly, it is not only science fiction fetishism recast in data science clothes that is at work in the images of data that refer to outer space as a model. The aestheticization of data as a project rooted in generating height, where data are viewed to offer the "bird's eye view" of a problem, a view located as high above as the galactic cloud, certainly lends data streams representational authority. However, the cosmic imagery also reduces the world to an observable phenomenon that one can take in not only as if from a safe distance but as a whole.

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[330] The tricorder is a medical body scanner that is meant to "accurately diagnose" thirteen conditions at the wave of a hand, inspired by a device of the same name used in the popular sci-fi series *Star Trek*.
[331] In April 2017, QualComm announced that no team had met its original specifications for the $7 million grand prize, but three highest-performing companies received a total of $3 million in prize money.
[332] See Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993).

A friend working as a computer engineer at a wearables company only confirmed this sentiment when he explained to me: "Data is really knowledge derived from a height of 10,000 feet."[333] For him, the "knowledge derived from 10,000 feet" pointed to the sense of perspective that data, especially "big data," appear to offer, as though information aggregated at scale itself ladders up to a more advantageous vantage from which to see. My interlocutor's comment was intended as a critique, but only because he felt that the sense of perspective that data offer typically comes at a cost to detail one could otherwise see from up close. This sense of distance and galactic altitude is likewise evident when data points are visualized in "cluster maps" that all but mimic an interstellar cloud.

Many of the people I spoke with about their self-tracking efforts likewise explained that gathering data offered a sense of loftiness and distance. Life is lived as a close-up, as though the zoom on the photo camera is turned all the way in. Without data, Sharon, for instance, described feeling out of control because of her inability to see what was happening around her, right under her nose. She was immersed in the experience, but she lacked perspective. By contrast, data allowed her to zoom out, to adjust the frame, putting her in the figurative control seat to manage life as though from a distance. "Now I'm manipulating the numbers by making sure that I'm eating right and getting enough activity … once I started doing that [gathering data], I could see clearly."[334] And again, where emotions are seen to plunge one in a problem foreclosing proper decision-making, data helped remove the person from a situation, creating space for self-reflection. Speaking of her challenges with losing weight, Sharon explained that the data she collected helped her get a handle on her problem by allowing her to separate herself from the

[333] Field notes, October 2015, on file with the author.
[334] Sharon, interview with the author, September 2015.

issues she has been dealing with. Gathering data helped her keep her concerns at arm's length and from overwhelming her. "Creating that distance and knowing it's the numbers helps you go … oh, wait, it isn't me, it's just my choices. Let me make some better choices." At one point, Wolf also compared data gathering to the work of the macroscope, borrowing the term from climate scientist Jesse Ausubel. In coining the neologism, Ausebel combined words "microscope" and "telescope." The microscope and the telescope were inventions that opened up new fields of vision; they allowed people to see both near and far. The macroscope characterized a new vision opened up by information technology that now made it possible to also see wide, to integrate stray bits into larger wholes, like the weather patterns gathered by people in various parts of the world, into a singular pattern. Wolf adopted the term to describe the possibilities self-monitoring devices offered to regular people. "A telescope sees far," Wolf noted at a TedEx conference in Amsterdam. "A macroscope sees how things are connected."[335]

The perceived relationship between height and data gathering, of data gathering as a project rooted in the broadening of perspective that reveals "how things are connected," may also account for some of the reasons why the airport has become a favorite site for advertisements of wearable technology, IoT platforms, and data integration solutions. As I traveled during fieldwork, I often encounter expansive posters gloriously stretched throughout the airports' main halls (Figure 36).

[335] Gary Wolf, "Quantify Yourself," Tedx Amsterdam, November 25, 2011, http://tedx.amsterdam/2011/11/gary-wolf-quantify-yourself/

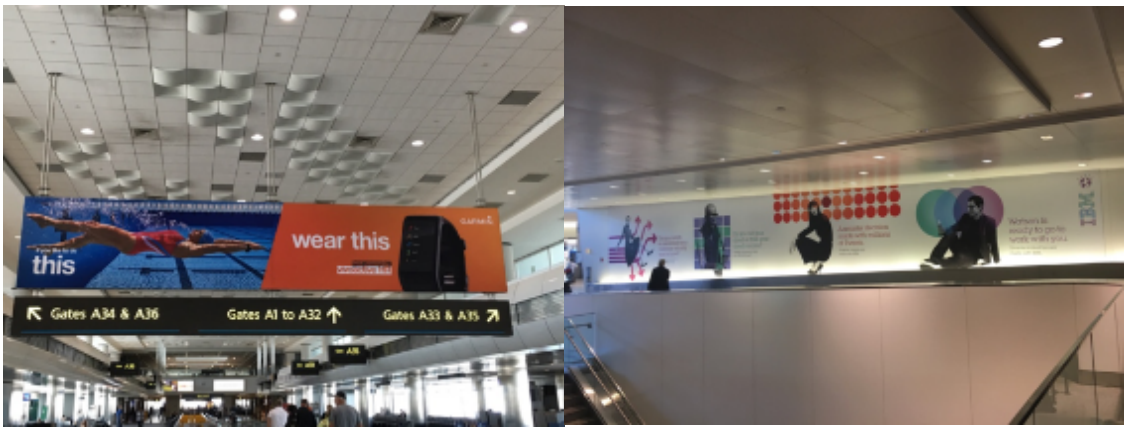

Figure 36: Ads for data-processing software and wearable technology in SF and Denver airports.

The relationship between data and height is even reproduced in the aerial imagery invoked to narrate business success of tools that generate this data. A project that goes well is said to have "taken off" or to "skyrocket." When discussing budgeting and resources, investors and business developers often speak of having enough "runway" – capital – to "launch" a business, as though a start-up were itself a spacecraft being shot into space, the brightest becoming "stars." QualComm has referred to aspirational technology that missed the spot but that nevertheless reached "high" as "moonshots."

The idea of a world as a collection of aggregates that can, with the right technology, be gleaned as a totality also borrows from an earlier socio-technical imaginary, one that offered a space-age update to the editorial "we" that print capitalism, as Benedict Anderson had noted, formally established.[336] One example of this imaginary is an image of the Earth taken from outer space, titled the "Blue Marble;" an image that has since become legendary. Captured by the crew of the Apollo 17 mission in 1972, it pictures a tiny Earth barely the size of a marble set against

[336] Benedict Anderson, *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (New York: Verso, 1983).

the unfathomable vastness and darkness of space.[337] Rather than as an immense object too large to encompass, the photograph has helped reframe Earth as a manageable, knowable, and unified singularity. During the Cold War era, as historian Paul N. Edwards has noted, this imagery helped express the idea that computer systems that were being developed concurrently also advanced: that the world was a comprehensible whole and could be firmly grasped and continuously monitored.[338] For readers of the *Whole Earth Catalog*, first published by Stewart Brand in 1968 at the height of the Space Age, the view of Earth taken from space has likewise emerged as the catalog's central visual mnemonic, serving as a key bridge between notions of technocratic and social unity (Figure 37). "In the *Whole Earth Catalog*," writes Fred Turner, "Cold War technocracy itself had granted its opponents the power to see the world in which they lived as a single whole."[339] The conceptual unity (re)produced through the image, Turner argues, later helped foreground the invoked community of the World Wide Web, one that has helped update ideas of a global community united by technical systems for the digital age.

In the halo of this galactic imagery, the contemporary iconography of data likewise advances a notion not only of a unifiable self but of a singular humanity that, through being digitally united in its differences, can now also be rendered as a commensurable whole. Personal data are therefore imagined not only as global, as bits that will string together the world, but on the model of the globe, as an existing totality that modern devices need only learn to discover. Communion through data, a common humanity discovered through interoperable data sets,

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[337] NASA,"Blue Marble – Image of the Earth from Apollo 17." Nasa.gov. https://www.nasa.gov/content/blue-marble-image-of-the-earth-from-apollo-17

[338] Paul N. Edwards, *Closed World: Computers and the Politics of Difference in Cold War America* (Cambridge: MIT Press, 1996).

[339] See Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago and London: The University of Chicago Press, 2006), p. 83.

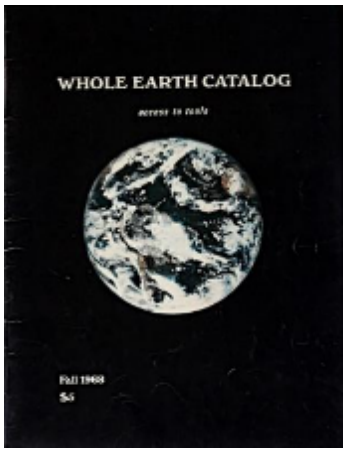

Figure 37: Cover of the first edition of the Whole Earth Catalog

marks an apotheosis of Marshall McLuhan's notion of the "global village" that prefigured and helped fuel the globalizing language of the World Wide Web, now transposed increasingly onto personal data.[340] These are the same ideas that are actively in play in corporate diversity policies or in the images of the Quantified Self as a community of globally dispersed members united by their common interest in said data.

Traveling with Baggage

Where data are increasingly seen as singularities that both traverse and unify the world, the plurality of data has become a growing practical concern. "Data is not only siloed; it's different," warned a presenter at the Quantified Self Public Health Symposium, regretting this pesky heterogeneity. The goal of the Quantified Self Public Health Symposium, convened through a grant from the Robert Wood Johnson Foundation, was to discuss how self-tracking may help benefit public health. During the event, the infrastructural, commercial, and technical

[340] Marshall McLuhan, *Understanding Media: The Extensions of Man* (Cambridge, MA: MIT Press, 1994).

impediments that often hold desired commensuration of data at bay instead emerged as the unofficial theme of the day.

