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Our Bodies, Our Quantified Selves: A Sociological Analysis of Wearable Technology

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Our Bodies, Our Quantified Selves: A Sociological Analysis of Wearable Technology

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Submitted in Partial Fulfillment of the Prerequisite for Honors in Sociology

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Introduction

Farrah Wilson opened her eyes on the first day of 8th grade feeling nervous and excited. She had just finished another night of perfect slumber—one hour of light sleep, six hours of REM—regulated by a smart eye mask, which used sono technology to lull her into an easy dream state. Downstairs, a nutrient rich protein shake was waiting for her—Farrah’s mom, Lara, had already gotten a report that she was a little low on iron and calcium that morning. As Farrah moved through her day, school assignments loaded automatically onto the Personal Organizer hub of her network, viewed with a quick swipe of her glasses. That night the Wilsons sat down to dinner, each eating a meal optimized by health reports from their wearable devices, and shared snapshots they’d taken throughout the day.

According to a marketing study done by PricewaterhouseCoopers, this is the technological utopia that awaits our society in the near future. But is this really a vision of utopia? According to the writer who discusses this study on digital news site Quartz, it sounds “pretty awful,” and he also warns readers that reading the study “may trigger feverish visions of a dystopian future.” Is wearable technology a dream come true, the beginning of the end, or something else entirely?

The Importance of Sociologically Analyzing Technology

Technological advances are heralded by some as hallmarks of societal progress and condemned by others as a perversion of nature and humanity. Neither of these polarizing narratives adequately describes the relationship of people and society to technology. In this thesis, I will use sociological analysis to push beyond clichéd cultural ideas about technology to critically examine quantified self wearable technology. To engage with the material, I will be using an approach outlined by Eva Illouz in Saving the

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2 Ibid.
Modern Soul:

...the point of cultural analysis is not to measure cultural practices against what they ought to be or what they ought to have been but rather to understand how they have come to be or what they are and why, in being what they are, they “accomplish” things for people...my analysis subscribes to the pragmatic insight that meanings and ideas should be viewed as useful tools, that is, as tools enabling us to accomplish things in daily life.³

This interpretation is not an anti-technology treatise or a futuristic utopian daydream, but rather an exploration of quantified self wearable technology as a part of a daily life, a method of creating meaning, a site of mistrust, and a source of societal conflict.

The Quantified Self: An Introduction

On the official quantified self website quantifiedself.com, bright orange letters at the top of the site inform visitors that the purpose of the practice is “self knowledge through numbers.” Scroll through the homepage and you’ll find lists of local meet-ups, instructions on how to download Fitbit data using Google Spreadsheets, articles written by users on the knowledge they’ve gained, and more. While self tracking and self reflection are a cultural practices with long histories, quantified self takes the idea of self tracking to a new level. Self-surveillant technologies, while not necessary, are certainly commonplace among quantified self devotees; these technologies produce massive amounts of data on anything from step counts to skin’s electrical conductivity. Quantified self practitioners approach this data version of their self with the mind of a data scientist, graphing, mapping, and analyzing their data to find out how to improve their health and wellness. Some users combine these practices with self experimentation; for example,

tracking sleep with earplugs and without earplugs to help determine optimal sleeping conditions.

While quantifiedself.com doesn’t keep an official history, the first archived version of the site from the Internet Archive’s Wayback Machine is from March 2008. The picture of relatively recent beginnings to the organized quantified self movement are corroborated by Google Trends which, measuring relative search volume over time, shows the first significant amount of search volume for the term “quantified self” coming in late 2010/early 2011.

Wearable technology with quantified self capabilities started to emerge as a major player in the consumer goods market with the introduction of the Fitbit in 2009. There are two major segments within the wearable technology market: specialty athletic devices and mass consumer devices. GPS watches, heart rate chest straps, and triathlon trackers are among those technologies sold to athletes. These devices are meant to be worn during training, and emphasize functionality over style. Mass consumer devices include fitness trackers that can do some of the same functions as athlete-specific devices (GPS mapping a run, for example), but also include non-fitness related wearables, as detailed in the next section. Mass consumer wearables have more of an emphasis on aesthetics, with partnerships like Tory Burch for Fitbit adding glamour to consumer wearables.

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6 Fitbit is one of the more ubiquitous fitness tracking devices in today’s wearable market. For more on Fitbit and other fitness trackers, see “Fitness trackers,” below under “What kinds of products are you talking about?”
Wearable technology, as a group of products, refers to “smart” or “connected” technologies (like smartwatches and fitness bands), not to other items (such as digital/analog watches) that are technically technology that can be worn. This “smart” type of wearable technology has seen growing market presence over the past few years, with 12.7 million units shipped globally in third retail quarter in 2014 (a 40% increase from the third quarter in 2013).7 Consumer excitement for wearable technology predicts a bright future for such products. According to a white paper published by technology consulting firm Citrix, 91% of respondents in a nationally representative survey of US consumers 18 and older expressed excitement about wearable devices, even though 70% of respondents expressed concerns, particularly regarding privacy and security.8 These respondents also expected ubiquity in the future, with 32% planning to purchase wearable technology and 60% believing the technology will soon be “as common as smartphones” are now.9

Quantified Self and Related Practices

The quantified self community consists of a core and a periphery. The core of users are the early adopters, the product creators, and others who are heavily involved in the active creation of the quantified self community. The periphery, by contrast, are

9 Ibid.
average, mass market users who are probably not involved in the quantified self community, and may have never even heard that term.

Users in the core community can be involved with three interrelated practices: biohacking, quantified self, and life logging. The following diagram shows the relationship of the three practices:

*Biohacking* is the most general of the three practices, referring to anyone who is engaging in an attempt to “hack,” or apply scientific methods systematically, to their body for the purpose of self-improvement or self-understanding. This includes quantified self, but also includes a very wide variety of other practices. Such practices include drinking Bulletproof coffee (coffee with two or more tablespoons of butter), taking
intravenous vitamins, stimulating muscles with electrical shocks, and using homemade hyperbaric chambers.¹⁰

*Quantified self* refers to measuring and recording one or more aspects of the user’s life. That data is then used for self-improvement. While this thesis focuses on users who collect their data with the help of wearable technology, data can also be collected manually.

*Life logging* is a specific form of quantified self that uses photographs to maintain a digital diary. Life loggers use devices that take pictures either continuously, at fixed intervals, or on command for the purpose of recording their daily life.

**What Kinds of Products Are You Talking About?**

For the purpose of this paper, quantified self wearable technology is defined as any piece of technology that can: a) be worn on the body, b) interface with other devices (e.g. synch with a smartphone), and c) measure and record one or more aspect of the wearer’s life. To get a sense of the devices that are included in this paper, here is an overview of the main types of wearable technology products on the market today.

*Fitness Trackers:*

When most people think of quantified self wearables, they are probably thinking of fitness trackers. Such products have taken off since the introduction of the Fitbit.

While some early wearables such as the heart-rate monitoring chest strap have been

available to and even common among athletes, this wave of consumer trackers has something for everyone, from people who want a reminder to get up off the couch to hardcore athletes looking to shave extra minutes off their marathon time.

Many fitness trackers can track more than activity. Most trackers included some kind of sleep tracking, which uses the accelerometer in the band to determine movement during sleep and give a rough picture of how long, and how well, someone has slept. Recently, products have started to roll out heart rate tracking (though this is still questionable in accuracy). Trackers generally also have the capability for GPS tracking, but generally that is a feature that one turns on and off (for mapping out a run, for example). Since some also display time, there is a blurry line between a jacked up fitness tracker and a basic fitness-oriented smartwatch; for the purposes of this paper, that distinction is not relevant since it is functionality, not product category, that is important for this thesis.

Note that not all fitness trackers are for activity. At least one could be better described as a wellness tracker; the Olive is geared toward managing stress, managing physical activity, sleep, light exposure, skin temperature, and heart rate. Some fitness trackers have other primary uses; for example, the Lumo Lift measures posture but also activity.

Common fitness trackers include: Jawbone (UP, UP24), Fitbit (One, Flex, Charge, Charge HR, Surge), Misfit (Shine, Bloom), Samsung Gear Fit, and Garmin Vivoband.
Smartwatches:

Smartwatches can be categorized into fitness specific products and consumer oriented products. Fitness specific products, such as the Pebble or Garmin smartwatches, are made and marketed specifically toward fitness buffs, and often do not have as many other smart functionalities. Consumer oriented products, like the Apple Watch, are not explicitly sold as trackers, but do include the capability to track fitness and GPS location. These consumer smartwatches also have a large range of other functionalities, and some are expected to be able to replace people’s smartphones (this is prevented by the fact that currently, one needs to synch the watch with a smartphone). In this category of consumer smartwatches I would also put the recent smartbands phenomenon; these are essentially the same as consumer smartwatches (range of functionalities including tracking capabilities, speculation about ability to replace a smartphone), but look like a band or bangle. These are not common, and I have only come across two: the Intel MICA and will.i.am’s Puls.

Common smartwatches/smartbands include: Basis Peak, Samsung Galaxy (S, Live, Fit, 2, 2 Neo, Gear), LG G Watch R, Motorola Moto 360, and Sony Smartwatch 3.

Security Wearables:

Security wearables are included because they include tracking capabilities, but these are more analogous to security keycards and other such non-wearable security products than to the other quantified self products in this section. These products track co-presence; if your device is near a smart door, smart thermostat, or smart car, it will respond accordingly by opening, adjusting to your preferred temperature, or unlocking,
respectively. These products are not particularly common at this time. Security wearables include Nymi and Senturion.

Life Logging Products:

Life logging wearables allow users to take photographs continuously, in fixed intervals, or on command for the purpose of tracking what the user does during the time they wear the product. Some products, like the Narrative clip (takes pictures in fixed intervals) or the Nixie wrist-drone (takes selfies on command) have the sole purpose of life logging. Others, like Google Glass or other smartglass products, have gained infamy for their capability for continuous video recording, but have other functions as well.

Habit Influencing Wearables:

While almost all the other products listed above aim to influence habits, one product has that sole purpose while providing no other capabilities. The Pavlok, based on the psychological principles of Pavlov, trains users to adopt habits that they wish through an incentive structure that punishes slip-ups by charging money, administers light electric shocks through the bracelet, and gives Facebook friends the option to publically shame the user.

Literature Review

This thesis will bring a sociological lens to a cultural phenomenon that, due to its newness, has not been the subject of academic study. Blogs, newspapers, marketing firms, and others have jumped to comment on quantified self wearable technology, but their analysis lacks a grounding in sociological theory and is often more interested in
promoting their market-related agendas than critically investigating culture. In this thesis, I ask what role quantified self wearable technology plays in the lives of users and in society in general. I argue that quantified self wearable technologies are sources of reenchantment from consumerist self-making and association with transcendent narratives of scientific progress. The devices, however, hide the relationship that users have with expert systems that produced the products, namely science, technology, the therapeutic ethos, and capitalism. The nature of these abstract relationships breeds ambivalence and mistrust, which manifests itself in cultural conflicts over the role of technology in society. In this thesis, I will draw on a number of relevant theorists whose work touches on four areas: rationalization and reenchantment, the self, the therapeutic ethos, and expert systems and trust.

*Rationalization and Reenchantment*

Max Weber identified what he claimed were the processes of modernity: rationalization and differentiation. These processes, taken together, formed the basis for the changes that the world would go through during the advent of modernity. Rationalization is the process by which instrumental rationality spreads, taking the place of other motivators of action. The quantified self is concretely a part of this modern tendency toward rationalization, as quantified self seeks to explain and control the body through scientific means. Rationalization, however, leads to the removal of the magic in
the world (disenchantment), because what was once mystical is now explained using science and reason.\(^{11}\)

Modernity, however, is not a linear process. Edward Tiryakian theorized about the dialectics of modernity, or, the contradictions posed by certain social ideas, and their resolution. Modernity thus has “new ways of viewing the world as magical and enchanted,” meaning that rationalization and disenchantment are countered by the reenchantment of the formerly mundane.\(^{12}\) This change has been marked by a transition from other-worldly enchantment to this-worldly enchantment, as human agency (rather than “inexorable laws”) came to be seen as the driving force of the world.\(^{13}\) Tiryakin points to Romanticism as a major example of reenchantment, as it represents “an orientation that seeks and finds, often in the imagination, the creative center of human energy, the potential for altering or conjuring a different order than the industrial one at hand.”\(^{14}\) Reenchantment can also be centered around exotism, or "the appeal or the enchantment of the unfamiliar."\(^{15}\) The exotic acts as “compensation” for the "sea of grays" of industrialization, and also as an outlet to escape the “Victorian ethos” of sobriety.\(^{16}\) Exotic goods, and exotic lands, are also a veritable bounty of profit for anyone who can sell the enchantment that the exotic provides.\(^{17}\) Technology, in a world where all the land has been ‘discovered’ and formerly foreign locales can be viewed online, is a


\(^{13}\) Ibid., 84.

\(^{14}\) Ibid., 85.

\(^{15}\) Ibid., 86.

\(^{16}\) Ibid., 87.

\(^{17}\) Ibid.
prevailing form of the exotic. New technologies are indeed unknown and foreign to people whose realities did not include capabilities that the technology provides.