In technical settings that increasingly agitate for the "interoperability" of data, the plural now largely represents the redundancy, repetition, or duplication of effort that continues to frustrate desired commensuration of divergent data sets. For the speaker I quote above, the bureaucratic red tape encountered in the medical or research fields that make it difficult to share and move personal data between institutions or individuals, such as the Health Insurance Portability and Accountability Act (HIPPA) regulations, were emblematic of larger impediments that stood in the way of data. Others fretted about powerful conglomerates like Google, Facebook, and Apple that selfishly held data hostage in their "gated gardens," precluding data from coming together in ever more productive ways. Largely, these obstructions were viewed as a problem that needed to be cleared away. As the presenter spoke, proponents of "open data," like Madeline Ball, nodded along. As a founder of the research firm Open Human that made it possible for people to "donate" their digital data streams to research to ease the practical barriers to data access by scientists as well as to circumvent institutional bureaucracy, she was particularly invested in this borderless worldview.

Later during the same event, the room broke into smaller groups to brainstorm means of "aligning data" and to explore impediments to "data access." When we reconvened in the auditorium after an hour, we placed our thoughts, written down on large pads of paper, onto easels set up on stage. As everyone took their seats, Susannah Fox, an executive with the Pew Research Center's Internet Project, took on the unenviable task of quickly summarizing key issues from the stage. Although there were many ideas to go through, only moments later Fox announced "Data Flow" as the central theme. "Data Flow was any card that had anything to do

with interoperability," she hastily explained.[341] Rachel Kalmar, a data scientist and an organizer of the popular San Francisco Meetup "Sensored," quickly intervened. "Flow is a metaphor that makes us think of data as water, which makes it seem that data is easy to move. I'd like to suggest that we see data as travel. It takes effort to move and it comes with its own baggage," she cautioned Fox and the audience from her seat.[342] The room erupted with excited murmurs, and a flurry of approving tweets on Twitter flagged her comments for further public circulation.

Rachel's comment touched on a common sentiment. Thinking of data as something that could "flow" as water was a problem, but it was not the concept of flow that was in itself flawed. Rather, the challenge for many in the room was the pesky plurality of data, in other words the "baggage" that slowed and weighted data down, one that restricted the capacity of data to connect and to flow. That "baggage" represented the "silos" that created needless duplication of information, preventing data from crossing institution and physical boundaries without tension. "Baggage" was also a euphemism for the chaos of multiple standards, like the variegated metrics for "steps," that produced a stream of pale simulacra that frustratingly did not all properly align.

Travel is not simply a metaphor for challenged connections. As Talal Asad had noted, travel does not only unite; it separates. And when travel does connect, it does so unevenly. Suffused with associations of Western notions of progress and modernity, the figure of travel disguises inequalities and dynamics of power that shape mobility.[343] If, as theorists have often

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[341] Field notes, May 2016, on file with the author.
[342] Field notes, May 2016, on file with the author.
[343] Patrick Joyce, for instance, explores how liberal subjectivity was constructed alongside infrastructural projects that sought to open up the city for improved circulation and movement. As nineteenth-century philosophers advanced notions of free-moving and free-choosing subjects, cities like London and Manchester began constructing open roads and boulevards that simulated this type of mobility. The desire for freedom was constructed by these infrastructural developments as much as they emerged as sites that also symbolized the freedom of the liberal subject. The water pipe surfaces as the main conduit of liberal values in Joyce's historical analysis. While the citywide water pipes and sewer systems on the surface appear as objective feats of engineering, Joyce argues that the

claimed, mobility has become a modern condition, Asad condemns the "cheerfulness" with which these assertions are frequently made. As seen even in the divergent experiences of the "expatriate" versus the "migrant," capacity for movement is not universal. Rather, he notes, "power realizes itself through the very discourse on mobility." This is why Asad cautions that mobility is "not merely an event in itself, but a moment in the subsumption of one act by another."[344]

In recent decades, political philosophers and social theorists have additionally argued that difference cannot easily be resolved or aggregated. The world does not simply add up to the sum of its parts. Not only is there rhetorical power in allowing differences of opinion to surface, as Ernesto Laclau and Chantal Mouffe argued some time ago, but, as a wide body of work has since explored, the power dynamics underwriting images of cohesion and translation undercut any easy assembly of difference into equitable, continuous, or seamless wholes.[345] Borders and boundaries are not only dividers separating otherwise continuous spaces, impediments that now can become lifted through advanced technology. Partitions recreate and reconfigure space.[346] As I will continue to discuss in the last chapter, they also overwrite it, submerging competing narratives in the process of opening up or bringing new ones to the surface.[347]

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city's hydraulic infrastructure emerged as a major and largely unacknowledged "arm of government." See Joyce Patrick, *The Rule of Freedom: Liberalism and the Modern City* (London: Verso, 2003), quote on p. 69.

[344] Talal Asad, *Genealogies of Religion: Discipline and Reasons of Power in Christianity and Islam* (Baltimore and London: Johns Hopkins University Press, 1993), p.10.

[345] Ernesto Leclau and Chantal Mouffe, *Hegemony and Socialist Strategy: Towards a Radical Democratic Politics* (New York and London: Verso, 1985). See also Nancy Fraser, "Rethinking the Public Sphere: A Contribution to the Critique of Actually Existing Democracy," *Social Text,* 25/26 (1990): 56–80. See also Starosielski's discussion of the network connections that unevenly enable Internet access around the globe. Nicole Starosielski, *The Undersea Network* (Durham, NC: Duke University Press, 2015).

[346] See, for instance, Paul Kockelman, "Keywords: Enclosure and Disclosure" in *Public Culture* (Durham, NC: Duke University Press, 2007), pp. 19, 2.

[347] See Harvey, where he works through Lefebvre's tripartite of space (material space, the representation of space, and spaces of representation) to think about ways all these converge with tensions, creating an always variable and contested experience of space: David Harvey, "Space as a Key Word," Paper for Marx and Philosophy Conference, May 29, 2004, Institute of Education, London. See also: Elizabeth A. Povinelli, *The Cunning of Recognition:*

There is then an opportunity to reevaluate the notion of "travel" that Rachel had proposed. For Rachel, the metaphor of travel helped expose the challenges, the "baggage," that rendered the coming together of data sets a weighty rather than a seamless task. By contrast, Asad's notion of travel as that which is shaped by power offers a way to think of data as a residue of ongoing contestation, of both the opening up of commensuration and of its closing down. Here, the language of "real estate" that many technology executives default to, as I discussed in an earlier chapter, can also be read in a new way. Thinking of the body as "real estate" over which wearable technology makers constantly compete can very well help reaffirm that data are products of a mediated reality and that they are continuously written and rewritten by social, political, and economic imperatives. Whereas the language of "open" data sets is the vocabulary of public-facing proclamations and engineering aspirations, the rhetoric of "real estate" is the stuff of private industry grumblings – one that exposes the actual politics of personal data that the public discourse on open data sets formally disguises. The language of "real estate" reveals openness as a by-product of boundary making and position taking rather than of their perpetual elimination. It also exposes the fact that any community of data (points) achieves only a tenuous union.

The contemporary discourse on data, one that is equally mirrored in office diversity policies as in trepidations about the (lack of) difference in the Quantified Self, has colonized the conversation on personal data and their social effects, increasingly proposing to only see data in the singular. Thinking about the plurality of data, as I will continue to do in the next chapter, of

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Indigenous Alterities and the Making of Australian Multiculturalism (Durham, NC: Duke University Press, 2002); Wendy Brown, *Regulating Aversion: Tolerance in the Age of Identity and Empire* (Princeton, NJ: Princeton University Press, 2006).

ways data do not only link together, helps to once again give the plural – that is data in the plural – a place.

PART IV:

CLEAN DATA

Chapter 6: Emotional Sweating

As Karen, Rachel, and I are waiting for everyone to gather, we are sharing artisanal chocolates that Karen brought in because it's Valentine's Day. Today, I am accompanying the group on a visit to M University's "lab" where we plan to test the emotion-sensing ring that Karen, a cognitive psychologist and designer, has developed.[348] The "lab" is a weekly gathering of computer engineers and tinkerers hosted by M University's computer science department. In true laboratory fashion, entrepreneurs and university students come here to collaborate on new ideas and to explore "emerging" ideas in the works, like the lab's state-of-the-art Virtual Reality (VR) program called Shark Tank. The VR and the collaborative environment are among the reasons we are here too. We plan to evaluate the effectiveness of the ring, which is still in prototype, while visitors take turns completing a simulated dive amidst a school of sharks by wearing the VR glasses, as well as to mingle with fellow inventors. The previous chapter examined the staging of data sets as singularities. The invoked singularity of data captures none of the social complexity of data gathering and interpretation, I argued. As I follow the team to public presentations, investor meetings, and the experimental "lab" at M University, I examine how the singularity of data is repeatedly undermined.

The key tension that I explore throughout this chapter derives from the contrasting ways Karen talks about the device she has developed. When discussing the mechanics of the ring, Karen represents the ring as something technical and precise, characteristically situating the impassioned subject to be tracked by the device within the dispassionate frame of scientific discourse. The ring, she explains, works by detecting trace amounts of "galvanic skin response"

[348] The name of the university has been changed to protect the privacy of the participants.

otherwise known as "skin conductivity," a subtle bodily emission that dips or rises when the body enters flight-or-fight response. The secretion is correlated by the medical community with the onset of a psychological event. While many commercial gadgets use heart-monitoring as a barometer of emotion, heart-rate can spike easily in response to both physical and psychological exertion. By contrast, skin-conductance is unaffected by physical activity. For this reason, Karen calls skin conductance a "cleaner" signal. However, that skin conductance is a cleaner signal also seems connected to the fact that it can only be detected by technical means and is therefore not contaminated by human mediation. While a person can feel their heart-rate rising, changes in skin conductivity are hard to spot without mechanical assistance. Long known to psychology, Jung had even declared skin conductance "a looking glass into the unconscious."[349]

Although Karen promotes the ring as something that detects a cleaner signal, the clarity of data produced by the device becomes blurred when Karen speaks about the ring to less technical audiences and translates the specialized terminology into idiomatic vocabulary. For instance, when I struggled to get a sense for what skin-conductance really is given that it is not a bio-signal one can see or feel, Karen proposed that I think of skin conductance as "emotional sweating." The shift from skin conductance to emotional sweating may seem banal. However, if emotional sweat is meant to represent some of the properties of skin conductance, there is already something startling in the characterizing of a cleaner signal in terms of sweat, a bodily discharge that frequently elicits feelings of disgust. Typically, sweat is something clean bodies lack.