George Ritzer elaborated on reenchantment further through his analysis of consumerism, particularly in America. Consumer culture today is marked by what he calls “the new means of consumption,” which rely on a mass-produced, on-demand form of reenchantment. These new means, or “cathedrals of consumption,” rely on spectacles, extravaganzas, simulation, and time/space implosions to produce a systemized magification, making mass reenchantment into a rationalized endeavor. Concerned with the seeming lack of power of modern consumers, Ritzer argues that “the new means of consumption concentrate on the control of consumers to get them to spend as much as possible.”

For examples, malls “manage the emotions of customers by offering bright, cheery, and upbeat environment.”

The control that the new means of consumption demands is achieved through non-human technology. In-store surveillance, control over internal environments with heating/cooling systems, inventory-tracking software to ensure efficient stock allocation, and mechanized distribution centers all participate in ensuring perfection in the consumption environment. This technology is used to control consumers (to maximize profit) and human workers. Human labor represents a potential flaw in a mechanized system of enchantment that the new means of consumption creates, and thus are subject to control over their performances as employees by managerial systems. This level of

18 George Ritzer, Enchanting a Disenchanted World: Continuity and Change in the Cathedrals of Consumption, 3rd ed (Los Angeles: SAGE, 2010), 7.
19 Ibid., 54.
20 Ibid., 83.
21 Ibid.
control is of large concern to Ritzer who, borrowing concepts from Foucault and Goffman, describes cathedrals of consumption as “part of the ‘carceral archipelago’ that has come to encompass the ‘entire social body,’ exercising the kind of complete control of people inside of the cathedral as on par with a “total institution.”22

As consumer products, wearable technology engages in this project of mass reenchantment through the spectacular, fantastical, and fun that marketing campaigns carefully create. The self surveillant nature of these products makes them mechanisms of control of the social body. Users experience this surveillance in two spheres: as consumers and as workers. As consumers, users seek to surveil and control their own body. In the workplace, employers seek to incorporate surveillant management methods into the manager/employee relationship.

The Self

Erving Goffman’s ideas on social behavior, laid out in The Presentation of Self in Everyday Life, are framed using a dramaturgical metaphor. Life is a stage, and people are just actors putting on performances. “To be a given kind of person, then” Goffman writes, “is not merely to possess the required attributes, but also to sustain the standards of conduct and appearance that one’s social grouping attaches thereto.”23 Performances need actors who can read the script, however, which requires a self that can ‘read’ the semiotic codes that pattern the world. Goffman posits that people reflexively interpret situations to inform their own behavior.

22 Ibid., 85–86.
Such reflexive interpretation is, according to David Riesman, constitutes an “other directed” self. Riesman contrasts this with the tradition-directed and inner-directed personalities in his book *The Lonely Crowd*, which focused on the changing modes of personality in modernity. The inner-directed person has a socially-instilled “gyroscope” that guides her through life; this assumes, however, a world where every situation can reasonably fit into a template that the person has been taught to navigate. The modern world, in contrast, is one of constant change. To adapt, the other-directed person has a “radar” instead of a gyroscope. This radar picks up social cues from outside the self; such a person can more easily navigate situations of little to no familiarity, since they navigate by sensing what others around them expect.\(^{24}\)

As wearable technology seeks to influence behavior, it incorporates itself into the reflexive loop of selfhood that constitutes other-direction. People respond to technological cues in the same way they would respond to a generalized other, in what I term data-direction.

*The Therapeutic Ethos and Emotional Capitalism*

Wearable technology, like the therapeutic ethos, is part of an intricate web of the ideologies of rationalization and science and the cultural practices of individualism and self-making. The therapeutic ethos is a method of understanding the self that relies on psychology, in both its academic and popular forms.\(^{25}\) This self is created through narratives of suffering; through self-interrogation, a therapeutic liberation and happiness is offered. At its core, “the therapeutic is a site within which we invent ourselves as

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\(^{25}\) Ilouz, *Saving the Modern Soul*, 7.
individuals, with wants, needs, and desires to be known, categorized, and controlled for the sake of freedom.”

Eva Illouz points to the rise of the therapeutic ethos, marked by psychoanalysis and psychology, the start of second-wave feminism, and the shift toward managerial, corporate capitalism as the prime sources of what she terms “emotional capitalism.” In this form of social organization, the public and private merge as intimate relations become rationalized and subjected to the discourse of rights, and rational, economic relations become emotionally intimate as communication and emotional recognition are identified with the successful worker and manager. The rationalization of the intimate involves “techniques of calculation,” where “intimate life and emotions are made into measurable and calculable objects, to be captured in quantitative statements.” This in turn takes emotions and places them outside of the self, turning them into “discrete entities” that, “detached from the self” can be “observed, manipulated, and controlled.”

This rationalizing process can be described as “an intellectualization of intimate bonds.” In her writings, Illouz notes that this is for “a broader moral project” of egalitarian communication. However, in the context of the quantified self movement, this intellectualization can be seen as being done in the service of a different moral project: that of self-improvement and self control. After all, the most intimate relationship a person can have is with their own body.

26 Ibid., 3.
28 Ibid., 32.
29 Ibid., 33.
30 Ibid., 34.
**Expert Systems and Trust**

Modernity is filled with more knowledge than any one person can comprehensively know. As such, to live in the modern world, one must rely on abstract systems filled with expert knowledge. You don’t know how your food was grown or made, or how the building you are sitting in was built, but there are individuals whose specialized expertise in those topics (the agricultural scientist and the architect) and others whose unseen labor (the farm hand and the construction worker) made the world you see possible. Such expert systems surround us, creating a world where nobody can opt out of relying on experts. Trust is therefore essential to the maintenance of expert systems, but the unknown nature of the knowledge that experts have “always provides grounds for skepticism or at least caution.” The result of this “bargain with modernity,” where one must trust something that seems worthy of caution, results in life being experienced with a blend of “deference and skepticism, comfort and fear.”

Ambivalence is then a central part of the experience of modernity. Quantified self wearable technology is heavily wrapped up in expert systems, starting with the products themselves: how many of us actually know how our devices work?

**Methodology**

My methodology was a qualitative content analysis of the tech community’s discourse surrounding quantified self wearable technology. The tech community is not located in physical spaces, but instead manifests itself in digital spaces. For this reason, I

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32 Ibid., 89.
33 Ibid., 90.
collected data online in a method designed to capture a variety of information regarding quantified self wearable technologies. This sample, collected from October 2014 to December 2014, includes content from users, producers, cultural commentators, and experts within the field. Note that most sources include a mix of these voices, and that many people participating in the online tech community fit into more than one of these categories. I collected a total of 405 pieces of data from 5 different channels, as detailed below. Since online data collection is an emerging field, there are no established procedures to follow. For this reason, I have included in an appendix a more detailed account of precisely how data was collected and how the sources were chosen, in the hopes that it may be of help to future readers who seek to do online research.

Sources

Using Feedly, an RSS (Really Simple Syndication) reader, I collected all articles from five prominent tech blogs: Engadget, Gizmodo, TechCrunch, The Verge, and Wired. From those articles, I saved and downloaded those that pertained to quantified self wearable technology on a weekly basis. These five blogs, as large, widely-read tech blogs, represent the mainstream of the tech community. In total, 142 articles I collected through Feedly between 10/4 and 11/25.

I used Google Alerts to collect what its algorithms determine are the most relevant items from around the web for any given search term, and alerts for “quantified self” and “wearable tech” resulted in the collection of 59 articles and posts. Google Alerts includes both small, boutique sources that are outside of the mainstream, as well as
larger, non-tech-specific sources. Data collection on Google Alerts occurred from 10/2 until 11/19.

I collected Instagram posts from two separate hashtags, #quantifiedself and #wearabletech. Data collection started on 10/20 for #quantifiedself with the selection of the first 20 posts on the tag. Every Monday, I collected all relevant posts on the tag. For #wearabletech, data collection began on 10/24. On that day, and every 4 days after that, I collected the first 10 relevant posts. Data collection for both tags stopped on 12/1, after a total of 132 posts had been collected.

Facebook posts from the search of the term “quantified self” provided another source of individual, small community, and producer sponsored content. I collected all relevant results every 9 days from 10/29 to 11/24, resulting in a total of 30 posts.

The forums on forum.quantifiedself.org provided data directly from users who are very involved in the core quantified self community. To prevent active threads from appearing in the data set several times, I collected all forum data on 12/30. For each sub-forum, I collected all threads where the last update was during the month of December. Note that this does not mean that the threads were started in December. For sub-forums that had no activity during December, the last 5 updated threads from those sub-forums were chosen, as long as those threads were posted in 2014. This resulted in a total of 42 threads collected.

Coding

Each piece of data was read and reviewed during the data collection process. More in-depth analysis was performed in ATLAS.ti. Using grounded theory I began by
open coding, letting the codes emerge from the data as I identified major themes. Codes centered on four major themes: consumerism/capitalism, relation of self to technology, opinion/speculation about the state of the market for wearable technology, and discussion of the proper, improper, and possible uses of technology. For a full list of codes, see appendix.

**Thesis overview**

While quantified self wearable technologies may seem to be faddish trinkets, they are a manifestation of the tension between the desire for transcendent meaning and the mistrust in the opaque and alienating ways in which that meaning is created. Ultimately, I seek to use this technology as a starting point to investigate meaning, control, freedom, and self in late modernity.

In the first chapter, I examine the reenchanting qualities of quantified self wearable technology that create a transcendent meaning. In the second chapter, I explore the expert systems that create that transcendence. In the third chapter, I look at the cultural battles being fought over this technology. Finally, I ask: can wearable technology be used to make a different world, or is it simply reproducing the world that already exists?

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Reenchantment creates transcendent meaning for users of quantified self wearable technology through the production of spectacle, exclusivity, and wonder. The ability of users to locate themselves inside reenchanting webs relies on the selling and promoting of devices by tech blogs, marketers, and tech evangelists.

**Spectacular Consumption**

The lifecycle of a piece of wearable technology is filled with spectacle. They premiere at events like Salesforce’s Dreamforce conference and Intel’s Opening Ceremony, where the latest gadgets are displayed by tech executives before screaming...
crowds. They are featured in fashion shows.\textsuperscript{35} The fires of spectacle are fed by tech bloggers, whose coverage of each new product is tabloid-worthy. As each blog tries to outdo its competitors, writers turn relatively dry information like technical specifications into exciting breaking news. For example, the run-up to the release of the new Fitbit Charge, Charge HR, and Surge was preempted by an information leak, leading to a frenzy of speculative articles. The first article came when Gizmodo got their hands on a leaked Sports Authority ad in October 2014 (Figure 2), showing official marketing materials for the new Fitbit Charge and Charge HR.\textsuperscript{36} They breathlessly published this exclusive: “a tipster has sent us what appears to be official marketing materials that give us our first clear look at both the Fitbit Charge and Charge HR. Not only do we have a full feature rundown for each of these trackers, but the cleanest look yet at the devices themselves.”\textsuperscript{37} Note that this is not even confirmed information from Fitbit, but just “what appears to be” the new products.

Not to be outdone, the Verge obtained an exclusive on the third new Fitbit product, the Surge.\textsuperscript{38} Although the source was a photo taken of an ad on a computer screen (watermarked “The Verge,” to protect their find), the writer managed to produce four paragraphs of wry, sarcastic language: “Apparently Fitbit thinks Surge is several steps beyond your average "wearable." The company refers to it as a ‘superwatch’

\textsuperscript{35} @justinfashion4u, “Photo by justinfashion4u” (Instagram, October 23, 2014), http://instagram.com/p/ugXv2TEJ7M/; @spacycloud, “Photo by Spacycloud” (Instagram, October 24, 2014), http://instagram.com/p/ui9yyXnf2C/.
\textsuperscript{37} Ibid.
according to marketing materials *The Verge* has received from a tipster.”\(^{39}\) Wanting to maintain their initial upper hand, Gizmodo published another article combining the details from their original article with the new information. Their chatty tone combines with a subtle dig about the company’s failed Force band with writing worthy of *People* magazine: “It appears that Fitbit Charge will be a basic activity tracker very similar the to Fitbit Force that was recalled last year. And that's okay! We loved the Fitbit Force, aside from how it caused a lot of people to break out in rashes.”\(^{40}\) These writers have now managed to turn two screenshots into three articles (and probably thousands of site hits) by couching their finds in gossipy language.

New products aren’t the only things writers publically wonder about. A staple of tech blogging is the rampant speculation about the state of the wearable market. Speculation turns to spectacle as writers imagine these companies engaged in a cutthroat battle for money and power. As Gizmodo reports, “everybody's vying for fitness tracker dominance.”\(^{41}\) One such power play happened shortly before the Fitbit product leak, when Fitbit had announced that they would not opt in to Apple’s new Health platform that had been released with iOS8 (although Engadget, noting Apple’s market dominance, ominously titled their article “Fitbit doesn’t plan to share stats with Apple’s new Health

\(^{39}\) Ibid.