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[349] Brown, Barbara. "Skin Talks – And it may not be saying what you want to." Pocatello, Idaho: Field Enterprises, Inc. Idaho State Journal. p. 3,2

This chapter is situated in the space between the ring as that which registers a cleaner skin-conductance signal and emotional sweat. My analysis resonates with George Bataille's treatment of bodily effluvia.[350] In his writing, corporeal emissions like sweat, excrement, or spit figure as uncomfortable remainders of a totalizing logic. These secretions offer a material challenge to hygienic discipline that sought to produce clean and orderly subjects. They leak, pour, or spurt and in the final analysis subvert a calculating rationality that aims to decisively stabilize and discipline unruly bodies. Similarly, the rhetorical conversion of a clean skin-conductance signal to emotional sweating opens up an important space of tension and reveals a messier reality that frustrates the possibility of seeing the emotion-sensing ring only as a gadget that retrieves clean and steady signals from passive bodies. While there is increasing awareness even in engineering circles that "raw data is an oxymoron," data are still largely seen to move linearly from dirty to clean.[351] Thinking about skin conductance in terms of emotional sweating helps to upset this trajectory.

The first section focuses on the work of translation in digital self-tracking. Media critics often worry that device developers aim to obscure the gap inherent in digital translation to dangerous effects. By contrast, I argue that when Karen translates the role of the ring for different audiences, she inadvertently reveals that translation is more than a process of faithful commensuration. In translating, she exposes what the longing for cleaner signals covers: that the body is a cultural and not just a biological entity, that affect accumulates in the body and does not simply show up in digital recordings, that bio signals require a human interpreter and are not self-evident. Not only does translation fail to produce neat and totalized subjects, I show that

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[350] See: George Bataille, *Visions of Excess: Selected Writings, 1927–1939* (Minneapolis: University of Minnesota Press, 1985).
[351] Lisa Gitelman, "*Raw Data" Is an Oxymoron* (Cambridge, MA: MIT Press, 2013

device developers are actually invested in widening this differential for profit, contrary to popular belief.

Part two of this chapter opens with a glitch. Technology breaks, but the imaginary of technical breakdown is not evenly distributed. In places like Nigeria, as Brian Larkin notes, breakdown represents the "default state of technical existence."[352] In the Western framework, by contrast, technology is often seen to work so well as to practically disappear from consideration. It emerges only in moment of failure.[353] In this section, I use the temporary disrepair to recover ideas that otherwise become submerged in images of self-monitoring technology as that which surfaces clean signals without resistance or interruptions. When the ring functions as intended, it is often characterized by Karen as a rational device that is used to make sense of emotional subjects. The breakdown of the ring instead exposes the device rather than the person as that which is emotional and excitable. Although the excessive sensitivity of the ring is something that Karen works to repair, the technical rupture also reveals that extreme sensitivity is the desired effect of self-tracking tools whose function is often coded in gendered and feminized terms. In this section, I explore how gender shapes the way digital devices work. When conceived as a rational device intended to make sense of the human sensorium, the ring can appear to do little else but to collect sober bio-signals put out by emotional bodies. When viewed as a technology wrapped up in gendered dynamics, the clinical certainty and clarity of the device and the signal becomes muddled.

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[352] Brian Larkin, "Degraded Images, Distorted Sounds: Nigerian Video and the Infrastructure of Piracy," *Public Culture,* Volume 16, Number 2 (Durham: Duke University Press: Spring 2004), p. 291.
[353] Martin Heidegger famously noted that breakdown brings previously unconscious processes into awareness. For example, we become aware of a doorknob only when it malfunctions. See discussion in Hubert L. Dreyfus, *Being-in-the-World: A Commentary on Heidegger's Being and Time, Division 1* (Cambridge: MIT Press, 1991), 70.

In the final section, I return to the "lab" with a functioning device but continue to focus the conversation on the politics of knowledge and representation to upend the stoic certainty and singularity of data generated by the ring.

Data in Translation

At the lab, Karen summoned us to take a look at how the ring had captured the "pleasure" she had experienced while eating an apple. We huddled around as Karen pulled her laptop close to let us see the spiky graph running across her computer screen. Karen explained that she was eating the fruit while wearing the ring, but that as it was happening she had not paid her snacking any special attention. When she later looked at the data, Karen noticed that the ring had inadvertently captured the satisfaction she had felt. We gazed at the meandering lines, that appeared to have surreptitiously documented Karen's gastronomic experience, as she guided us to the peaks and valleys that pointed to the "intense sensation of me eating an apple."[354] As we talked, Rachel's eyes wandered to the half-eaten Valentine's Day chocolate, another symbol of pleasure, still lying on the table. "Maybe we should run another test while wearing the ring and subjecting ourselves to chocolate," she playfully suggested.

Emotional sweat is a metaphor. When Karen compares skin conductivity to emotional sweating, her analogy offers to see sentiment in terms of bodily effluvia. She simultaneously equates the bio-signal with mood. In other words, Karen proposes not only to think of feelings in terms of perspiration, that is as a concrete and palpable substance that seeps out of bodies, but to also think of skin conductance as commensurate with sentiment. She views data as prone to

[354] Field notes, February 2016, on file with the author.

similar fluidity. The ring that Karen has developed is not new, but it does offer one important innovation. Earlier contraptions were bulky and difficult to administer and carry, restricting their use to laboratory settings. Now that the mechanism has been condensed dramatically to fit neatly within the finger-size device, Karen hopes that the ring can help "remove the lab" and allow scientists and researchers to study emotions "in the wild."[355] She does worry that, with the barriers removed, the ring can have unintended consequences. "The device is revealing your personal information, it's your basic signal. You are leaking something that is not supposed to be represented," she expressed concern, speaking it seemed both of skin conductance, the subtle bodily emission, as of the digital data collected by the ring, that she also feared was now at risk of escaping its natural as well as mechanized constraints.

As a metaphor, the notion of emotional sweating also plays a familiar role in the context of personal computing. The move of the computer into the home was precipitated by several important innovations, such as the mouse, that has helped to accommodate the computer for use by a non-specialist audience.[356] Whereas early computers required users to know how to code, the mouse made it possible to interact with the computer through a tactile vocabulary already familiar to a non-technical user: through a series of simple movements and clicks. The popularity of personal computing was also bolstered by a shift from a dialogical to a direct model of computer interaction. Instead of conversational commands that had to be entered to activate computer functions as recently as the 1980s, the direct interaction model sought to obviate language altogether by facilitating computer use through a set of familiar icons. [357] In the direct

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[355] Field notes, November 2015, on file with the author.
[356] The computer mouse was first developed by Douglas C. Engelbart in 1964.
[357] See discussion in Dennis Tenen, *Plain Text: The Poetics of Computation* (Stanford, CA: Stanford University Press, 2017).

interaction model, computer metaphors assumed a central function; seen by engineers as an important explanatory mechanism that translated complex technical processes for the lay user. Figurative trash bins, libraries, and folders were incorporated widely to translate for the user what was happening within the computer – as they continue to do today. When Karen substituted emotional sweating for skin conductance, she seemed to do so with a similar purpose. Just as computer use is now largely powered by a panoply of metaphorical devices, so emotional sweating as a substitute for skin conductance is meant to make the ring usable for people who do not possess complex technical or medical expertise.

Engineers believed that computer metaphors established a sufficient equivalence between figurative devices and computer processes. The presumed similarity, however, occludes the practical incongruence between computer metaphors and automated tools. Dennis Tenen examines the trash bin as an operative example. The familiar action of tossing the trash does not actually result in full deletion of a document. Although the document may indeed disappear from the user's purview on the computer screen, it may continue to linger on servers and databases. The difference can beget damaging social and political effects.

The purported explanatory function of computer metaphors and their limitations echoes with anthropology's own formative disposition toward translation. The work of early anthropologists was often aimed at rendering unfamiliar experience of "exotic" others in more conventional western terms. Not unlike early computer engineers, early anthropologists saw themselves as engaged in the work of translation, habituating Western audiences to unfamiliar social concepts and territories. Tenen calls out the restrictions of the metaphor with respect to computer code. Talal Asad points to the limits of translation as it relates to anthropological

work.[358] In the mode of cultural translation, the exchange of knowledge is staged as an equitable transfer. Although the concept of translation suggests a process of charitable commensuration and transportation of knowledge across linguistic and cultural lines, Asad points out that the notion of translation also disguises important dynamics of power. The anthropologist as translator does not simply speak on the other's behalf; anthropologists, he says, often wield the final "authority in determining the subject's meaning" and so the power to dictate what it is the other has said.[359] In making this critique, Asad is particularly attuned to the ramifications of translation conducted under the auspices of already unequally divided global powers. Under these conditions, he worries ethnographic writing does not simply transpose meaning from one cultural medium into another, but very well may act as the "privileged element in the potential store for historical memory for the non-literate society concerned." [360] The trope of translation posits society as a static document that can be unequivocally accessed and read. "But," Asad notes, "society is not a text that communicates itself to the skilled reader. It is people who speak. And the ultimate meaning of what they say does not reside in society – society is the historical condition in which speakers act and are acted upon, speak, hear, and overhear."[361] The notion of society as a product of human activity also suggests that there is no singular society to be discovered and translated as such.