Apple had already stopped selling Fitbit products in its stores, and TechCrunch used the leaked materials and recent friction between the companies to come up with answers for its readers: “Apple has pulled Fitbit devices from its retail stores. And now we know why — because Fitbit is building a device that will compete directly with the upcoming Apple Watch.” Readers participate in finding drama in the wearables market; one commenter sagely warned Fitbit to “please review what happened to OpenFeint, Plus+, AGON and others once Apple introduced GameCenter. Where are those guys today?” The market may not quite be a deadly game of thrones, but these writers and readers still like to think they are involved in a set of high stakes stratagems. In these narratives, companies even have personalities. Fitbit, in the above article, is too proud for Apple’s platform. In the passage below, taken from a review of Jawbone’s new devices, Misfit is portrayed as even more stubborn and stuck up than Fitbit: “Given that even Fitbit's devices work with the [Jawbone] Up platform, that makes me wonder what role the Up Move will serve if Misfit, whose devices are far sleeker, ever decides to cooperate.” Discussing wearable technologies in this manner creates a veneer of glamour around the products themselves, acting as another layer of enchantment.

**Exclusivity and boundary creation**

Group identities are a form of transcendence that, quite literally, involves

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44 Steele, “Fitbit Doesn’t Plan to Share Stats with Apple’s New Health App, for Now.”
membership into some entity larger than the self, allowing members to derive meaning from belonging to the group. Quantified self groups offer meaning through engagement with moral projects of technological, rational control. Fashion groups offer a tasteful curation of self enchanted with luxury of glamour. However, without meaningful boundaries between group and other, it is difficult to create meaning from group identity. Thus, boundary creation and maintenance is a central part of maintaining reenchantment.

Glamour is more than a veneer in the wearables world. Designers are acutely aware that “in order to become socially acceptable, wearables need to be stylish” and that “anything wearable has to be beautiful.” Companies are attempting to brand their products as fashion forward; one that sells skins for fitness wristbands tagged a photo of a user wearing one of their designs on Instagram with “#fashion...#notamodel #armcandy #love...#instagood #beauty #wristcandy,” indicating that their intended audience is the fashion/lifestyle crowd that uses those tags. Users appreciate beautiful design as well; @wellnessscience writes that “I have gotten so many compliments on my #Bloom necklace from @misfit. Surprises everyone when they learn it is a #fitness tracker!”

48 @design.ux, “Photo by Design.ux” (Instagram, November 22, 2014), http://instagram.com/p/vueEGNkIeo/.
49 A central content-finding mechanism on Instagram is the hashtag search. For this reason, Instagrammers use enormous blocks of tags on posts to ensure that they have an audience beyond their followers. Note that the #instagood tag is a form of hashtag only found on Instagram, where “insta” is followed a single descriptor (good, cool, fun), and is used to demarcate that the post, and the whole account, can be described by that word.
50 @wellnessscience, “Photo by Wellnessscience” (Instagram, October 30, 2014), http://instagram.com/p/uyV47jglzH/.
This also shows, however, an expectation among the general public that these products will not be fashionable. As the wearable market expands, and as luxury items jump into the mix, that expectation will be changed soon: the MICA smart bracelet (Figure 3), for example, is “haute couture, incorporating materials like snake skin, tiger’s eye, and pearls.”  

This is both exotic in design choices like snake skin and reenchanting in the luxurious escape from the industrial grayness of the rational world. Porsche Woman, a lifestyle outlet for women based off of the iconic car company, also names wearables as the “latest craze to emerge on the international runways,” signaling a likely future of glamorous technologies.

Like other products in the luxury goods market, expensive wearables play up the exclusivity and expense of their products as a method of sectioning their users off from the rest of the population. One luxury wearable company, Senturion, proudly proclaims their product to be “wearable tech built for the wrist space of the elite” in an Instagram post. A tech reviewer described the Lutetia smartwatch as “a premium feminine look,” built with “curved, sapphire-coated glass piece” and “available in silver, rose gold, and gold.” Between the explicit statement of exclusivity, the choice of precious metal

52 @porsche_woman, “Photo by Porsche_woman” (Instagram, October 27, 2014), http://instagram.com/p/upM4CzjtZF/.
53 @senturion_wearabletech, “Photo by Senturion_wearabletech” (Instagram, November 22, 2014), http://instagram.com/p/vs8ti0qixo/.
finishes, and the actual price tags, these goods set their users apart from the normal consumer. Such exclusive group identity contributes to the self-transcendent meaning that individuals can harvest from their wearables.

Not every wearable is a luxury good, however. In fact, luxury items represent a small handful of the wearables market, and are up against the sea of lower priced goods. Additionally, these luxury goods tend to be more associated with the fashion world, and aren’t thought to be very serious tracking products. Such anti-fashion bias is evident in articles about Intel’s MICA smart bracelet, where reviewers were not impressed with the functionality, with The Verge declaring it “a high-fashion device with low-tech capabilities,” Gizmodo titling their review “A Fancy, High-Fashion Beeper For $500” and Engadget complaining that “as a piece of technology, it's been very strictly limited by design to serve purposes demanded by the fashionistas and style gurus.” This criticism is also a form of exclusivity, created through the maintenance of a boundary between the tech savvy and the rest of the world. In the case of the MICA, the invaders are companies making wearables for users who are more interested in fashion than in tracking. Even

55 The Luteitia is a relatively inexpensive $169 (http://www.engadget.com/2014/10/14/omate-lutetia-smartwatch-for-women/) compared to the price tag of the Senturion (£12,000 or £60,000, depending on the model). (http://senturionkey.com/pricing)
though Engadget admits that the fashion/technology collaboration is getting “less-bizarre-by-the-day,” the disdain for wearables that prize form far above function is evident.

As the gap between fashion and tech closes, barriers are being actively built by tech writers. In the same Engadget review, the writers differentiated the fashion writers from tech writers with some self-deprecation, saying “Intel and its design partners…finally let us pedestrian techie types get our hands on the thing…see what happens when high tech and haute couture collide.” Characterizing themselves as pedestrian, when they had just described the fashion writers as “fashionistas and style gurus,” juxtaposes the two groups by positioning fashion culture a step above tech in the food chain of cool, thus ensuring that the two worlds stay separate in readers’ minds. This act of boundary maintenance ensures that the meaning that techies get out of being in the tech community continues to be available, as the community remains a meaning-rich entity not filled with either fashionistas or the pedestrian public.

The tech world isn’t just threatened by the rival yet vital fashion world; there is still the general public to consider. This boundary is patrolled more subtly; considering that market logic demands that users proselytize and convert everyday people into techies. However, once inducted, users are part of the tech savvy, a group that maintains exclusivity by requiring an extensive knowledge of the technology they use. Technological skill is a must: one user, posting on the official Quantified Self forums about the Basis Peak, said of non-techies that “some people should not be allowed to

59 Ibid.
60 Or, given that these technologies are artificial additions to bodies, perhaps “prosthelytize” might be a more appropriate word?
handle anything more advanced than a calculator."\textsuperscript{61} Gizmodo, in a post about exporting tracker data, recommended using the program IFTTT (If Then Then That) without giving further explanation, quipping “if you've never heard of it, you've obviously not been reading this blog very long.”\textsuperscript{62} The condescension keeps the groups separate. However, given that companies need to find new customers, there is a considerable amount of time spent trying to target these “regular people” for conversion.\textsuperscript{63} In an effort to demonstrate the usefulness of Jawbone’s new hardware and app, a Wired review noted that the built-in coach will “encourage you to walk a little on a slow day, for example, or remind you to go to bed early on a night when you’re trying to get eight hours. For regular people, this is tremendously important stuff.”\textsuperscript{64} Readers of this article need to be reminded, apparently, of what regular people need, indicating that these are two distinct groups. The “regular people,” who haven’t reached enlightenment through self tracking, need some help to enter into the community, with an entry-level device that interprets data for them, to help users walk or sleep some more. These devices do seem to be a gateway; the group manager for wellness and platform said that Jawbone’s Move is “about people who are


IFTTT is a program that executes formulas, based on “if X then Y” logic. For example, a formula saying “If sunrise then text me the weather,” the user would receive a text with the daily weather report.


\textsuperscript{64} Ibid.
starting their tracking journey,” indicating that devices act as methods of socialization into the technological self-tracking world.

Self tracking, while very related to the world of athletics, is still separate from that community. People who self-track attain health by applying scientific methods to the body, whereas athletes engage in physical activity to be healthy. These ideas overlap, and the communities probably share membership as well, but they are not the same. Additionally, believing that fitness buffs and self-tracking techies are to be juxtaposed in the classic jocks versus nerds standoff represents an outdated trope given the recent mainstreaming of nerd culture and the mass appeal of consumer electronics. However, it is still important to remember that the core of the wearable tech and quantified self community are the ones making and patrolling the boundaries, and there are many users who fall outside of those boundaries (any of the “regular people” who need to walk a little more or the fashionistas buying the MICA, for example). The separation of the tech world from everyone else helps give the core community, but not necessarily the general community, definition and purpose, imbuing a sense of community and belonging to its members.

Desire, fun, and wonder

“Oh @fitbit, you had me at 'continuous heart rate monitoring,’” waxes @guruinmotion in a post about the new FitBit Charge. Such pining might be seem more appropriate in a romantic comedy than in a fitspirational Instagram, but the use of faux-

65 Hardawar, “Jawbone Takes on Misfit with the $50 Up Move.”
66 @guroinmotion, “Photo by Guroinmotion” (Instagram, October 31, 2014), http://instagram.com/p/uz_DKtmW_b/.
67 Fitspiration is a form of online content meant to inspire people to get fit (hence the portmanteau of the words fitness and inspiration).
amorous desire is a common expressive form used to describe devices. The Moto360 (Figure 4) is “Sexy [smiling face with heart shaped eyes].”\textsuperscript{68} \textsuperscript{69} Atlas is “[ok hand sign] [ok hand sign] [hundred point symbol] [hundred points symbol].”\textsuperscript{70} The GWatchR is part of @peterlorimer’s “#TechAddiction,”\textsuperscript{71} and one commenter “would die for” a Senturion.\textsuperscript{72} Whether or not these are literal does not matter; the hyperbole only adds to the enchanting spectacle. These users are building the image of these products to be objects of desire.

Wearable technology is, first and foremost, supposed to be something that people will want to buy. For many companies, that means making their products fun. The developers of Nixie, a drone wristband that takes selfies on command, said that they chose the “cute, light, and fun” name because “a heavy word like drone wasn’t going to take off for the average consumer.”\textsuperscript{73} Writers from prominent tech blogs have expectations that they will be playing with fancy toys when they review products; a reviewer of Epson’s smart glass (which are meant for use in “augmented workplace”\textsuperscript{74}) used the 3D construction application to make Lego helicopters, stating that “maybe it's a

\textsuperscript{68} @toreyrawr, “Photo by Toreyrawr” (Instagram, October 30, 2014), http://instagram.com/p/uyAatHJQ11/.
\textsuperscript{69} Emojis are a commonly used in place of words as methods of description. The three emojis referenced in this paragraph are, in order: 😍👏💯 The first is used to indicate intense desire. The last two are being used in this context as shorthand for “perfect.” For more on each emoji and its common uses, see Emojipedia.
\textsuperscript{70} @atlaswearables, “Photo by Atlaswearables” (Instagram, October 23, 2014), http://instagram.com/p/ugHjVfRzD6/.
\textsuperscript{71} @peterlorimer, “Photo by Peterlorimer” (Instagram, November 10, 2014), http://instagram.com/p/vOjqlDQAqT/.
\textsuperscript{72} @senturion_weareabletech, “Photo by Senturion_weareabletech” (Instagram, October 26, 2014), http://instagram.com/p/uoVLNgKj5-/
\textsuperscript{73} Flaherty, “The Inventors of the Wristwatch Drone Share Their Vision of the Future.”
\textsuperscript{74} This term is used to describe spaces in which virtual reality technology enhances the workplace; for example, overlaying virtual building plans onto a construction site.
unnecessarily complicated method for delivering Lego assembly instructions, but it made
the task ridiculously easy and more fun to boot.” These toys for adults (not to be
mistaken for adult toys) channel a nostalgia for childhood as a fun and carefree time to
enchant users.

A toy-like nature is evident in the fantastical descriptions that people give their
technologies. One Android Wear user, after changing the display of the watch to mimic
the look of Tony Stark’s arc reactor from the Marvel comic *Iron Man*, proclaimed in an
Instagram post “I am ironman!” Another Instagrammer captioned a sleek, highly edited
photo of his Google Glass (Figure 5) with “#startrek.” These descriptions are not
limited to silly posts on social media; a reviewer in *Wired* described the Nixie as
something that “feels like an invention likely to fly out of the Batcave.” A TechCrunch
writer said the Division Furtive Type 50 made him feel like “an International Man of
Mystery,” saying that the watch would be useful “in order to deflect the bullets shot at
you by evil henchmen.” These people are all using their technology as an access point
into the fantastical world that they describe, allowing them to incorporate those magical
elements of superheroes and spies into their identity.

75 Sean Buckley, “Not Quite Google Glass: A Week with Epson’s Awkward Smart
moverio-bt-200/.
76 @tombha, “Photo by Tombha” (Instagram, November 10, 2014),
77 @tristan_mayer, “Photo by Tristan_mayer” (Instagram, October 31, 2014),
http://instagram.com/p/u1Hu5gTe4B/.
78 Flaherty, “The Inventors of the Wristwatch Drone Share Their Vision of the Future.”
79 John Biggs, “Division Furtive Introduces A Line Of Super-Secret High Tech
furtive-introduces-a-line-of-super-secret-high-tech-watches/.
Summary

Users find wearable technology to be a reenchanting experience. This is actively created by companies who engage in spectacle to promote products, and whose devices are interpreted by many as very fancy toys. Users also gain a transcendent meaning from belonging to groups, whether that be the technologically savvy or the fashion forward, and patrolling borders between groups that threaten to move closer to one another preserves the meaning that users get from being associated with the projects of those groups. Transcendence has its downsides, however, as the involvement of experts in the meaning making process fosters the mistrust that accompanies all abstract systems.
Figure 2: Leaked Fitbit ad.
Source: Barrett 2014.

Figure 3: Intel MICA.
Source: Crook 2014.

Figure 4: Instagram from @toreyrawr.
Source: @toreyrawr 2014.

Figure 5: Instagram from @tristan_mayer.
Source: @tristan_mayer 2014.
Chapter 2: Self and Expert Systems

“With each step we become more aware of data’s ability to influence our behavior.”

Quantified self wearable technology is both an expert system and the product of other expert systems. Science, technology, and the therapeutic ethos intersect in quantified self, producing a self that uses technology to shape the body according to the prescriptive ideals of health sciences as part of a larger moral project of control, all of which is experienced through a veneer of reenchantment. Selves are produced through rational control and through consumerism, making this method of self production a global industry. This constricts the potential goals of quantified self wearable technology to those that can be encapsulated in the symbolic universe of the market.

Technology’s Effect on Behavior

The method that technologies use to influence behavior is a form of other direction. David Riesman, who pioneered the idea of other direction, wrote before personal technology became so widespread; therefore he did not anticipate data’s ability to fill the role of the generalized other. Data direction, by which people navigate by sensing what a piece of technology wants them to do, is a new feature of advanced modernity.

Choice structures are the mechanism through which individuals feel technology’s influence on their behavior. Technology is not sentient and does not “want” anything. However, listening to users discuss how their behavior has changed, one might think that technology has a mind of its own. One tech writer described how technology

“disciplined” him, saying, “I also don’t usually count my reps, instead doing a certain set until my muscles fail or I get bored, but this app quickly disciplined me and — through my innate fastidiousness about neat round numbers — got me to do more reps in each set.”\(^{81}\) He does have a choice of how many repetitions per set he does, however, the technology superimposes onto his daily life a choice structure that incentivizes a certain outcome (in this case, more repetitions). The idea of choice structure returns in another writer’s vision for Jawbone’s digital coach, which promises to use your personal data to give personal suggestions for behavior: “Your coach puts all these things together and begins reminding you to drink water when you're done with a workout, or tells you to go to bed a little earlier because you ran this morning and you need the shut-eye.”\(^{82}\) This technology doesn’t incentivize in the same way, however: it gives instructions for healthful living based on your activity, sleep, hydration, and any other data you give it. The instructions are not mandatory, but if the power of suggestion had no sway over users then these products would be useless.\(^{83}\)

Choice structure can be compared to Bruno Latour’s idea of “programs,” or methods of compelling people to act in a certain manner. The desired outcome for the person establishing the choice structure/program occurs “only once most of the anti-

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\(^{83}\) I will personally attest to the power of the choice structures in these devices to change behavior, having worn one for several months.
programs,” or ways of circumventing the program, “are countered.” He uses the example of a hotel manager wishing to have keys returned; the manager can develop anti-programs such as verbal reminders and heavy weights attached to keys that are designed to modify behavior of customers. These anti-programs, and anti-anti-programs, continue to the point where it is in the interests of any rational actor to follow the program by returning the key. Wearable technologies in the market today have a wide variety of such behavior managing programs; Fitbit, for example, displays leaderboards of top steppers, awards badges for daily and lifetime step counts/mileage, offers challenges against friends, and can even auto-tweet a user’s step count at the end of every day for added public scrutiny. Each element of the choice structure incentivize more activity (the goal of Fitbit) through negative (possible public shaming) and positive (badges and awards) incentives.

It is easy to say that the attribution of power to the technology is simply false consciousness. People who design this technology decide on the choice structures embedded within the product (e.g. giving incentive to walk more by awarding badges for a certain number of steps, tweeting to followers when specified goals are not reached), so when users act within those choice structures it is the creators of the technology that are exerting the behavior-changing power, not the technology itself. These choice structures themselves are informed by expert knowledge systems of health science (or faux science, 66)

85 Ibid.
86 One could also say that it is not false consciousness because users are perfectly aware of the situation; there are plenty of users who believe that this technology is a mechanism of control, and more who express discomfort about using it. I will discuss this discomfort and dissent in more detail in the next chapter.
depending on who you talk to). It would seem that these technologies are mechanisms of control of bodies by expert knowledge systems. However, not everyone puts the power of behavioral change in the hands of technology.

Some users view this technology as a tool to increase their own power over their bodies and lives. Control and choice are dominant themes of these narratives, in which data and technology allow users to choose to exert more effective control over themselves. One writer, talking about the rise of the quantified self, explains that: “now, with Fitbits, Fuelbands, Jawbones and Whistles (even our dogs are tracking activity!), we can capture this data in a snap, see it updated in real time and use it to make better, more healthy decisions.”87 From this viewpoint, it seems that technology is giving people power to more effectively control their bodies. Companies, in promoting products, emphasize this control. In a post on Instagram, one company posted a screenshot Tweet from a thankful customer, captioning it with: “Remember, it's YOUR data. Keep it in your back pocket and aim for optimal health. Don't wait for symptom to make a lifestyle change - you can take control #fitspo #healthy.”88

The emphasis on self control and self ownership is the most pronounced in people who can be considered early adopters and evangelists of the quantified self cause. One such early adopter, in an article on a biohacking conference, said that the practice is “the art and science of changing the environment inside and outside yourself so you can perform at the level you want…it’s about owning your own body instead of it owning

88 @wellnessfx, “Photo by Wellnessfx” (Instagram, October 8, 2014), http://instagram.com/p/t5qD2GQW1f/.
you.\textsuperscript{89} Another evangelist of the cause, J. Lynn Jacobs (a former contestant of NBC’s \textit{The Biggest Loser}), names consciousness and choice as constitutive elements of quantified self, making agency a central part of self improvement. He explains his prophetic vision for the quantified self in an Instagram post:

\begin{quote}
\ldots I'm really looking forward to the time when #millions + #billions of people embrace the simple life-affirming principles of #smartphonefit\textsuperscript{90} 1) #consciousness 2) #choice 3) #conditioning 4) #community to create a healthier lifestyle... embrace power of the #quantifiedself #itsalreadyhere #itsgunnaexplode\textsuperscript{91}
\end{quote}

This view, where users make choices by evaluating information, puts users in a more active role than the previous one, where technology gives recommendations and users are incentivized to follow those recommendations, even though users in both scenarios are following the lead of expert knowledge on health to determine what is healthy or unhealthy.

Herein lies a paradox. Some users feel controlled by their technology, while others feel that the technology helps them better control themselves. Meanwhile, the technology has within it a choice/incentive structure that itself was created by expert knowledge. This expert knowledge also informs those users who are in control of themselves, as the health they aspire to is defined by experts. This paradox can be resolved by changing the view of the person/technology relationship to one of expert knowledge.

\textsuperscript{89} “The Cyborgs Among Us.”
\textsuperscript{90} From a search of that hashtag on Instagram, it appears that primarily @jlynnjacobs uses this hashtag (the first 20+ posts were selfies from his account, detailing his progress in training for a marathon), and he uses it to tag posts where he discusses using quantified self technology to train and get fit. It is unclear whether he is just using his smartphone, or if he’s using wearables, but the use of the #quantifiedself makes it clear that there is some self tracking happening here.
\textsuperscript{91} @jlynnjacobs, “Photo by JlynnJacobs” (Instagram, October 28, 2014), http://instagram.com/p/utdc1ppb-6/.
systems and non-expert people. The expert system creates the choice structure, and by following said choice structure (whether by technological encouragement or by the user’s own volition) users gain social recognition of normative bodily style. A bodily style is anything that goes into how the body is interpreted as an object, and normative bodily style is a matrix of the expected and socially acceptable bodily styles. While this changes across time and space, evaluations on what is normative are measured in this thesis against the standard of present day American mainstream culture.

**Scientific Prescriptions for Health and Body**

Normative bodily style can be understood through comparison to Eva Illouz’s concept of controlled emotional style; in everyday life, people “should be in full control of their emotional expressiveness to be better able to secure their interests.” The ability to secure one’s interests lies at the heart of the Weberian definition of power, which is the ability to exercise one’s will on others. The basis of the power Illouz describes lies in the idea that “self-control means that one is governed by calculated reason.” Applying this to the body, if one’s body is “governed by calculated reason,” then one has access to social recognition of self-control, which itself is a signal for highly prized attributes such as work ethic and discipline. Of course, one cannot tell at a glance how “governed by calculated reason” another person’s body is, and so actors must evaluate the impression that others give and give off. Wearable technology is a prop that people use to give the impression of self control.

The value of these positive impressions can be observed by thinking of common cultural understandings of fatness as a signal of a lazy and undisciplined self and the

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92 Illouz, *Saving the Modern Soul*, 79.
93 Ibid.
negative consequences that can have for people. Successfully executed impressions are channels through which one can exercise will; for example, recognition of work ethic can lead to a promotion at work and increased status as a result. In effect, normative bodily style is a manner of fostering certain impressions and securing better roles, and technology is a set of props to help give that impression. Normative bodily style is, of course, no guarantee of social recognition, nor is normative bodily style consistent across social groups. However, in the matrix of socially acceptable bodies, “controlled” fit bodies are valued over “uncontrolled” fat bodies.

Part of what makes normative bodily style so appealing as a manner of distributing power is the appearance of democratization in the system. Unlike fixed traits such as skin color, fitness is something that is culturally understood to be a choice. Perhaps this is why the fitness community online places such an emphasis on that particular value. While cultural ideals of fitness can be quite narrow, the idea that any person could attain fitness through correct application of willpower is alluring, especially in a country whose historical memory is filled with self-made, boot-strapping individuals who turned willpower into social power.

Expert systems that define normative bodily style have the ability to influence behavior because they control a gateway that gives access to valued social traits. Analyzing bodily style as a choice structure, expert systems have the means to offer incentives because expert systems are intimately tied to ideology, as expert systems are a essentially a formalized, sedimented branch of an ideological system. In turn, ideology, as part of the fabric of reality, has the means to distribute rewards (positive social
recognition) to those whose behavior is favorable within the choice structure because it is ideology that affects how social actors interpret one another.

In general, choice structures can be built by anyone with the means to offer incentives of any kind; this is a manner of exercising power, defined in terms of the ability to influence wills. Those who can successfully exert power have access to the means by which rewards can be distributed.

Wearable technology is part of the larger ideological systems of rationalization and science, which are woven together with cultural ideas about individualism and self-making (a combination that has also yielded the therapeutic ethos). These cultural systems pattern ways of seeing, so having a normatively disciplined body opens the channel through which social actors can access traits that aid in exercising economic, political, and personal power.

**The Moral Project of Control**

Beyond just the personality traits that come with control, control itself is a moral project. To understand this, we must view control as a part of a rationalized world that relies on scientific expert knowledge to legitimate and reproduce itself. Science is the belief in a pre-discursive objectivity that can be discovered through rationalized empirical inquiry. Empirical inquiry is a display of human agency and ingenuity, designed to exercise human control over nature, often times for the benefit of capitalism. Like the Protestant idea of calling, where profit is a result and sign of virtue,\(^{94}\) the modern imperative of rationality carries a moral weight that promotes rationalized control as a sign of righteousness. The therapeutic ethos also promotes this moral imperative, as self

control in a therapeutic world is a mark of “properly groomed selfhood” and other such “models of social competence.”\(^95\)

In this moralistic view, data collection is recognized as a social good and data can be industriously put to use for personal or collective benefit. One example of the virtues of data collection can be observed in this excerpt about a public service rendered after an earthquake by Jawbone, in which “the company used the [sleep] data [from its devices] to produce a map showing exactly what time people were jolted awake on the night of the quake, based on their distance from the epicenter — information of great potential importance to public safety and emergency response agencies.”\(^96\) This casually brushes past the fact that Jawbone employees have detailed access to user data and emphasizes the potential of big data. Public safety and emergency response is just one example of the kind of good that can come from constant data collection.

Data, representing an alleged objectivity, has the power to reveal truth in situations where a true account of events could deliver justice. After months of national debate about the relationship between police and young black men, TechCrunch writer Josh Constine wrote a passionate manifesto arguing for citizens to use cameras to constantly surveil their surroundings, which he refers to as “sousveillance” or “little brother” (as opposed to the Big Brother of George Orwell’s \textit{1984}).\(^97\) Civilian/consumer body cameras are a form of life-logging technology, with products such as Glass and Narrative having the ability to constantly photograph surroundings. Constine refers to

\(^95\) Illouz, \textit{Saving the Modern Soul}, 62.
sousveillance as “Foucault’s panopticon put to good use,” explaining this potential for good by saying that “recordings by Little Brother could deliver the facts needed to deliver that justice,” as in the cases of police shootings of young black men that took place in the months before this article appeared. He also instructs readers that cameras “level the playing field between the populace and the powers that be, as long as we turn them on.”