Karen uses the phrase "emotional sweating" as though it were a direct substitute for skin conductance, paralleling the imputed function of metaphors in the context of computing. While knowing something about emotions or sweating may help one to grasp something about skin

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[358] Talal Asad, *Genealogies of Religion: Discipline and Reasons of Power in Christianity and Islam* (Baltimore: Johns Hopkins University Press, 1993).
[359] Asad, *Genealogies of Religion,* p. 196.
[360] Asad, *Genealogies of Religion,* p. 196.
[361] Asad, *Genealogies of Religion,* p. 187.

conductance as a biometric measure, skin conductance, much like the computer metaphor, is also not directly reducible to these figurative terms. This is because the body is not just a text to be skillfully "read," translated, or reduced to numbers. To paraphrase Asad, it is not just the body, but people who speak. The body is not simply a pre-linguistic factuality but also something that is configured through language and social practice. The apparent coherence and universality of the body conceals – as Terence Turner had written, summoning a rich tradition of theoretical reflection on embodiment – that the body itself "consists essentially in the process of self-productive activity, at once subjective and objective, meaningful and material, personal and social, an agent that produces discourse as well as receives it."[362]

In comparing skin conductance to emotional sweating Karen suggests seeing sentiment as something that shows up in the body as though emotions were a substance that can be gathered and studied. Feelings thus appear as discrete, sensible, and amenable to precise detection. In practice, this language only reveals the cultural and historical logic that shapes the way people are invited to receive and make sense of both data and bodies.[363] Terminology like emotional

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[362] Terence Turner, "Bodies and anti-bodies: Flesh and fetish in contemporary social theory," in *Embodiment and Experience,* ed. Thomas J. Csordas (Cambridge: Cambridge University Press: 1994), 46.

[363] See discussion in Shigehisa Kuriyama, *The Expressiveness of the Body and the Divergence of Greek and Chinese Medicine (New York:* Zone Books, 2002). The language of skin conductance as a "cleaner" signal that emerges from the body is an extension of the Western anatomical gaze. Kuriyama historicizes this mode of inquiry. The anatomical gaze departs vastly, for instance, from the language of the body offered by traditional Chinese medicine, as historian Shigehisa Kuriyama suggests, where altering attention to the body's surfaces contrasted drastically with the Western medical tradition. Rather than seeking to distill elementary forms and segment crisp categories, Chinese medicine historically proceeded through more nuanced logic, Kuriyama writes. The dynamic and multiple Eastern "mo" discerned by Chinese doctors cannot be made easily commensurate with the rhythmic singularity of the pulse perceived by Western medics. Similarly, the sculpted definition of the muscular anatomical body stands at odds with the fulsome, fleshy plentitude of the body articulated by principles of acupuncture. The exposed physical and symbolic membranes of the "Body Worlds" and the "Body Metrics" exhibits that I discussed in Chapter 1 proposed to see the anatomical gaze that digital discourse parodies as both universal and universally denuding. Yet the disjuncture between Chinese bodies and Western paradigms was folded straight into the folds of the *Body Worlds* exhibit increasingly adopted as a parallel for the digital imaginary depicted in the "Body Metrics" exhibit where, ironically, it is the bodies of deceased Chinese elderly persons, all preserved over thirty years ago, were made to account and speak to contemporary American and European life and politics.

sweating acts like "tuning forks," as Kathleen Stewart and Jennifer Carlson poetically propose in a different context; they are "magnets for attention and activity. When something comes up, it's through them that feelings take shape."[364] In our particular case, it is also the apple or the chocolate as a conduit of "pleasure" or the virtual reality Shark Tank as a cultural shorthand for "excitement" that affect whether or not one searches for these particular emotional expressions in the data gathered by the ring, in the first place. While physiological processes may appear to become more sensible through this terminology, they are not reducible to these terms. Devices such as Karen's ring may propose to cut through language and to move beyond it to access the (universal) body and sentiment lying in wait, but they also obviate the possibility of identifying a signal for affective states, tout court.

Stewart's work additionally helps to think about how affect accumulates rather than simply surfaces in the body. Her broader language of slow accretions foregrounds a focus on the "ordinary," to the hum-drum minutia of the everyday.[365] "Attention to mood opens up the everyday stuff of which lives are made," she and Carlson now write, "in the midst of world-historical events, imploding narratives of how life 'is' or 'was' in a particular location into a complex of objects and attachments formed through the repetitive rhythms of everyday life."[366] Affect, the authors note, coalesces rather than just appears, becoming deposited in the body slowly, across time, in a myriad ways. Against this imaginary of slow accretions, it is both seductive and insufficient to talk of a signal that sporadically shows up in the body as a specific something that can then be neatly witnessed, correlated, translated, and digitally transcribed.

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[364] Carlson and Stewart, "The legibilities of mood," p. 123.
[365] Kathleen Stewart, *Ordinary Affects* (Durham, NC: Duke University Press, 2007).
[366] Carlson and Stewart, "The legibilities of mood," p. 123.

Finally, the bio-signal cannot be presumed to be self-evident. Despite Karen's insistence on skin conductance as a cleaner signal, in our conversations I learned that skin conductivity is often hindered by the practical variability of bodies. Skin conductance fluctuates with age, individual physiology, and even environmental factors. People who are more anxious have higher skin conductivity, Karen explains. But skin conductivity is only a crude barometer of emotion. While low arousal often correlates with feelings of sadness, anger and joy, all three are marked by states of high skin conductivity so without additional contextual cues, the signal remains difficult to decipher. Older people typically have lower skin conductivity as compared with people who are younger. If it is too cold, skin conductivity is low. But the skin conductance measure is also affected by heat. If it is too hot, the metric will become skewed. Laughing about the specialized conditions required to take an accurate skin conductance signal, Karen notes that "basically, on a cold day, young people will glow," referring to the LED light she has added to the ring to indicate whether skin conductivity is high or low. [367] And to see how heat affects the reading of the signal, Rachel joked that what we may need to do is to "embarrass people on a hot day." In my research, I've often come across similar corporeal and environmental impediments to interpretation that continue to trouble the ideal conditions necessary to derive a proper signal from one's body. Despite the rhetoric of nudity that I discussed in the opening chapter, these technical challenges suggest that there is no singular nor universal body that technology can help uncover – only that devices are calibrated to certain kinds of bodies.

The role of the expert in translating between the technological output and the body further challenges the idea that mood is readily available for technical detection. For instance, contrary to the imagined optics of mechanical objectivity, anthropologist Joseph Dumit's work

[367] Field notes, January 2015, on file with the author.

on Positron Emission Tomography (PET) scans helps to show that mechanically derived bio signals become manifest only through the intervention of a skilled interpreter. The PET scan, he notes, was often cast in the characteristic mode of mechanical objectivity as though the "image that (objectively) speaks for itself" existed in a binary relationship with the "expert who (subjectively) reads its lips."[368] The work of such a device was constantly situated above subjective experience. The purpose of the mechanized brain-scan was to "reduce ambiguity to make things clear, and clearly acceptable."[369] In practice, it was the human translator who rendered the biometric both visible and sensible.

For Dumit, the courtroom, where PET technology first started to enter as expert testimony, was the perfect stage where the full drama of this paradox could be placed on display. Despite the expectation that "the image speaks for itself," lawyers repeatedly underscored the need of the jury to learn to read the image, emphasizing that this information is not in itself self-evident. "Be sure to spend adequate time with your witness to work out your approach and format for elevating the jury from a plane of zero knowledge on this technology to a plane of adequate knowledge so that they can interpret the demonstrative evidence which you have to offer" one lawyer counseled his attorneys on the use of PET scans.[370] Although the brain scan is presented as in itself transparent, its declarative clarity is made visible, so Dumit shows, only through assisted scientific authority. "Picturing the brain" required not only precision technology, but also specialized knowledge and expertise in order to see. The expert's subjective perception forms not simply a contrast to objective reading, but becomes an important

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[368] Joseph Dumit, *Picturing Personhood: Brain Scans and Biomedical Identity* (Princeton, NJ: Princeton University Press, 2004), p. 18.
[369] Dumit, *Picturing Personhood*, p. 18.
[370] Dumit, *Picturing Personhood*, p. 119.

component of mechanized discovery. Like Asad's figure of the translator, the expert is not a neutral body through which information passes as though from one medium or language into another, but one who has the authority to create the image; to not only "read its lips," but also to constitute its digital and corresponding bodily form.

In Dumit's research, the expert's role was always visible. The virtue of this presence was that his or her testimony could, in principle, be contested and challenged. Technology that detected skin conductivity in the body, such as the polygraph exam, has similarly historically relied on the testimony of experts trained in the vagaries of social circumstances, devices, and bodies. Today, as wearable technology transitions out of professional settings such as research facilities and medical offices, and into consumer hands, many social critics worry that the true interpretative work is being progressively disguised within the background "black box" operating system of the machine, the expert increasingly removed from view and therefore becoming more difficult to confront or challenge.[371] While the user is often extoled by vendors as "empowered" by wearable technology because she or he is presumed armed with "democratized" knowledge that previously resided only in specialized hands, scholars decry that automation of decision-making increasingly produces an abdication of agency to technology.[372]

Despite these fears, device developers do not so easily obscure the incongruence between the metaphorical and the biological processes. On the contrary, or perhaps simultaneously, the gap between the metaphor and its referent is also something that entrepreneurs often seek to expand for profit. Colloquial terminology such as emotional sweating thus does not only fill an

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[371] Frank Pasquale, *The Black Box Society: The Secret Algorithms That Control Money and Information* (Cambridge, MA: Harvard University Press, 2015).
[372] Natasha Dow Schull, *Data for Life: Wearable Technology and the Design of Self*. BioSocieties 1–17 (London: Macmillan Publishers, 2016).

explanatory function, but also helps companies to take advantage of the linguistic slippages these comparisons allow.

The relationship between skin conductance and emotional sweating is similar to other substitutions common in the wearables industry. Consider figurations such as "wellness" widely used in place of "health," or terminology like "suggestions," "insight," or "advice," that are regularly employed as an alternative to "diagnosis." It may at first appear that companies resort to this vernacular to help translate the routinized and specialized language of technology and science for their customers, using the terminology in the way computer engineers characteristically employ metaphorical devices: in order to facilitate the use of certain computer functions. The substitutions, however, also have a legal purpose. While surrogate terms bask in the halo of official terminology, they also help shield companies from very real fiscal or legal responsibilities. Using terms like "health" or "diagnosis" requires businesses to meet stringent accuracy standards and to comply with costly and rigorous Food and Drug Administration (FDA) or Health Insurance Portability and Accountability Act (HIPAA) regulations. Terms like "wellness" and "advice" are free of these legal and technical obligations. An entire legal and promotional apparatus has emerged, advising companies about terms that may get them into legal hot-water and the softer language to use to circumvent these legal and technical constraints. Scanadu, for instance, initially boldly billed by its founders as a "medical" rather than simply as a "wellness" device, was forced to discontinue technical support and production for its devices in early 2017 because the gadget failed to meet FDA standards. Commentators have since viewed Scanadu's failure as a linguistic rather than purely as a technological one: the reason the company lost credibility with its customers was that it did not situate its work in a fitting linguistic frame.

Wearable device developers do source legitimacy from the perception that their technologies are increasingly producing automated and exacting scientific knowledge. At the same time, colloquial terminology helps companies distance themselves from a too-close association with concrete science. Linguistic volatility abets the dynamics that underwrite the wearable industry. Using colloquial substitutions that approximate their scientific or technical referents enable businesses to successfully achieve two things: to simultaneously claim that the devices they produce parallel technology that may meet more stringent regulatory and legal demands, at the same time as permitting companies to claim that their tools do no such thing and only offer "advice" on general and non-specific forms of "wellness," a rhetorical modality that cleverly enables companies to escape legal or technical accountability. When emotional sweating becomes recruited as a parallel to skin conductance, what precisely the device may tell becomes not simply promising or dangerous, announcing the hermetic closure of signification and analysis, but also diffuse, elusive, alterable, and almost purposefully difficult to firmly stabilize or establish. In so doing, the shift from technical to lay vocabulary helps remove the device developers from any legal responsibility to deliver on any one specific promise. The fluid movement between scientific terminology and lay vocabulary allows companies to claim that, like subjective expressions, what their devices really produce are only loose directives, mere opinions rather than scientific or objective knowledge.

In Karen's case, the substitution of emotional sweating for skin conductance is still used casually, mostly to dramatize the capabilities of the device. Yet it is these seemingly natural slippages, ones that sound like free-hand exchanges, like mere translations, that allow wearable makers to both align their tool with authoritative science and at the same time to take advantage of the semantic variability of terms that appear to express little more than subjective opinion. The

translation work of technical or scientific language into user knowledge does not simply create commensuration, but as Asad noted of cultural translation, becomes shaped by dynamics of power, in this case by corporate power. While appearing simply to express specialized knowledge in more accessible user terms, situating wearable devices through such colloquial terminology only helps entrepreneurs suggest that they have produced authoritative knowledge and simultaneously claim that these tool should only be used playfully and not truly taken at their word.

You're So Exciting

Whether the ring captures a clean signal or emotional sweat again surfaced as an issue as we settled in at the lab to try the ring with visitors for the first time and the device stopped working. Karen picked at the wires trying to get the ring going as we huddled around her waiting for the ring to emit signals of a sensible life – of the device as of the body. The ring has been fitted with a small LED light that Karen had rigged to grow brighter or dimmer in response to the rise or fall in skin conductivity. If the light glows bright red, one's psychological arousal has peaked. If it grows faint, the pale signal points to the onset of psychological calm. When Karen gave a presentation about the ring to a group of engineering students during a class visit, students swarmed her afterwards to take their turn with the ring. They probed one another with progressively more embarrassing questions to try and make the light on the wearer's finger quiver. One classmate asked his peer about dinner, another probed about last night's dreams, one more asked to know a sultry secret. The ring flared up in hot flashes of red in response to some questions, growing dim at others. While the students mostly kept their answers to themselves, the glimmer of red light or its absence seemed to signal a clear answer for the classmates in the

room. Now, the light that flickered and danced on Karen's finger appeared to her to lack a referent. On her computer, lines formally correlated to the bio signal captured by the ring flitted across the screen in erratic succession. Karen wiggled her finger, adjusting the ring as we watched for the graph and the ring to come back into alignment. At times, the ring's light went dark and then occasionally beamed red again. By all accounts, the ring was still "on." As Karen worked to repair what she was certain was a lost connection, I wondered aloud: "How do you know that it's not working?" "You see?" Karen jostled the limp wires and motioned to the irregular spikes on the screen. "It has become very jumpy," she shook her head. "It's very excited."

Karen typically situates the devices through a masculine lens of rational discourse, staging the ring as a cooling agent applied to bodies flushed with emotion. When the ring fails, the masculine frame momentarily breaks down as well, exposing an erratic and emotional response that has historically and stereotypically been linked with female bodies.[373] The present excitement and excessive sensitivity of the device is cast as a temporary problem. The glitch, however, opens a way to think how feminized labor is a constitutive and not an exceptional factor in the operation of self-monitoring technology like this ring. Emotional sweating can then be viewed as an additional euphemism for the emotional labor – really, the sweat equity – performed by women as a contrast to the view of skin conductance as a disembodied, masculinized, and clean bio-signal that emerges all on its own. Theorists have continuously noted that technology routinely contributes to the molding of accepted gender roles and that technology itself is shaped by existing gender norms. Recent scholarship has mostly focused on

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[373] For an example, see discussion in Emily Martin, *The Woman in the Body: A Cultural Analysis of Reproduction* (Cambridge: Beacon Press, 1987). Martin discusses how women's reproductive organs and processes like menstruation and menopause is often seen negatively, as a that over which women have no control.

the former.[374] But contemporary self-tracking tools are also increasingly animated by familiar gender tropes.

For one, as a sensor that is intended to be continuously worn on the body, the ring requires the forms of "attunement" to individual bodies that sociologist Kara Mary Van Cleaf parallels to the focused vigilance characteristic of "attachment parenting," a style of parenting where the mother is encouraged to be in constant presence of her children, for instance by carrying infants in special slings throughout the day so as to remain attentive to their minutely changing needs.[375] Secondly, the gendered resonances echo in the technology's more specific disciplinary affiliations. The ring was developed within the context of Affective Computing, the branch of computer science that deals with emotions. The field was founded by an MIT engineer Rosalind Picard in the 1990s and over the last several decades, Picard's work has helped to bring both greater interest in emotion into computing and more women, like Karen, into MIT.[376] Women are cast as effective bearers of sentiment in technical settings in ways that also exceed the parameters of Affective Computing, resurfacing familiar tropes that equate female bodies with emotion. At one conference for wearable technology that I attended, for example, a female executive chided the still largely male audience for simultaneously developing technology that disregards human emotions and for not hiring enough women who, she would believed, would help incorporate that human quality into product design. Women's purported affective faculties

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[374] For an example, see discussion in Debora Lupton, (2015). Quantified sex: a critical analysis of sexual and reproductive self-tracking using apps. *Culture, Health and Sexuality*, 17(4), 1–14. Lupton focuses her analysis on ways marketers selling self-monitoring tools geared around sexual activity target male users with messages of pleasure but focus on fertility and reproduction when it comes to the female audience. See also Rachel Sanders, "Self-tracking in the Digital Era: Biopower, Patriarchy, and the New Biometric Body Projects," *Body &Society* Volume: 23 issue: 1, page(s): 36-63.

[375] See discussion in Kara Mary Van Cleaf, "Our mothers have always been machines: The conflation of media and motherhood," in *The Digital Sociology Handbook*, edited by Jessie Daniels, Karen Gregory, and Tressie McMillin Cottom. (Policy Press).

[376] See Rosalind W. Picard, *Affective Computing* (Cambridge, MA: MIT Press, 1997).

are thus often presented as something that can help round out the edges of cutting-edge cerebral, rational, and masculine technical innovations.

As a device intended for personal use at home, it is female or at least feminized grunt work that is additionally seen as being automated by the ring. These affiliations draw upon the emotional labor of monitoring and record-keeping that often falls on women's shoulders. Women have historically not only taken on a disproportionate level of care and monitoring of the family, but have long acted as the family historians, organizing family memorabilia into scrapbooks, family albums, and journals.[377] The ring is inadvertently cast as a device that will take over the labor of noticing that is still typically performed by women in the home. In one example of the device's desired use, Karen discussed with me how she hopes this technology will find application in a family context. She was especially excited about the results of one experimental trial. In this scenario, a mother was arguing with her teenage daughter. During the argument, the mother failed to recognize her daughter's growing anger until she noticed that the ring her daughter was wearing started to glow bright red. Alerted to this sudden sign, the mother checked her anger and her voice, having realized that her daughter was more upset than she had disclosed. In this case, the ring had both subsumed the emotional labor mothers are often expected to perform at the same time as it was presented as a tool that may improve the quality of awareness mothers are socially expected to "naturally" possess. In so doing, the ring only

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[377] For women and housework see: Ruth Schwarts Cowan, *More Work for Mother: The Ironies of Household Technology from the open Hearth to the Microwave* (New York: Basic Books, 1983). For women and memory keeping: Holland, Patricia. 1991. "Introduction: History, Memory and the Family Album." Pp.1-14 in Family Snaps: The Meanings of Domestic Photography, edited by J. Spence and P. Holland. London, Great Britain: Virago Press; Martin, Rosy. 1991. "Unwinde the Ties that Bind." Pp. 209-21 in Family Snaps: The Meanings of Domestic Photography edited by J. Spence and P. Holland. London, Great Britain: Virago..

elevates the social burden of affective management that already disproportionately falls to women's hands as it works to discipline women to become "attentive" mothers.