The collection of video thus fulfills the virtue of citizen power (over corporate and state power) that this author is invested in.

Other examples of the moral imperative of data collection revolve around the great American ideal of self-reliance, or people helping themselves. In Mark van Rijmenan’s “4 Ways Big Data Will Make You Happy,” Rijmenan explains the benefits of data, claiming that “analysing this data can give us control over our lives if we know how to deal with it. If we understand why we sleep so restless or if we know why we are so tired every day (for example because we don’t exercise enough), it can make us happier because we feel better.” Data can thus uncover health and happiness, through proper, rational analysis. More than that, it can uncover objectivity, the highest moral form in a rational society, and build a world that is based in truth. Crusading for data is thus a manifestation of the larger moral project of control in the rationalized world.

Technology, Science, and Reenchantment

As data evangelists promote technology’s promise of a better world through knowledge and control, science and technology come with their own promoters who see

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98 Ibid.
99 Ibid.
an inevitability of unending progress that accompanies these expert systems. Science and
technology exemplify the this-worldly enchantment that Edward Tiryakin describes, as
they are disciplines based in the human mastery and understanding of the world.\textsuperscript{101}

Watered down and translated for the consumer market, the science behind wearable
technologies has a similar allure.\textsuperscript{102} The selling point of wearables is their ability help
people make behavioral changes, triumphing human willpower over our lazy natures.
However, as described above, the help they offer in the form of imposed choice structures
that spell out pathways to prescribed normative bodily styles is not individual mastery of
the body, rather expert mastery of the body. It appears that only experts themselves
exhibit the kind of individual mastery that is idealized by users and producers alike. Thus,
the reenchanting nature of science and technology is a form of alienation.

The intoxicating promise of technology, as an enchanting triumph of human skill,
is that all things are possible with it. This is most apparent when writers are discussing
the enormous potential that technology has for the future. In an article for WIRED
magazine, Jean-Marc Emden, the Chief Visionary Officer of DreamsCloud,\textsuperscript{103}
breathlessly proclaims that “thanks to technology and advances in mobile innovation,

\begin{footnotes}
\footnotetext{101}{Tiryakian, “Dialectics of Modernity: Reenchantment and Dedifferentiation as Counterprocesses,” 84.}
\footnotetext{102}{Calling these devices purely scientific seems disingenuous; the technology itself is a
feat of science, but the actual tracking is generally not scientifically proven. Though there
are many medical devices that technically fall into the category of quantified self
wearable technology, most of the products that people buy are not for strictly medical
purposes.}
\footnotetext{103}{DreamsCloud is a company specializing in dream interpretation, and has an app to log
dream, look up different dream symbols, and share your dreams with friends. The tagline
on their website: “Log, Share and Discover your dreams, dream meanings and yourself.
We make dreams social!” (https://www.dreamscloud.com/)}
\end{footnotes}
uncovering our dreams in ways never before possible is becoming a reality.”¹⁰⁴ He is discussing iWink’s Aurora headband, which, through unexplained mechanisms, will be “giving us access to data needed to analyze our dream patterns over time, helping us uncover how our dreams influence our waking lives” in the very near future.¹⁰⁵ This author very literally states that the impossible is becoming real in his conclusion, where he say, “thanks to technology and advances in mobile innovation, uncovering our dreams in ways never before possible is becoming a reality.”¹⁰⁶ This understanding of technology is rooted in the modern belief in progress as an unproblematic social good.

There is a similarity between this view of technology and what Tiryakin identified as the reenchancing power of Romanticism, as “an orientation that seeks and finds…the potential for altering or conjuring a different order than the industrial one at hand.”¹⁰⁷ The principle of finding the potential for world-changing transformation is a pillar of technology. Technology itself is potential, with each innovation containing the ability to inspire others: “That companies are now developing attractively designed products with powerful measuring capabilities is very exciting, not just because of the raw measurements themselves, but also because of what they will inspire scientists and entrepreneurs to do.”¹⁰⁸ This particular article, “Watching the Apple Watch: Huge Health Potential Outweighs First-Generation Concerns” from Wired, shows a willingness to

¹⁰⁵ Ibid.
¹⁰⁶ Ibid.
¹⁰⁷ Tiryakian, “Dialectics of Modernity: Reenchantment and Dedifferentiation as Counterprocesses,” 85.
overlook concerns (such as the faux-scientific nature of the biometric tracking Apple’s Health provides) due to the enormous positive sentiment surrounding the technology, representing both a belief in the power of science to allow humans to triumph over adversity, and a belief in a continually better future. This writer, who states that there is “no doubt” these first generation products are “gimmicks,” then goes on to say that they still “are extremely exciting because they will inspire groups of people to create better ways to collect data, provide feedback and help us in the quest to treat and eradicate a whole slew of diseases.”¹⁰⁹ The gimmicks will lead to somewhere important, even though that road is shrouded in mystery at the current moment. Even the use of the word “quest” to describe this mission imbues self-tracking (even at a gimmicky stage) with the upmost gravity, and places it in the road to the future that technology provides. Note also that the ultimate social good in this situation comes from “scientists and entrepreneurs,” indicating the centrality of science and capitalism to the project of technological improvement and the subsequent moral quality that active scientific/capitalistic participation takes on.

This fantastical future comes at a price, and in commenting on the overt privacy price that users, tech promoters uncover the alienation inherent in enchanted views of technology. In an article titled “Forget the quantified self. We need to build the quantified us,” two researchers involved in public health make the case for trading privacy for enlightenment, offering a tantalizing picture of a potential future: “Imagine a future where self-tracking harnesses a whole population’s data to identify patterns and make meaningful recommendations. Imagine a future where we can see into the data of people

¹⁰⁹ Ibid.
just like us, to help us live better, and where we willingly give up a bit of privacy in exchange for vast benefits.”

The benefits, we are assured, with be vast indeed. Without getting into many specifics, the writers assure that “ultimately the Quantified Us can help people take better care of themselves, more often—and feel more connected to each other in the process.”

Quantified self is cast as a transcendent authority by these authors. However, such transcendent authority must locate power outside of the self in order to be larger than individuals, making the reenchanting nature of the quasi-divine little more than a form of alienation. In a paradoxical twist, it is these expert systems of science and technology, that take power once held by magic and nature and locate it in humans, that claim to give power to people when in fact it is the wills of the expert systems that are being realized. One of the most prominent expert wills is the profit motive, which will be explored in the next chapter.

Self Creation and Global Industry

Quantified self, as a general practice, gives users the ability to produce the self by applying the same empirical methods of discovery to the body as a scientist would apply to a subject of study. In this way, the body is produced in the same way that science produces the rationalized world. The resulting body is a mechanized one, a machine to be finely tuned through data collection and analysis. This was put succinctly by one writer who said that quantified self technologies “guide us towards wellness, so we should treat


111 Ibid.
them as what they are: tools we can use to build our healthier selves.”

Here, the building of the self is evident.

In practice, users truly are building healthier selves with the tools provided by technology. Instagrammer @soyjimmyflores posted the following health insight he had recently gained: “First reading off the iHealth Gluco-Meter straight outta bed. Contrast this with a reading taken at the pharmacy after a 10k run and breakfast: 89.9mg/dl.

Learning, exercise is a must. #ihealth #glucose #glucometer #quantifiedself #biohacking.”

He combines specific data points to gain insight about the inner workings of his body, thus rationally producing a healthier body and self. And indeed, these insights are useful; one user tweeted at the company that made the product he uses, thanking them for “giving me the tools to understand and own my health. #data saved my life.”

However, rationalization can have a component of alienation, as the way some users talk makes it seem as though the technology is revealing what the user couldn’t see about themselves. In the words of one reviewer, “Two days in and I’ve already got a much better idea of my own habits than I’ve had in all the preceding months…Numbers brought clarity and visibility to my daily routine, which in turn helped me quickly improve it.”

Another user implies that he doesn’t even know what he’s doing without the aid of technology, captioning a photo of his new life logging device with: “My #narrativeclip arrived today. I might get a bit of insight into what I really do all day

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112 Emeden, “No Longer a Pipe Dream.”
113 @soyjimmyflores, “Photo by Soyjimmyflores” (Instagram, October 5, 2014), http://instagram.com/p/tw8YU6EIv1/.
114 Quantified self is considered to be a form of biohacking, which is an amorphous descriptor for anyone using technology and/or self experimentation to manage their bodies.
115 “Photo by Wellnessfx.”
Technologies of self production can then be seen as a sort of middleman to self understanding (similar to therapy), inserting expert knowledge between a person and their body.

Experts place themselves at the center of self creation in our consumer oriented society where products play a large role in self-making. Quantified self products, in addition to giving users rationalized body production methods, sell the ability to produce the self through consumption by folding elements like discipline, fitness, and technological savvy into the self. Russell Belk’s concept of the extended self, or the incorporation of products into identity, is relevant as a method of analysis, as it does seem that users incorporate products and their meanings into their selves, resulting in a type of self that is constitutively intertwined with capitalist markets.

Instagrammer @widydee demonstrates this by posting a picture of his and his wife’s hands with the


"Technologies of self production also alter the relationship of self to body from that of the earlier digital era. In the digital space of the internet, according to Russell Belk, “we are freed of our physical bodies. According to this logic, rather than the body being the most proximal instantiation of our selves (Belk, 1988), we are set free in cyberspace to be whomever we wish.” (Belk 2014, 1101) However, quantified self technologies makes bodies once again the proximal instantiation of the self, by tethering the physical reality of the body to the digital world. If the purely online world is filled with disembodied selves, as Belk suggests, then self surveillance is a method of re-embodying the self, as wearable technology locates the source of data as the physical body (as opposed to other sources of data that have no such connection, such as web history or social media profiles). The data double of the self is then connected to the physical body in this one aspect. In general, the Internet of Things (of which wearable technology is a part) is reversing the reality/space distanciation of the internet by anchoring digital reality in physical spaces.

caption “#Smartwatch Smart Couple.” Companies sell the potential identities a user can take on; Senturion lets prospective buyers know who their consumers are with a picture captioned “Wearable tech built for the wrist space of the elite #MySenturion.”

Technology isn’t just a part of the self. It can act as a gatekeeper for what else becomes a part of the self. A startup making air quality wearables promoted their product with a photo captioned: “This new sleek device measures air quality in your environment. Take control with @mytzoa #YouAreWhatYouBreath[e].” The ominous yet comforting promise of “#YouAreWhatYouBreath[e]” warns consumers that without this product, someone could inhale dirty air and pollute their very self. Of course, @mytzoa presents itself as the solution to a healthful self. Charles Huang, COO of a company that makes connected home products, writes explicitly that companies need to take user identity into account when making products, saying that during the development process, “asking those questions first — how to create a product that lets people feel they are healthier, smarter or a better parent, for example — we have a much more interesting starting point.” People need to “feel they are healthier, smarter, or a better parent,” and products are a means to accomplish those goals. This method of self creation through self/commodity coproduction positions capitalism at the heart of the self, and turns products into indispensible tools of individualistic expression.

120 @widydee, “Photo by Widydee” (Instagram, November 15, 2014), http://instagram.com/p/vaILb9DjIT/.
121 “Photo by Senturion_wearabletech,” November 22, 2014.
122 @ctm_media, “Photo by Ctm_media” (Instagram, November 21, 2014), http://instagram.com/p/vq_Av2LeDx/.
Both of these narratives of self production can take on two shapes; in one, quantified self is uncovering a self that already existed; in another, the quantified self is actively building a new self that is an improvement upon the old self. These two visions of self production are at odds; in one, a true self already exists, and in the other, there is no true self, only the self that can be built. These are part of larger world views on what the self is that are beyond the scope of this thesis.

Regardless of whether the self exists prediscursively or not, the selling of this ability to produce the self “has become a global empire.”124 While quantified self wearable technology may not be global in scale yet, it is certainly an expansive presence in the markets. According to research from Futuresource Consulting, “consumer demand for wearable technology is rising fast, with Q3 [2014] global shipments totaling 12.7 million units, up 40% from just over nine million units in Q3 2013.”125 Wearable technology plays with the line of producer and consumer, as it is in fact a consumer good, but the data it produces is also a valuable commodity. This duality is noted in a report from iMedia Connections on demographic targeting and big data: “Wearable tech is about more than just counting calories, of course. It generates a huge pool of data that’s helping consumers gather insights about their health and activity. Perhaps just as importantly, it informs industries and offers useful insights to marketers.”126 Data isn’t just building new selves, it can build a new world, but specifically new developments in capitalism: “This is a huge and fundamental shift. When we start making things

124 Illouz, Cold Intimacies, 49.
intelligent, it’s going to be a major engine for creating new products and new services.”

The restricted world view on display in this excerpt is indicative of the excising of non-market human goals from quantified self as wearables become a large market force. However, this restricted view is not indicative of restricted impact: wearable technologies are changing the very fabric of everyday life, and not always in ways people like. In the next chapter, I examine the discursive negotiation over the role of technology in our reality.