The role of the devices as that which will supplement or supplant maternal oversight has a parallel in the way the figure of the woman qua mother configures the broader social reception and staging of self-tracking tools. In casual talk as in the press, self-monitoring technology is routinely cast as automating "mom guilt." These comments are not reserved for the sensational article, alone. Device developers earnestly endorse these associations in conference sessions and in marketing materials. The French home surveillance system Mother does double duty in this regard by packaging its sensors in a structure that takes inspiration from the Russian *matryoshka* doll, the traditional symbol of maternity and fecundity. The device, which comes with "cookies" (as portable sensors were called) that customers could place throughout their home to monitor anything from visitors entering the house to the consumption of actual cookies, are all connected to the digital hub dubbed Mother. When it was first unveiled for the U.S. market at the Consumer Electronics Show (CES) in 2015, the device attracted a lot of attention. As I jostled for space around the exhibition table crowded by onlookers and journalists, I managed to ask an executive about the decision to name the device in such a literal way. People find comfort in the fact that "mother" is always watching, the executive nonchalantly explained. Self-tracking is thus framed as a benevolent "Big Mother," the figurative foil to the paternalistic and sinister Big Brother associated with corporate or government surveillance. [378]

[378] I take the term "Big Mother" from a Buzz Feed article reporting on the trend, but these were also the terms in which Chris has cast his relationship to self-tracking technology. Anne Helen Petersen, "Big Mother Is Watching You," *BuzzFeed,* January 1, 2015,, www.buzzfeed.com/annehelenpetersen/the-track-everything-revolution-is-here-to-improve-you-wheth?utm_term=.os6ygadD6#.usxl7ydpJ

Chris expressed a similar sentiment when he compared his avid digital self-monitoring to the diaries his mother wrote. His mother collected copious records about his life ever since he was born, boxes and boxes of which she eventually mailed to his home when he was already an adult. "This is you," she told him when they arrived. "This is who you are."[379] The journals reached Chris at a low point in his life and when he lost his mother suddenly to a terminal illness a year later, he picked up where she had left off, slowly building up his life as he built up his digital collection. "The ten areas that I started tracking were Spirituality, Money, Food, Health …you know, they were all from my mother," he explained to me, presenting his digital self-monitoring as a technical ode to her. For Chris, self-tracking felt maternal, as an extension of his mother's caring oversight that she had kept over him during all of those years without him even knowing. The protective gaze, he felt, now transferred to the mechanical device.

The same gendered bifurcation is echoed in the way devices targeted for the home are routinely christened with female sounding proper names, the best known of which are Amazon's Alexa, Apple's Siri, and Google's Julia. This is a trend that even inspired the Hollywood film *Her*, in which the main character falls in love with his Siri-like digital assistant voiced over by Scarlett Johansen. During fieldwork, several of my male interlocutors repeatedly recommended that I see the film to grasp the significance of a data-driven future. In a field rife with "founding fathers" but more forgetful of its "founding mothers," as Karen noted bitterly to me once, the tendency to default to feminine names echoes with the more venerated tradition of referring to technology such as ships or cars by female-gendered pronouns, a move that also helps to situate male inventors in paternalistic terms and extends the affiliation of technology with a patriarchal view of the female body as something that the owner then controls. However, given that the

[379] Field notes, April 2015, on file with the author.

computerized devices are advertised largely as automated personal assistants intended for the home, often depicted in promotional materials as tasked with such mundane duties as searching for directions, keeping track of song lists and birthday invitations, or reordering a bar of soap, the anthropomorphizing of these tools through female proper names and pronouns also resuscitates the history that has connected female labor with administrative and supportive roles.

IBM's AI system, named Watson, offers an important contrast to the female nomenclature that dominates devices promoted for the home. So named after the IBM visionary Thomas Watson, the system's name is one of gravitas that also invokes associations with the famous confidant of the fictional detective Sherlock Holmes. While tools marketed for personal self-monitoring are frequently connected with a female identity, Watson, voiced over in commercials by a male baritone, is marketed as a computerized male colleague whose technology is suited for the scientific laboratory or the executive suite. In one publicity stunt, Watson even participated in a round of *Jeopardy*, a match that "he" successfully won. Watson, Siri, Julia, and Alexa are all based on machine learning and natural language processing, technology which, despite the singularity of their names, is supported by teams of data scientists, marketers, and engineers. In public representations, however, the tools are differentiated through their imputed gender. And whereas devices that are gendered male are relegated to a professional role, the tools that are linked with unskilled, routine, administrative, and emotional labor of the home are regularly personified via the female form.

The framing of domestic or clerical work as female labor, one that self-tracking tools merely automate, also reanimates the computer industry's own gendered past. It is well documented, for instance, that history has encoded within computing two different forms of gendered labor from the start. The term "computer" characterized the work of female aids, who,

when coding still required the physical manipulation of wires and bulbs rather than the swift entry of code written on a keyboard, programmed the machine by hand. [380] Women were thus viewed as isomorphic with the machine they helped automate. The notion that operating the computer was women's work because it was seen as low-skilled manual labor lingered even as programming became a more mechanized function. By 1958, John von Neumann and Herman Goldstine hardened the term "software" into place to differentiate the "'head work' of (male) scientist, or 'planner,' and 'hand-work' of the (largely female) 'coders'" in the first programming textbook.[381] The relationship between computing and administrative duties, moreover, was supported by the fact that computers were then still largely viewed as word-processing machines whose operation was coextensive with female-dominated secretarial duties.

Historian Nathan Ensmenger suggests that the shift of programming to a masculinized field came only in the 1960s, when employers, under pressure to recruit more talent as programming needs continued to rise, sought to elevate the field's prestige. They did so by slowly connecting computer programming in job announcements and employment aptitude exams with complex thinking and numerical expertise, skills then associated with male-dominated engineering and mathematical fields. Ensmenger points to the part played by job announcements and newly emerging aptitude exams in shifting perceptions of computer programming from low-skilled female labor to a male-centered, skilled, and cognitively taxing role. Historians have also highlighted the impact of advertising campaigns of the period. Promotional materials generated by computer giants like IBM helped reframe the computer from a tool that was associated with secretarial labor to one that became increasingly viewed as a male

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[380] Wendy Hui Kyong Chun, *Programmed Vision: Software Memory* (Cambridge, MA: MIT Press, 2011).
[381] Nathan Ensmenger, "Making programming masculine," in *Gender Codes: Why Women are Leaving Computing,* edited by Tomas J. Misa (Hoboken, NJ: John Wiley & Sons, 2010), p. 15

executive's right hand.[382] As computer manufacturers sought to explain the value of computers to corporate managers who constituted their key clientele, advertising and promotional manuals increasingly connected computer use not just with routine administrative work like word processing and typing performed mostly by their female employees but with the executive decision-making of the male C-suite.[383]

Despite the equitable rhetoric of "inclusion" favored by corporate executives today that I discussed in the previous chapter, these gendered expectations continue to stratify the roles that men and women take on in technical settings, gendering technology within and outside of the office. By framing the work of self-monitoring in the image of the woman that the device increasingly subsumes, contemporary self-tracking technology does not simply create "more work for mother," as Ruth Schwartz Cowan had famously noted of modern tools like washing machines and microwaves that were intended to alleviated the work of women in the home but instead created new and more frequent chores.[384] In capitalizing on these gendered socio-technical configurations, digital self-tracking tools also further embed sexist and patriarchal ideas that have connected women qua mothers with domestic oversight into technology otherwise staged as objective, universal, and gendered only in the sense that they monitor the output of different types of bodies. The feminization of self-monitoring technology reads as an unsettling extension or perhaps even endorsement of gendered tropes often believed to have been overcome or to be absent from tools viewed as scientific, neutral, and objective.

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[382] Paul Atkins, *Computer* (London: Reaktion, 2010).
[383] Nathan Ensmenger, *The Computer Boys Take Over: Computers, Programmers and the Politics of Technical Expertise* (Cambridge, MA: MIT Press, 2010).
[384] Ruth Schwarts Cowan, *More Work for Mother: The Ironies of Household Technology from the open Hearth to the Microwave* (New York: Basic Books, 1983).

It is not just self-tracking technology, but also personal data that are animated by gendered tropes. In technical settings, personal data are naturalized by being connected with the female form.[385] In one of my conversations with a digital entrepreneur named Sasha, she presented data precisely in these terms. As we spoke about her business – a digital platform that would allow people to sell the personal data they produce from self-tracking activity directly to interested corporate sponsors – she enthusiastically intoned:

> So I am out to get the girls. How do I get girls? I'm not going to get the girls by bringing in the boys and really talk about girls and boys together in the bar. I'm going to get people to go to the bar because this bar has the most awesome restroom where all of the girls gather and share lots and lots of secrets, interesting stuff about themselves that helps them get the boys. So we could share all of this data and talk about it as individuals amongst ourselves, and then we go to the boys in the bar. My job is to win the girls.

Speaking to me as another woman, she scanned my face for signs of recognition before continuing:

> I want to create a data revolution. Because it's all about us. That's when you see that a lot of the lexicon I use is about revolution. It's about reclaiming your data. It's about re-empowerment. It's about using computational tools that companies have, for ourselves.[386]

Besides the radical commodification of the body thus implied, of particularly interest to me are the gendered terms in which Sasha made her business case, delivering this idea with the ease of someone who has uttered these words in boardrooms or conferences many times before. On the surface, "girls" and "boys" are simply metaphors for the consumer and the corporation

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[385] For a connection between materiality and nature with women's bodies, see, for example: Judith Butler, *Bodies that Matter: On the Discursive Limits of "Sex"* (New York: Routledge, 1993); Sherry Ortner, "Is female to male as nature is to culture? In M. Z. Rosaldo and L. Lamphere (eds), *Woman, culture, and society* (Stanford, CA: Stanford University Press), pp. 68-87.

[386] Interview with the author, June 2015.

personified in familiar gendered terms. The figure of the woman, after all, has long operated as a synonym for the lay user. Design specifications, such as "Make it easy enough for my mom to use," or "So simple my 97-year-old grandmother can figure it out,' or "Imagine you're designing for your mother," abound in professional setting.[387] In Sasha's example, "boys" and "girls" helped to differentiate between the private user who creates and sells data and the potential corporate party who would pay for it. Although tech companies currently make a profit from the data generated by their user-base by selling or trading the information to interested partners and marketers, there is no developed mechanism in place that would simultaneously enable people to make money from the data they produce. Sasha is one of several entrepreneurs now working to create such a platform, which she here metaphorically calls the "bar," that would allow private users – the girls – to trade directly with interested companies – "the boys." This gendered framework even helps Sasha to conceive of her company as a feminist technology that will help to rebalance the power dynamics between the girls and the boys all the while staging the trade in personal data as a mating ritual between people and corporations.