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Chapter 3: Cultural Conflicts Over Wearable Technology

*We tend to talk about wearables with a sense of inevitability. They’re gonna happen, and they’re gonna be big. We’re just... not exactly sure what that looks like yet... From our vantage today, it’s still tough to envision what a truly ubiquitous wearable might look like.*

What does a society filled with wearable technology look like? What kind of products will be offered? What will this technology do for us? What should this technology do for us? How will it fit into everyday life? These are questions that users and non-users, consumers and producers, naysayers and evangelists alike are trying to figure out. This chapter will explore the discursive negotiations that go into creating a vision of the present and future of this technology.

Previous chapters have largely focused on those people within the technology community. It would be incorrect to say that their understanding of wearable technology can be generalized to society at large. In a market study focusing on wearable technology done by PricewaterhouseCoopers (PwC), respondents expressed a substantial amount of concern for how these products will influence our lives:

<table>
<thead>
<tr>
<th>Percent of consumers who say wearable tech will...</th>
<th></th>
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<tbody>
<tr>
<td>make us vulnerable to security breaches - 86%</td>
<td></td>
</tr>
<tr>
<td>invade my privacy - 82%</td>
<td></td>
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<tr>
<td>hurt our ability to relate to other humans - 72%</td>
<td></td>
</tr>
<tr>
<td>make me too dependent on technology - 68%</td>
<td></td>
</tr>
<tr>
<td>lead us all to own and use too many devices - 65%</td>
<td></td>
</tr>
<tr>
<td>take away my autonomy at work - 54%</td>
<td></td>
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<tr>
<td>turn us into robots - 52%</td>
<td></td>
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<tr>
<td>make my job unnecessary/redundant - 47%</td>
<td></td>
</tr>
<tr>
<td>make everyone look ridiculous - 37%</td>
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</tbody>
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128 VanHemert, “Jawbone’s New Wearable, the Up3, Is Ambitious in All the Right Places.”
These expressions of ambivalence stem from the fact that “no one can completely opt out of the abstract systems involved in modern institutions.”\textsuperscript{130} If the future of wearable technology is here, there’s no way out of it. The internet, computers, and smartphones were all rare once, but now, according to an Ericsson survey of technology in American homes, “roughly 90 percent of American households have three or more devices connected to the internet. And about half have five or more… By 2020, 90 percent of the world’s population over six years old will have a mobile phone.”\textsuperscript{131}

The fact is, we do not know how something will change our society until it actually does, and by the time it is institutionalized in expert systems, governance, markets, and people’s lives, it will probably be too late to turn back the clock and undo what has been done. Since ambivalence is so central to the majority of people’s experience of wearable technology, it is vital to analyze the surrounding social and cultural negotiations to fully understand the relationship between people and wearable tech. Ambivalence is expressed around four key areas: technologically altered interpersonal interaction, human/technology relationships, privacy in the age of mass data collection, and technology in the workplace.

**Social interaction, humanity, and wearable technology**

*Percent of consumers who say wearable tech will...*

...hurt our ability to relate to other humans - 72%
...make everyone look ridiculous - 37%\textsuperscript{132}

\textsuperscript{130} Giddens, *The Consequences of Modernity*, 84.
\textsuperscript{132} Mirani, “The Wearable Technology Future Is Coming, and It Sounds Pretty Awful.”
Google Glass users are known as “glassholes” for a reason. People don’t like that there are “pretentious posers” walking around with cameras on their face, potentially recording those around them.\textsuperscript{133} Even bars in Seattle and San Francisco, two locations known for the presence of the tech industry, banned the devices shortly after they were announced.\textsuperscript{134} There is a lot of discomfort surrounding wearable technology as it does not apply to known social scripts. One reviewer of the Epson Moverio, another smartglass device, wrote this anecdote of his time wearing the product: “My trip to the local cafe was met with nervous laughter, general bewilderment and the expected barrage of questions: "Are you recording me? Is that Google Glass?"… The Moverio left me feeling self-conscious and embarrassed."\textsuperscript{135} Users are unsure of how to act, and non-users are unsure of how to react when faced with new technology. There are social boundaries that are not supposed to be crossed that wearables easily enable the transgression of, like recording video of everyone without their knowledge. One user, posting on a quantified self forum, noted that while wearing a time lapse camera device, “people changed their conversational behavior noticeably, knowing I was recording video.”\textsuperscript{136} Particularly with these video-capable devices, the social contract of civil inattention is being violated.

Civil inattention, if Goffman’s writings, is a form of vague aloofness where people co-inhabiting space exhibit a “carefully monitored demonstration” of “polite

\textsuperscript{133} Vermeren, “Why Wearable Tech Hasn’t Reached The Mainstream Yet.”
\textsuperscript{134} Ibid.
\textsuperscript{135} Buckley, “Not Quite Google Glass: A Week with Epson’s Awkward Smart Glasses.”
Such inattention creates a side stage, where social actors can partially shrug off their front stage personality while in public or shared spaces. Video-capable devices convert that side stage back into a front stage by creating a permanent record of what is supposed to be a transient and inconsequential moment. Additionally, civil inattention acts as an “implicit reassurance of lack of hostile intent,” and is thus a precondition for trusting strangers in shared spaces. The heavy negative reaction to devices like Google Glass is thus an alarm over a violation of boundaries with a technology that turns a stranger from a benign co-presence to a potential threat.

**Humanity and Technology**

Percent of consumers who say wearable tech will...
...make me too dependent on technology - 68%
...lead us all to own and use too many devices - 65%
...turn us into robots - 52%

How much are we playing with the line of what is human and what is not? The 52% of PwC survey respondents who said wearable tech will “turn us into robots” seem ridiculous, but there are quantified self users who refer to themselves as cyborgs.

Devices play with the line between human and machine, natural and unnatural with machines attempting to emulate humans, fill human roles, and extend possibilities further than normal human capabilities while changing human-human and human-machine relationships.

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138 Ibid.
139 Mirani, “The Wearable Technology Future Is Coming, and It Sounds Pretty Awful.”
140 “The Cyborgs Among Us.”
One group of devices aim to make the user experience feel more human. This stems from a concern that technologies keep humans from one another. One product, Pillow Talk, allows people to remotely send their heartbeat to a companion’s pillow: “When you place your head on said pillow you can hear the primary muscle in your partner’s human circulatory system do its tireless work, thereby offering the illusion of closeness no matter how far apart you are.”¹⁴¹ This is clearly aiming to bring people closer to one another, and even to “feel a sense of the other person’s presence,” all in a more visceral way that can be offered via screens. There is a distinct focus on trying to emulate what is ‘natural’ for people to do, whether that’s hearing a partner’s heartbeat or running as if one were barefoot in the woods.¹⁴² The great potential of wearables is their ability to be “not in the way” like phones, tablets, or computers are.¹⁴³

When technologies are built to emulate humans in a way that’s less connected to the ‘natural,’ they start to get creepy. ‘Creepy’ is, in fact, a very popular word used to describe technology that crosses boundaries of what is considered appropriate for a machine to do. The Sen.se Mother markets itself as an upgraded version of a human mother, attempting to replace the reproductive and emotional labor of motherhood with a task-minding machine. In a review for Wired magazine, a writer describes the somewhat alarming nature of the product:

If you visit Sen.se Mother’s website, your first reaction might be to get creeped out. The product is billed as “like a mom, only better.” The company’s tagline is “the meaning of life.” Sen.se says that “Mother knows everything,” and with this device, your mom has been given “a slight upgrade.” That’s weird. And Mother looks like a little ghost with glowing LED eyeballs, so it’s also a bit spooky.144

The Mother works by users attaching “motion cookies” (small digital tags) to objects they want to measure; it’s current apps are “Walk, Sleep, Door, Teeth, Medication, Presence, Temperature, Check, and Coffee,” giving a sense of what kind of range the device has. It then dispenses advice based on your patterns.145 While this is similar to other trackers, the idea that it is attempting to replace a human mother makes the device creepy.146 It looks like a glowing, smiling white nesting doll, it’s described as a mom-replacement, and it even comes with a name (the one in the review is “Precious Josefa,” which the reviewer renamed “Albino Grimace” to reflect his feelings on the device).147

The Mother pushes the bounds of what human roles technology should fill.

Other products push the bounds of how much information we can have about ourselves. Below is a description of what can be described as a creepy death-clock app:

Deadline is an iOS app that uses a short quiz and the new Healthkit functionality in iOS 8 to create a timer that counts down towards your death. Although it’s just a generic algorithm that forecasts your death, there’s still something undeniably creepy about having a clock in my widget screen, just below the weather forecast, cheerily informing me that I’ve got 54 years, 2 months, 20 days and 22 hours left to live.148

145 Ibid.
146 It’s interesting to think what the makers of the Mother think of motherhood, given that Mother is a surveillant task manager.
147 Moynihan, “Review: Sen.se Mother.”
Humans, as a general rule, do not know detailed information on the manner or time of our deaths, making this app one that, using purportedly objective scientific knowledge and detailed data, gives users a type of illicit, impossible knowledge about themselves. When has the line been crossed between acceptable and unacceptable? Is knowing your own death-date going too far?

For a small number of writers, natural versus unnatural is an irrelevant debate. In an article decrying critics who say that technology is undermining humanity, writer Melanie Swan outlined the irrelevance of such concerns:

While many people might enjoy relinquishing planning and coordination as a class of human cognitive activity, others might regard it as a humanness that should be preserved, that is some how unnatural to discard. However, the more relevant question is what we will do with all of the time saved once technology has automated our planning and coordination activities.¹⁴⁹

For these people, technology brings us to the next level of humanity. In this article, titled “Connected World Wearables Free Cognitive Surplus,” Swan explains that technology is taking over basic functioning that takes up brainpower, thus freeing humans to expand their minds beyond what is currently possible, ushering in a new future.¹⁵⁰ However, for those 52% of people concerned about turning into robots, and probably for many more people, ideas of natural and unnatural still hold salience.

_Human Freedom versus Technological Control_

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¹⁵⁰ Ibid.
Technology in general, but especially surveillant technology, places people within choice structures that are not of their own making, thus curating their experiences. This aspect of technology is disturbing to some consumers, who, according to Marketing Magazine’s #Trending2015 roundup, “are growing more concerned with the filtering effect of technology. Where once life was lived through a lens, now it is a life distilled and, some believe, diminished by an algorithm.”

Is life truly distilled through technology? Mark van Rijmenam, author of “4 Ways Big Data Will Make You Happy,” certainly thinks so. However, he finds such life filtering to be beneficial in a world where we would otherwise be overwhelmed with choices, saying it is lucky that “companies like Walmart, Netflix and Amazon have developed smart algorithms that limit our choices.” It is true that there is an enormous amount of information and limited time and attention; however, the thought that corporations are deciding what choices we are presented with is unnerving. While algorithms and products can (and probably are/will be) co-opted by users in unexpected ways, such choice limiting reduces possible user goals into ones that can be made profitable for corporations.

Dependence

For those worried about our dependence on technology, the most extreme confirmation of this fear is the first reported Google Glass addiction. This man, while in rehab for alcohol, experienced what he described as a more extreme withdrawal from his

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152 van Rijmenam, “4 Ways Big Data Will Make You Happy.”
device. Dr. Andrew Doan, who published a paper on this man’s addiction, describes the patient’s problem: “…when the therapist would ask him a question, he would have this repeated movement of placing his index finger to the right side of face, similar to trying to turn on the Glass’…The man even began experiencing his dreams as if they were viewed through the eyeglass-like smart headset.”¹⁵³ Even the average user probably feels the addictive quality of devices: “Odds are, you’ve experienced leaving the house without your phone and felt some anxiety. And you likely thought to yourself — how crazy is it that I’ve become this reliant on my phone? Crazy though it may be, science shows that we crave interaction with technology — we check our phones 150 times a day.”¹⁵⁴

This addictive quality comes from relationship between devices and people, particularly in the gratifying nature of following instructions to reach goals set by the device. This emotional interplay is explored in a piece for Wired magazine by Meng Li, cofounder and CEO of Moov, which makes fitness trackers. What is interesting in his writing, however, is not the actual analysis, but the take-away, which describes how companies should exploit this relationship to make it more compelling:

As devices become artificially intelligent, it seems we’ve reached a critical new phase where we are striving to please our gadgets… it’s imperative that companies recognize the connections we’re forming with “smart” inanimate objects, and figure out ways to develop products accordingly – because the devices that will prevail are those that not only please us, but those that we also hope to please.¹⁵⁵

¹⁵⁵ Ibid.
Li is actively encouraging companies to emotionally exploit users to increase their market share. The market-centric message is unsurprising given that this is sponsored content. However, the writers of these long-form, social commentary think-pieces are almost always corporate sponsored ones. They are the thought leaders, and their motive (profit) blinds them to other potential take-aways from their articles, like the fact that users are being emotionally controlled by their products. Li even proudly states that company research demonstrated that while wearing their device, users “work harder, in part, because they want to please the Moov coach.” The lack of concern for the potentially disturbing ramifications of such emotionally charged data direction is the hallmark of this kind of corporate sponsored thought.