When users are cast as isomorphic with their data, talk of "the girls" also emerges as a euphemism for the personal data people generate. "Getting the girls," as Sasha puts it, speaks directly to the data she hopes the boys – the corporate clients – will be able to access. While the bar constitutes the mutual space – the market place – where users and companies congregate, the space where data – the girls – come together is allegorized as a woman's bathroom. Fittingly, in exploring this idea, Sasha started in her own bathroom, connecting every item in it to a digital sensor. The women's bathroom is a space that has conventionally existed outside of the male

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[387] Jeff Weir, "Please Stop Designing for Your Mother," *LinkedIn,* September 23, 2015, www.linkedin.com/pulse/please-stop-designing-your-mother-jeff-weir

gaze. Because this is one of the few places in a woman's life that the boys – the companies – currently know least about, Sasha reasons that corporations will be willing to pay top dollar for this information. Where data are conjured through the visual of the female bathroom, the familiar trope of nudity with which I opened this dissertation, is also close at hand, a trope that indeed now returns as a woman in the nude. The invoked connection between data and women's bodies helps to implicitly ratify personal data as one's very nature exposed.

Gendered connotations also color the conventional language of data's liquidity and flows. Flows, leaks, streams, oceans, rivers all form the popular vocabulary that describes the way data course into devices and out of bodies. There are many ways to parse these metaphors. In the context of the role gender already plays in digital self-tracking, however, it is hard to overlook the gendered tones of this vocabulary. These terms inadvertently equate data gathering with the fecundity of female bodies. It is the invoked relationship between data and female bodies that allows practitioners like Karen and Sasha to think of personal data in terms typically reserved for menstrual fluids; in other words, to think of data producing bodies, as Karen has said, as "leaking something that is not supposed to be represented."[388] When Sasha establishes an equivalence between the productivity of data and female bathrooms, her analogy likewise borrows from the productiveness of menstruating bodies. In many ways, self-tracking is thus framed by a doubled female image and not just by masculinized rationality, as is often claimed by pundits, critics, and practitioners. On the one hand there is the figure of the fertile, laboring mother discussed in this chapter. On the other is the naked *femme fatale* that opened this dissertation, that mediates the discourse on data transparency as one shaped by attraction, danger, seduction, and taboo.

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[388] See discussion in Emily Martin, *The Woman in the Body: A Cultural Analysis of Reproduction* (Boston: Beacon Press, 1987). Martin discusses menstruation is largely correlated with a sense of loss of control.

To stage self-tracking or the data this activity helps produce in the image of the woman or the female body is not to say that this technology is at all intended for women. The opposite is often true. Many wearable devices are still simply too large for a female body. One of the reasons this remains so, I am often told, is that despite the availability of increasingly more compact sensors, electronics are still not small enough to fit into devices appropriate for a woman's smaller frame. This can create awkward moments. A friend shared with me how she participated in a 2015 design sprint for an Android watch. This experimental workshop, which gathered female designers and engineers, was aimed at exploring ways the company could better market its wearable devices to a female audience. The sprint was held at Google headquarters, on March 8th, the International Women's Day, of all days. The women worked in teams, discussing their ideas as they struggled to actually comfortably fit the bulky gear onto their own wrists. The reason that the male wrist and pattern of use is often still seen as the minimal requirement to meet in speculative device development reflects an entrenched belief that to design for a man is to design for the general case whereas to design for a woman is to design for her specific or "special" needs – for instance by developing a period tracking gadget. Much like the cockpit in early aviation or the first airbags installed in automobiles, which were both initially designed with the male body in mind, the cultural expectation of the "typical" wearable user shapes the way these technologies are taken up in social life.[389] Digital self-tracking tools are often eulogized by inventors like Karen as technology that helps to expose intimate self-knowledge seen as otherwise all but buried within. The gendered history that presses these

[389] D. Johnson, "Sorting out the question of feminist technology," in *Feminist Technology*, edited by Linda Layne, Sharra Vostral, and Kate Boyer (Champaign, IL: University of Illinois Press, 2010), pp. 36–54.

devices and data into shape, however, helps surface other kinds of bodies that guide how these tools are seen to produce sensible knowledge.

As I watched Karen try to steady the irregular flickering of the LED light and the jerky patterns scrawling across her computer screen, I wondered how she knows when the ring has curbed its own excitement and the irregular lines began to indicate individual arousal. She paused to consider it. "It's just this sense that I developed because I've been working on it for a long time," she finally explained, unable to quite put her experience into words. In creating a device that tunes into our bodies, it is engineers like Karen who first have to tune themselves to the device. For the sensor to begin its work of rationally reading the emotions of others, it is Karen that must first calibrate the sensor properly, to calm and stabilize its exuberant response. Trying to get a better sense for the "ear" required to thus calibrate the device, I asked: "Is it like tuning a guitar?" thinking of the signal as something that plucks just so at an emotional chord? Karen shook her head. "No, it's more as though you are balancing a ball." Thus conjuring digital monitoring as a fragile balancing act between the wearer, the developer, and the device was a far cry from the transparent certainty that started this conversation where skin conductance represented a clean and static signal that was read out in rhythmic staccato by a composed and logical device. Technical certainty and objective rationality dissolved in that moment, and at the center all we had was a finicky gadget whose temperament and sensitivity we had to contend with before it could contend with our own.

"Whoot!" came a sudden noise and we all jerk our heads up in surprise. Jorge came up behind Karen and startled her, and immediately the momentary excitement sent a spike streaking across Karen's computer monitor. The correlated signal sent another jolt of enthusiasm through our little group. "You're so exciting!" Karen exclaimed, speaking to Jorge, but it also seemed of

the ring itself. Our group burst into chatter, elated that the device registered the moment and started up again.

Feelings about Feelings

As evening fell and the device began to work, we finally settled in for our scheduled user-test. Jorge was one of the first to be strapped into the technical trifecta of headphones, VR glasses, and the ring. Karen pushed the button for the VR film to begin and we waited patiently for the ring to start delivering a measure of how Jorge was "reacting" to the simulation of the shark rattling his submerged virtual cage, to her computer screen. As the shark began its offensive, we monitored Karen's computer for spiky lines that would indicate Jorge's "excitement." Despite the shark's continued onslaught, Jorge's reaction quickly flat-lined. The line-graph of Jorge's VR experience tracked by the ring reported back a steady and "boring" line. "We expect data to show constant change, to see the lines going up and down, but flat-lining can be a good thing," I remembered a data scientist comment on a panel I attended once, speaking about the aesthetics of data monitoring that affect the way people often evaluate data produced by self-tracking tools.[390] As Jorge's arousal traced an even line, I could see Karen begin to worry that the ring had broken once again. When the exercise was over, she rushed to check in on her device. It was working fine. "You're a calm guy," Karen laughed, looking over his results. We joked: "Jorge, you must have nerves of steel!"

Jorge's experience with the VR system and the ring contrasted sharply with my own. I looked forward to the shark attack simulation, particularly as I heard others in the room talk

[390] Field notes, September 2014, on file with the author.

admiringly about the life-like feel of this VR experience. But when I started my virtual adventure, I quickly realized that the reality of it had not matched my ambitious expectations. During the five-minute viewing, most of my attention was instead trained on managing the suture between the VR and the ring. I swiveled back and forth in my seat, bending my head back to get a full 360-degree view of the virtual scene, though given that I could not see what was actually happening in the lab around me, I moved about slowly, careful not tip over in my chair. Moreover, although the VR environment was meant to feel "immersive," with headphones helping block out external sound that could contaminate the experience, I could still hear voices in the room and was distinctly aware that people were watching me move around awkwardly in synch with the scene only I was seeing through the VR headset. All the while, I also kept a mental check on my left arm on which the ring was placed so as not to damage or rip out wires which, given that the ring was still in prototype, still protruded from its sides. Overall, I recall thinking that I was fairly underwhelmed. "How did it go?" I asked once the film was over, expecting a similar result to that of Jorge. To my surprise, I learned that "I was emoting all over the place." Unlike Jorge's linear affect, my data traced a jerky and erratic line. At first, I felt slightly embarrassed by this "emotional" presentation. Jorge teased that I may just be a "secret schizophrenic." I laughed uncomfortably when someone noted that being so "emotional" was pretty unusual for someone from Russia like myself, a country stereotyped as cold and severe. By contrast, Jorge, who was originally from South America, surprised everyone by not presenting as a "hot-blooded" Latino.

While most of these responses were uttered in jest, the spontaneous mock-assessment does point to the preconceived ideas that often shape and intervene in data analysis.[391] This anecdote also helps show the distance between data and experience. When laid out on the graph, the data appear clean and legible. In practice, the device at once revealed too much and not enough. The narrow record of my "psychological arousal" contrasted with the diverse sensations and emotions that I had felt at every point of the experience, and sometimes all at once. Excitement comingled with boredom, curiosity with responsibility, sheer exhaustion (it was late at night and we had already been there for hours) with the desire to please and appear engaged. It was an emotional mixture that would be difficult to neatly distill into a staccato of "clean" signals. Earlier, Karen had quipped that the ring could help remove the "lab" and allow scientists and researchers at last to study emotions "in the wild." The ring, she hoped, would help expand the lab to the entire world. By contrast, what the ring had inadvertently revealed was that the world, to paraphrase Bruno Latour, has been inside the laboratory all along.[392]

When I asked Karen whether the ring she had developed was similar to the popular mood ring of the 1970s, she flatly dismissed the correlation. The mood ring measured heat; it was mercurial. Moreover, the mood ring itself was just a toy. The ring she has developed was a scientific tool. In its time, however, the heat-based mood ring was heralded as grounded in sound science and had to be used with caution. "Using liquid crystals (the kind that make those fancy desk thermometers light up with the right temperature), the pair devised a way to bond the crystal to quartz-stones set into rings," a *Chicago Tribune* article had announced about the novel invention at the time. Because of the potential hazards of self-disclosure, the article advised that

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[391] Safiya U. Noble *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: New York University Press, 2018)
[392] Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993).

the ring's use should be restricted to entertainment only: "It is a surefire conversation starter at parties. The possibility of Mood Rings catching on for business wear, however, seems remote. Imagine a confident salesman making his pitch, only to have his Mood Ring betray his real state of mind by turning nervous black."[393]

The device I described here is a prototype, what start-up entrepreneurs call, ironically, an MVP. MVP is not an acronym for Most Valuable Player, but for Minimally Viable Product. The Most Valuable Player represents the most accomplished member of the league. The MVP in the context of digital innovation, often represents the opposite – not the best iteration, but the one that meets the bare minimum standards of usability. An MVP, moreover, is not the final iteration, but only a "proof of concept," something to demonstrate how a final version may work – and a promise to investors that with proper resources, it will. The MVP is thus still full of holes. The imperfections are instructive. They help to point to the friction that later comes to seem resolved and smoothed out in the "final" product. The move from an MVP to the final, market-ready device produces a false sense of closure, not least because the moment of perfection never comes. To some degree, every iteration can be seen as an MVP. If self-tracking tools were presented as perpetual MVPs rather than as objective know-it-alls, it would be possible to better see the myriad decisions that account for how to count and what to count as data. This more complex reality emerges in the gap between the ring as that which captures clean signals and emotional sweat.