When the primary contributors into public thought are ones who, like Li, have a motivation to promote products, increase page clicks, or otherwise sell things, the field of vision vis-à-vis wearable technology shrinks to ideas that can be encapsulated within the market. Concerns are reduced to how products are of subpar quality, or how a lack of privacy will result in lower consumer demand. Grand visions for the future involve conquering more market share or inspiring innovation that will in turn sell more products. Engaging in such an infuriatingly reductive view of humanity shuts out ideas that do not follow the market’s own contrived logic. Such blindness, if continued, will inevitably result in unanticipated consequences that could possibly be avoided by broadening the intellectual horizons of supposed thought leaders.

\footnote{Ibid.}
In some ways, wearable technology falls in a long tradition of people feeling ambivalence about their role in the capitalist market and placing that feeling on some other aspect of life, such as the ills of the youngest generation or the newest available products. Particularly when companies are explicitly attempting to make their products emotionally addictive, it is easy for consumers to feel discomfort about what they interpret to be manipulative practices. However, it would be inaccurate to reduce ambivalence about technology purely to misplaced feelings about capitalism. Expert systems, particularly science and technology in this case, are experienced as black boxes by non-expert people, and even those who are highly educated generally do not know for sure how exactly their devices work. Having to trust others to do what one does not understand is the great imperative, and the great peril, of late modernity.

Privacy versus Benefit

Percent of consumers who say wearable tech will...  
...make us vulnerable to security breaches - 86%  
...invade my privacy - 82%¹⁵⁷

Privacy is a hot topic for debate in an online world. Wearable technology is another place to have that debate. There are innumerable shades of variation in how much privacy people think we should have and should expect. Below are the two most extreme views; first, that we should willingly give up privacy to reap the benefits of big data, and second, that we are on the path to a dystopian future of corporate and/or government control:

Imagine a future where self-tracking harnesses a whole population’s data to identify patterns and make meaningful recommendations. Imagine a future where

¹⁵⁷ Mirani, “The Wearable Technology Future Is Coming, and It Sounds Pretty Awful.”
we can see into the data of people just like us, to help us live better, and where we willingly give up a bit of privacy in exchange for vast benefits.  

The jobs that NSA and KGB spies would train for decades to master are now being handled by the little computer in your pocket. In its spare time. As a sideline entertainment.  

Part of the privacy debate has to do with the cultural lag between when a technology is released and when the rest of society catches up with how to treat it. One writer thinks wearable technology is an impending “security nightmare,” mainly due to lack of foresight by producers who have not prioritized privacy protections:  

…I might be willing to share my sleeping pattern with my GP but not with my manager. What’s more, if you’re wearing a gadget – whether that’s on your wrist, around your neck or in front of your eyes – you’re letting the world know you own it. You might become an easy target for hackers. What happens if your data is shared with or sold to third parties? Publicly snapping photos, shooting videos or mapping your location also have the potential to compromise the privacy of others.  

The state of privacy currently is a mess. People don’t know what’s being done with their data. Companies struggle to keep the data they keep safe and secure. Policies on who can access collected data are unclear. In the discussion of privacy, the central recurrent themes are control, benefit, and choice.  

*Control*: Who gets to choose how data is used? Who controls data produced by consumers? The largest fear for privacy proponents is that consumers will not get to make these decisions at all. Corporate power is a threat to consumer agency in this line of thinking. One internet commenter warns that if we aren’t careful to discuss these issues

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158 “Forget the Quantified Self. We Need to Build the Quantified Us | Design.”  
160 Vermeren, “Why Wearable Tech Hasn’t Reached The Mainstream Yet.”
now, “one day big data may conclude there is no more privacy.”¹⁶¹ Another cautions that “even if you physically and legally own a Smart Thing, you won’t actually control it,” referring specifically to the data produced by the device.¹⁶² Data can be (and certainly is) used by marketers to target customers more specifically, but that’s not the only use. There is one court case in Canada where a lawyer in a personal injury suit want to use Fitbit data as evidence for their client. A reporter warned of the precedent this could set, saying “while the company says it has no plans to sell users’ personal data, it would be forced to hand it over to a court.”¹⁶³ Not even individual products are secure. At a talk at the Black Hat Europe Amsterdam information security conference, one speaker demonstrated how his home-made device could find and pull data off of personal devices in the vicinity: he “actually had his self manufactured Raspberry Pi device ‘sniff’ (track) up to at least 6 jawbone and Fitbit devices from visitors at his speaking session. He showed the public how easy it was to find out people’s whereabouts, their listed hardware addresses and the time they actually left or entered the room.”¹⁶⁴

There is a severe lack of choice regarding the privacy of user data, since neither users nor companies seem to be able to control who can access it. As on columnist warns, “the smarter one’s things, the greater the possibility that they’ll be conscripted into

¹⁶¹ “Forget the Quantified Self. We Need to Build the Quantified Us | Design.”
schemes you never would have imagined and might not like.”\textsuperscript{165} The lack of control that users feel over their digital disembodied self is probably why people spend so much time wringing their hands over privacy. If someone controlled another person’s disembodied self, the stolen self could be manipulated and co-opted for the controller’s own purposes. Generally people are concerned with thieves co-opting disembodied selves, but institutional co-optation is probably more common. Marketers use personal data to sell users more products. A court could subpoena GPS data to prove the location of a suspect. Researchers could theoretically access data from quantified self devices, as they do from websites. While they may be unknown, not all of these co-optations are negative. In fact, many involved in big data promote the benefit that data can bring to the world.

\textit{Benefit:} There is enormous benefit to pooling massive amounts of data, or so proponents would have people believe. Public health doctorate candidate Ernesto Ramirez lays out the “endless possibilities” that quantified self technologies represent “for collecting data and insights for public health research and interventions,” noting that “to collect data on this scale through traditional methods would be prohibitively expensive or impossible.”\textsuperscript{166} Not only is there enormous potential from a public health standpoint: the tradeoff of quantified self is one where privacy is traded for good throughout society. In an article transparently title “How Big Data Benefits Both the Individual and the Collective,” writer Lisa Falzone explains that while “part of the benefits of the Quantified Self require the individual to relinquish some of her privacy,” the “ability to make improvements and informed decisions to day-to-day behavior” more

\textsuperscript{165} Evans, “The Internet Of Someone Else’s Things.”
\textsuperscript{166} Karon, “Mobile Health Team Explores New Self-Tracking Technology.”
than makes up for the lost privacy. Proponents of using data for collective benefit sometimes skirt the issue altogether, just extolling the benefits without addressing privacy. An Engadget reviewer of the new Microsoft Band paints a fantastical picture of the possibilities that Microsoft offers without even addressing possible concerns over the pitfalls of a company knowing everything about its users: “Microsoft promises [that Microsoft Health software is] just the tip of the iceberg as well. As the company gathers more data, both about you and the population at large, it'll be able to put its powerful machine learning to better use.” These advocates and data scientists want people to willingly give up privacy for the benefit that could come from pooling data for research and science. However, this connects one expert system (quantified self) to other expert systems of scientific/social scientific research, market research, and big data, which amplifies the ambivalence.

Among those who see data as a force with the potential for evil, the seeming inevitability of a world without privacy drives the desire to maximize whatever benefit can be gained when privacy is lost. In his treatise on how to stop government and corporate surveillance with ‘sousveillance,’ Josh Constine concludes that “fighting cameras with cameras may further obliterate our privacy,” but argues that “if we’re losing it anyway, we can at least take control of the shutter button so we’re trading privacy for

The message is clear: privacy is dead, so we need to focus on what we can get out of this bargain instead of dwelling on what we’ve lost.

**Choice:** The middle ground of this debate is filled with people wanting to talk about individual choice: people should choose for themselves to give up (or not give up) privacy in return for benefit. To those holding this position, such as startup founder and security buff Mano Ten Napel, choice will solve privacy issues, because people will feel in control while still being able to benefit from collective data efforts if they so desire:

“It’s not so much the level of danger that people put themselves in wearing these devices. It’s more the fact that maybe they should be offered the choice of what to share and what not.”

This turns privacy, specifically the choice to keep it or give it up, into somewhat of a market. Proponents of choice, then, talk in the language of incentives. One writer explains that “consumer handing over personalized data…must have a good reason for doing so,” suggesting “tailored rewards and discounts” as alluring incentives. In the end, this approach seems short-sighted; past the first generation of these devices, how many people will truly get to choose? If enough people during tech’s formative years do not prioritize privacy, then a cultural precedent (and a non-privacy-prioritizing data infrastructure) will be sedimented by the time this technology becomes part of everyday life.

Of course, choosing to have heightened privacy standards is not as simple as making that decision; somebody needs to create security measures. Given the vast

169 Constine, “Grab Your Cameras, We Are Little Brother.”
170 Napel, “Wearables and Quantified Self Demand Security-First Design.”
171 Falzone, “How Big Data Benefits Both the Individual and the Collective.”
technical knowledge needed to protect data, privacy is itself an expert system. Thus, the solution to not trusting expert systems that could be co-opting personal data is turning to other expert systems, which does not allay the ambivalence felt in the first place. The expert systems remain black boxes, and the need to fix expert systems with more expert systems remains one of the many ironies of the modern world.

**Wearables at Work**

Percent of consumers who say wearable tech will...
...take away my autonomy at work - 54%
...make my job unnecessary/redundant - 47%

Once workplaces are added into the mix, the relationship between people and wearables shifts toward one where individuals have less power. Wearables at work aim to take the guesswork out of embodied labor by mechanizing human workers. Take, for example, a description of the ProGlove, a smart glove for industrial workers: “This workglove can identify parts or tools as the assembly worker touches them and provide instructions or training on the fly. It could also track the worker’s movements, heart rate, mood, and productivity.” The worker is being tracked and micromanaged through this glove; the augmentations to reality that the gloves provide (instructions, tool identification, etc) turns the worker into someone following instructions like a machine. This technology not only serves to eliminate human error, but also to maximize efficiency.

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Technology can be used in a variety of different workplaces to maximize efficiency. The coaches for the Seattle Mariners wanted to minimize travel fatigue for players and did so through wearable technology:

The wrist-borne devices, called Readibands, track sleep cycles of individual players. The data can then be grouped together to get averages of several kinds. This data, coupled with standard Major League Baseball stats like a-swing-and-a-miss percentages, can be combined, and that’s when patterns start to emerge. The coaching staff can then use these patterns to better tweak travel schedules for the team to both minimize fatigue and maximize rest.\(^\text{174}\)

While the Mariners are an unusual workplace, proponents of wearables at work are upfront about wanting to use quantification and technology to increase productivity.

Increasing productivity, however, is generally less about managing bodies than it is about managing emotions. In an article for Fast.Company, writer Art Markman warns against tracking “the most obvious things” (i.e. location and tasks), saying “we already know some of the dangers of trying to optimize the time that people are spending on tasks.”\(^\text{175}\) He continues on to outline the pitfalls of mechanizing workers by tracking their time usage and location, suggesting instead that wearables that could measure “physiological measurements that are related to emotional responses” would help managers create better workplaces through emotional management.\(^\text{176}\)\(^\text{177}\) Specifically, he


\(^{176}\) Ibid.

\(^{177}\) Here is an interesting class divide; industrial work has products like the smart glove, which mechanizes the body, while office work hopes to have technology that manages emotions.
suggested measuring heart rate and galvanic skin response (“moment-by-moment changes in the conductivity of the skin”), as well as the face muscles used to smile and frown, all of which could measure the intensity and direction, respectively, of emotions.  

The idea that biological measurements could capture emotion in the first place suggests that Markman and other proponents of this kind of quantification are consistent with psychological ideas about emotion being a physiological phenomenon. Outlining how managers could use this information, Markman states that “managers could get employees to review their day and focus on what was making them feel very good or very bad. In that way, managers could identify what is going well and what is going less well in the workplace without having to wait for small problems to become big ones.”

This falls in line with what Eva Illouz described in *Saving the Modern Soul* about corporate psychology, scientific management, and the therapeutic ethos at work. In her book, Illouz writes that management mixed with psychology led to personality and emotion being the prime vector of control in the workplace; a manager “was someone who acted as an investigator of social sentiments and who could further collaboration between managers and workers to achieve organizational goals.” These ideas place the management of personalities and emotions at the center of the workplace. Technology has the power to enhance that management; as Markman describes above, managers

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178 Markman, “Will Wearables In The Office Make Work More Productive?”
179 Ibid.
180 Illouz, *Saving the Modern Soul*, 72.
could see day to day what is troubling workers.\textsuperscript{181} While this could certainly lead to more pleasant work experiences, as it did when this emotional management replaced the angry foremen of early industrial capitalism, Illouz reminds us that the effect was a personalization of social issues that obfuscates structure, as “conflicts at work were reconceptualized as stemming from personality problems and a troubled childhood, not from the defective structural organization of capitalism.”\textsuperscript{182} It is a matter of debate whether a kinder, gentler capitalism, achieved through the therapeutic ethos, is truly attainable, or if the therapeutic ethos is just hiding problems that will eventually boil over, but further investigation of this topic is outside the scope of this thesis.