As we were wrapping up at the lab with Karen, I looked over to another group that was struggling to get their device to work. Karen reminisced about her college days when tools inevitably broke just as time came to present them. Back then, she recalled, failure was accepted.

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[393] Mary Knoblauch, "Mood ring monitors your state of mind," *Chicago Tribune*, October 8, 1975.

No one was expected to produce a perfect product. Just then, something fell into place and our neighbors' device began to work. The engineers breathed a sigh of relief as they wiped beads of sweat from their foreheads. "Don't look at it!" someone mockingly urged. Holding their breaths, they approached their sensitive tool with caution, careful not to upset the balance.

Conclusion: Purity and Data

When I first met Chris for dinner to discuss his interest in personal data, I noticed him quietly slip a napkin from the table as we spoke and tuck it into his pants pocket. He did so casually, as a practiced habit, with hardly so much as a second thought. Today, Chris is largely lauded for his digital collection. "We see in people what we need to see in them" a character from the TV series *The Americans* had once explained to her daughter. And in Chris, reporters prefer to see an exemplar devotee of digital self-tracking, a veritable cyborg in the flesh who is isomorphic with his personal data. One article starts with Chris jogging on his treadmill, the running commentary drumming off his performance numbers as quickly as he is moving his feet: "His heart rate is 81 beats per minute and he's speaking about 77 decibels."[394] Another presents his day-in-a-life as a staccato of statistics: "how many emails he sent (21), how long he slept (8 hours and 35 minutes), how many steps he took (8,088), and when he took his dog to the park (1:04)."[395] Although he has become best known for his interest in digital data, his collection started out analog. Long before he found his way to Fitbit and to Twitter scraping software, Chris lovingly assembled life-size scrapbooks filled with paraphernalia from years gone by. Ever since he was young, Chris nabbed knickknacks from places he's visited – theater tickets, matchbooks, pictures – and tacked them to his growing pastiche, holding on to the items as tokens of different experiences in his life. The boards often feature centrally in narratives of Chris, but they largely stand as silent backdrop, their seeming clutter a foil for his digitally streamlined life.

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[394] Signe Wandler, "The Man and the Machine,"*Mediacom,* February 24, 2017, https://www.mediacom.com/uk/article/index?id=the-man-and-the-machine

[395] Ira Boudway, "Is Chris Dancy the Most Quantified Self in America?" *Bloomberg,* June 5, 2014, https://www.bloomberg.com/news/articles/2014-06-05/is-chris-dancy-the-most-quantified-self-in-america

One can see Chris' analog archive in some of the articles profiling his digital habit. An exposé published in *Mashable* includes an image of him seated regally in an ornately carved wooden chair against a backdrop of loose paper, receipts, photographs, and seemingly random artifacts (Figure 38). The article provocatively begins: "The walls around him are a scrapbook of his life, pinned with foreign currency, concert tickets, and pictures of his icons, like Michael Jackson and Andy Warhol."[396] But then, without further commentary, the author turns to tech, never reflecting on the analog. In a photograph taken for *Bloomberg,* Chris's boards

Figure 38: Photo by Bianca Consunji, Evan Engel for Mashable.com

also adorn the background, but the author and editors have focused the reader's attention on the many gadgets Chris wears to monitor his life with bullet points, prompting the reader to click on the tiny red dots peppering his body to learn more about the data he derives from each device (Figure 39).[397]

[396] Samantha Murphy Kelly, "The Most Connected Man Is You, Just a Few Years from Now," *Mashable*, August 08, 2014, https://mashable.com/2014/08/21/most-connected-man/#MqGWAs8r0Gqk.
[397] Boudway, "Most Quantified Self."

Figure 39: Photo by Benjamin Rasmussen for Bloomberg BusinessWeek

In these accounts, Chris's boards and the personal data derived from his digital devices appear framed by their imputed contrast. They are conceived as binary opposites of one another. Chris' boards chiefly impress in their mess. They are presented as chaotic shrines to memory and cultivated identity filled with souvenirs from the past, tributes to places he's been, things he's seen, experiences he's lived through, and challenges he's overcome. Describing the significance of the boards, Chris explained to me: "they are almost skins; things I killed and conquered or want to kill and conquer.[398] Like someone may have animal heads and bear rugs. I have boots and lotions and places and behaviors. Sexual Promiscuity is a whole board in itself." The reference to taxidermy echoes with the taxidermic imaginary that often mediates data-discovery that I discussed in the first chapter, where data conjured as *second skin* were likewise imagined as momentos a past in arrested development. However, where taxidermied data may be affiliated

[398] Chris, interview with the author, April 2015.

with experiences plucked from a messy, lived reality, Chris's boards in these journalistic accounts, remain marked by the sense of disarray associated with an unruly hoard.

In Chris' home, the boards moreover complement other bottled memories, including hundreds of bottles of cologne that he had amassed over the years. "I buy cologne before I speak. …So I'll buy a bottle of cologne I've never worn before, write the date and event on it, wear it that day, and then use the cologne as a time-machine to go back to that event in the future," he had explained to me. The day we first met in New York, Chris arrived carrying a small shopping bag, a bottle of cologne he's purchased on this trip tucked away inside. Later he sent me a picture of the bottles, the care with which they were arranged a sharp contrast to the scattered channels to the past they were meant broker. The cologne bottles and the boards are veritable Proustian projects of memory, proverbial madeleines. The memories they trigger are not singular, nor linear or mono-directional. They seem to explode with many vectors of associations. In fact, he has organized in order to assist the triggering of unanticipated, surprise connections.

By contrast, the press connects Chris's digital records with purity and order. The boards overflow with tchotchkes, a muddle of kitsch culled from personal memorabilia. The digital data are viewed as clean, as organized, as easily legible and perusable. The boards appear scrambled. His personal data, by comparison, emerge as streamlined. The boards are meant to make an impression on the senses. The data: to appeal to one's sense of structure. In public narratives, Chris's move from boards to data is even staged as a process of clearing out. Articles present his take-up of digital self-tracking as that which helped bring about a massive reordering of his life: he lost weight, shed poor habits, rid of bad relationships. In older photographs that precede his digital infatuation, he is often pictured as overweight and unkempt, gazing timidly through oversized glasses while wearing an old and wrinkled T-shirt. Chris endorses this narrative. When

we spoke first met, he eagerly questioned me, “you’ve seen pictures of me before, right? I was 320lbs. Now I’m 185.” He took out an old driver’s license photo that he still keeps for reference to let me see the difference. Just as his old boards are juxtaposed to the digital data, in articles that I’ve come across, headshots of his “before” are often contrasted with his present sleek and trimmed physique and better styled hair in the “after” shots. Associated with the boards, Chris appears a man bogged down by his past. When symbolically aligned with his digital collection, he is styled as a sharp and focused man purposefully gliding into the future. (Figure 40).

Figure 40: Photo from Mashable.com’s "The Most Connected Man is You Just a Few Years from Now”

The boards were the “physical me,” he told me himself, indicating a kind of excess weight that literally took up room back when Chris also thought of his body merely as a “lump of flesh.” Now feeling lighter and more fit he thinks in different terms: “I hate to say Digital Me, but a kind of Ephemeral Me happened. I became more spiritual. The data – that’s Ephemeral Me.”[399] The narrative juxtaposition of boards to data reflects the dominant view that data are a

[399] Chris, interview with the author, January 2016.

coherent and logical arrangement of points. However, it also echoes the popular interpretation that data not only require "cleaning" but that they help to produce personal clarity.

The conventional narrative that frames personal data through references to water present data, and the person represented by them, as moving in lateral ways, to clean from dirty. This construction often loses sight of the complex ways in which personal data sets are actually generated, circulated, and used, obscuring the continuous friction that creates resistance along the way. The default language of data's clarity, moreover, makes it easy to overlook that the process of cleaning, as Mary Douglas has also noted some time ago, is itself social, cultural, and political.[400] Rather than abstracted and removed from analysis, the inherent rather than the initial variability, multiplicity, and social complexity of personal data – and their social work – has to be part of the meaning-making to which data are today increasingly put. Any consideration of personal data must remain alert to the social and historical practices that have helped define (and confine) how, when, and by whom data are rendered.

As this dissertation has explored, the working out of what personal data are or are not, is not simply about methodically getting to the thing itself as though "accuracy" were a final frontier to be crossed without turning back. The challenges encountered in distilling clean data and the lives they represent are not only irritants that trouble the generation of stable signals in their absolute. Rather, they point to the varied social and historical dynamics that always already complicate how personal data are interpreted and produced, and that govern the social effects they yield. In contemporary journalistic and popular accounts, it is only Chris's boards that are rendered in these messy terms. If personal data were instead presented by professionals and

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[400] Mary Douglas, *Purity and Danger: An Analysis of Concepts of Pollution and Taboo* (New York: Routledge & Kegan Paul, 1966).

pundits in the manner they currently assess Chris's analog collection, the apparent disarray of his oversized pastiches may help to model the thinking about personal data rather than serve as their silent other.

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