As wearable technology becomes a feature of the workplace, it will take on the cultural power that accompanies institutional retention. Wearable tech already plays into the other four of Michael Schudson’s elements of cultural potency: it is retrievable thanks to its now mainstream status, it has rhetorical force in the form of highly anticipated launch events, ever-present Apple stores, and the flashy advertisements, it has resonance due to its aforementioned reenchanting power, and it has resolution in its concrete goals of increased wellness/efficiency/etc.\textsuperscript{183} An institutionally retained form of wearable technology would be “tied down,” as people would be compelled to be consistent users of the products.\textsuperscript{184} Think of smartphones: they were a luxury until people started using them

\textsuperscript{181} A belief in the impartiality and objectivity of science suggests the potential for mechanized emotions: if your heart rate was above this threshold and you facial muscles were measured in this position, you must be angry.

\textsuperscript{182} Illouz, \textit{Saving the Modern Soul}, 73.


\textsuperscript{184} Ibid.
for work purposes, and then they became a necessity. The concerns expressed in the PwC study are well grounded. Especially for those who fear diminishing autonomy at work, their concerns are quite realistic. After all, part of the point of having wearable technology in the workplace is to more closely monitor workers and what they are doing, in order to maximize the efficiency of the workplace, whether that be emotionally or bodily. As for the fear that people’s jobs will be lost to machines, it seems more likely for those jobs where bodies are mechanized, not emotions. Regardless of the context, carving out institutional space for wearable technology turns it from a niche product to a ubiquitous part of life.
Conclusion

It’s just the beginning. 185

Wearable technology currently forms an intimate part of the lives of the niche market that uses them, but likely will become an intimate part of everyday life for many people in the near future. Sociological analysis of such important parts of our lives is essential and these consumer products should be seen as serious cultural elements. Through wearable technology and quantified self practices, users reenchant their lives through the spectacular wonder of consumerism and the modern, progressive narratives of science and technology. However, the true relationship to be concerned with is not that between user and their technology, but user and the expert systems that create the technology. This relationship is characterized by the choice structures that contour a user’s behavior, constituting a method of control that produces a normative bodily style that users seek to attain through proper and morally-charged practices of self control. As this self-controlled, normative body becomes a commodity attainable through consumer products, market ideologies increasingly dictate the vision of what technology is and can be. As expert systems form a transcendent authority, users gain meaning but lose power, and the increasing alienation they feel manifests itself in mistrust and ambivalence about the expert systems. Discursive negotiations that stem from this dual experience of mistrust and meaning, from concern over the changing nature of humanity to debates about personal privacy, create tension over the view of technology, which oscillates between utopia to dystopia.

185 Karon, “Mobile Health Team Explores New Self-Tracking Technology.”
While this analysis is an extensive first look, there are a number of unanswered questions that this thesis does not address. Possible questions for further study include:

*The coproduction of health and technology*: While the comparison between health science and capitalism to the therapeutic ethos and capitalism alluded to the similarities between the two, my thesis did not address the possible parallel to Eva Illouz’ central idea of emotional capitalism, specifically the coproduction of emotions and commodities. I believe there is a parallel coproduction of physical health and technologies of wellness, which could possibly explain the sticking power of the method of conceiving of the self in the terms of medical or health sciences.

*Further study of the core and periphery communities*: As I mentioned in the first chapter, the core and periphery of the quantified self community engage with technology for different reasons. The varying natures of these communities and their use of wearable technologies can be explored with much more detail than in this thesis.

*The relationship of technology to non-technological communities*: As wearable technology changes the nature of humanity and society, how do non-technological communities, or communities not explicitly organized around technology, experience the incursion of these devices into their lives? This could be particularly interesting for communities that are adjacent to and overlap with quantified self (such as the fitness community) and wearable technology (such as the fashion community). If wearables take off in the workplace, then the experience of those unwillingly compelled into becoming users would also be a fruitful area for study.
Non-wearable personal technologies: This work can be expanded greatly to include analysis of many more devices. Smartphones, as precursors to wearables, could form an interesting comparison, particularly once wearables have attained the same kind of prevalence that smartphones currently have (if they ever do). Another potentially fascinating area of study will be the newly emergent virtual reality and augmented reality products. Currently, such products are extremely niche, but the impending introduction of Microsoft’s first augmented reality device could signal an increasing role of such products in consumer markets (and eventually in daily life).

Technology and the changing experience of time and space: As I alluded to earlier, quantified self wearable technology takes the digital disembodied self and tethers that self to the physical body through self surveillance. These wearables are part of a phenomenon known as the Internet of Things, which also anchors digital reality to the physical world. The changing relationship between reality, time, space, and information are already rich potential sites of study, and will only continue to become more relevant as the Internet of Things expands.

In conclusion, I would like to speculate whether technology simply reproduces the world, or whether is can be used to create a different (and hopefully better) world. Technology obviously changes society in some ways, but do those societal changes simply impose new aspects onto the same infrastructure? The issue with future speculation lies in the tools we have to conceive of possible futures: we are constrained by the optic lenses we currently see through. If we can see beyond the futures that are patterned by such lenses, then a constitutively different world is possible. If no such creative individuals or groups exist, we will be mired in the same societal issues that
plague us now. Technology is not the savior we want it to be, rather, we must save ourselves.
APPENDIX I: DETAILED METHODOLOGY

A definition of quantified self wearable technology

A product is deemed to be a quantified self wearable technology for the purpose of this research if:

• A person can physically wear it on their body
• It can track one or more aspects about a person without the user having to do anything except wear it

The first criteria includes designs such as clips, bands, wristlets, and implants; it excludes smart devices like smartphones or pods that are not worn. The second criteria is interpreted broadly. The aspect about a person that the product can track can include location, activity, various biometric measures (heart rate, step count, skin conductivity), habits, surroundings, and/or co-presence of nearby people/objects. Such measurement does not need to be the primary purpose of the product (e.g. smart watches are watches with lots of other functions), although the vast majority of these products have an overt purpose of being a tracker.

Sources

Feedly

Feedly is an RSS (Really Simple Syndication) reader that aggregated all news stories published from a specified source into a single “feed” from which articles can be saved. In the feed, the article title and summary are displayed, and readers can click the article title to read the full article.

I chose to select blogs that are widely read, under the assumption that these are a better barometer of popular and influential opinion than smaller, boutique blogs. To find these blogs, I selected the first eight blogs that appeared under the Feedly search for
“#tech.” Those eight blogs are:

- Engadget
- Gizmodo
- Lifehacker
- Mashable
- ReadWrite
- TechCrunch
- The Verge
- Wired

After the first four days of monitoring the feed, three blogs (Lifehacker, Mashable, and ReadWrite) had yielded no unique relevant results and were removed from the feed.

Articles were selected as relevant if they met any of the following criteria:

- Article title, subtitle, or summary contained the name of a quantified self product
- Article title, subtitle, or summary specifically mentions “digital health,” “wearable technology,” “quantified self,” or any variations of those phrases
- Article title, subtitle, or summary discusses the collection of personal data

After reviewing the first few weeks of data on 10/21, I determined that there were excessive duplicates among the posts, because when short-form articles were reposted by every blog after their initial posting. To prevent collection of duplicates, only the first iteration of short-form viral articles were collected. Short-form viral articles are defined to be less than 2 paragraphs that contain only information and no opinion. These are common on blogs due to the desire to drive traffic; in multiple instances one blog in the feed would have an article announcing a release data for a new product and cite one of the other blogs in the feed.

I began data collection on 10/4, by using the “save for later” feature of Feedly to save relevant articles. Starting on 10/21, I converted all of these articles into PDF format to upload to a document manager. After the initial group (collected 10/4 to 10/21) were inputted, this format conversion took place. In total, 142 articles were collected from
Feedly.

**Google Alerts**

In order to capture content from both small, boutique sources and large, non-tech-specific sources, I set up Google Alerts to send digest emails of what the Google algorithms determine are the most relevant items from around the web on the topics of digital health, wearable tech, and quantified self. While the algorithm that Google uses is unclear, it is generally understood that these items are the most “popular” from around the web, which is likely based on how often they were read, shared, and searched for. Each Google Alert was set up on 10/2 in the following way for the topics of "wearable tech," “quantified self,” and “digital health."

Results = “best results only"
Content = “all types of content"
Region = “all regions"
Language = “English only"
Frequency = “weekly emails"

On 10/22, these settings were altered to set the region to U.S. only. The same standards of relevance were used for Google Alerts as for Feedly, with the exception that the digital health articles needed to also mention a consumer technology, to avoid content about record digitization or other such irrelevant digital health topics. Additionally, anything that required a subscription or form of payment to view was not used.

On 10/30, after no relevant content from the digital health for three consecutive weeks, that Google Alert was removed.

A total of 59 data points were collected through Google Alerts.

**Instagram**

After examining various hashtags on Instagram, I determined that the two most
relevant and fruitful hashtags for research purposes are #wearabletech and
#quantifiedself. I also examined but ruled out #wearabletechnology (which was just a
subset of #wearabletech but with fewer posts) and #wearables (which was mainly non-
technology posts). Due to the differing volume on each of these hashtags, different data
collection strategies were used for each. All posts were collected using the search
function of the mobile app because Instagram currently has no desktop client that
includes search functionality.

Posts were collected through screenshots and the “shareable link” function. Due
to a late discovery of the “sharable link” feature, links were found for all but 6 posts, due
to a combination of aggressive privacy settings, changed usernames/deleted accounts, and
deleted posts.
A post was considered relevant if the post was in English and met at least one of the
following criteria:
• The post had either a product or personal data in the picture.
• The post discussed a product or personal data in the caption.

Data collection started on 10/20 with the collection of the first 20 posts on the
#quantifiedself tag. After that, every Monday, all relevant posts on the #quantifiedself tag
were collected.

For #wearabletech, data collection began on 10/24, and the first 10 relevant posts
on the tag were collected on that day and every 4th day after that. Additionally, for
#wearabletech, no more than one photo per user was collected in one pull of data, to
ensure that one user did not dominate a single sitting of data collection.

Data collection for Instagram was suspended on 12/1. A total of 132 Instagram
posts have been collected through this method.

Facebook

Facebook provided another source of both individual, small community, and producer sponsored content. The initial query inputted into Facebook was search=“quantified self,” with no other parameters. How Facebook searches all the content and arranges it is unknown. I went through posts and, using the same relevance standards as for Feedly, determined all the relevant posts that the search. After that, the same search was used, but with time=“this month,” to ensure that the same content wasn’t showing up again and again. Without the extra parameter, it showed too much repeat content. Due to the low volume of the search, every relevant post was taken. Starting on 10/29, this search was repeated every 9 days. This time frame was chosen to avoid repeating the search on the same day every week. Thirty posts have been collected through this method.

forum.quantifiedself.org

This forum is for users registered with the official quantified self website, and provides data specifically on those user very involved with the quantified self lifestyle. As such, the conversations on these forums do not always discuss wearable technology.

To prevent active threads from appearing in the data set several times, I collected all forum data on one day. Due to the time-intensive nature of this undertaking, all data was collected on 12/30, after the semester had ended and past the data collection period of the other sources.

For each sub-forum, I collected all threads where Last Update was during the month of December. Note that this does not mean that the threads were started in
December. One popular thread on applying quantified self to chess playing, for example, was started in August 2014. For sub-forums that had no activity during December, I chose the last 5 updated threads from those sub-forums, as long as those threads were posted in 2014.

Threads were collected from the following 12 sub-forums, listed below with the number of threads collected:

- QS Newcomers: 4 threads
- Apps and Tools: 13 threads
- Data Ownership and Privacy: 3 threads
- Design: 1 threads
- Diet, Nutrition, and Weight: 1 threads
- General Health: 2 threads
- Learning and Cognition: 1 threads
- Mood: 1 threads
- Research and Media: 3 threads
- Sleep: 5 threads
- Sports, Physical Activity, and Fitness: 5 threads
- QS Open Forum: 3 threads

(Total: 42 threads)

Rejected sources

Reddit, Tumblr, and Twitter were also examined as potential sources but were not used as part of data collection.

On Tumblr, no relevant tag that yielded substantive results could be found, as #wearabletech (and variations thereof) were largely centered on non-quantified self types of technology and #quantifiedself (and variations) were dominated by a few users and, at the time that sources were being investigated, dominated by French-language Tumbler users. Fitness related hashtags (like #fitspo) do not have a substantive volume of quantified self or wearable technology related posts.

On Reddit, the forums that related to quantified self largely contained posts that
linked to articles that were collected through Feedly, Google Alerts, and Facebook, and forum.quantifiedself.org provided richer forum data.

Due to the constraints of the character limit, Twitter is filled with people linking to other sources. Thus Twitter had the same problem as Reddit with the lack of unique data.

*Total Data*

A total of 405 pieces of data were collected for this thesis. An overview of the sources of this data is below:

Feedly: 142  
Google Alerts: 59  
Instagram: 132  
Facebook: 30  
Forums: 42
APPENDIX II: CODE BOOK

Source codes: The following codes were added to more easily keep track of the source of each document.

source=Feedly  
source=Google Alerts  
source=Insta  
source=Facebook  
source=forum

Article types: In addition to source codes, article type codes were added for the purpose of seeing what kind of article quotations came from.

product or company gossip  
product review  
social commentary  
tech fun or silliness  
usage guide  
product commentary

Content codes: These we applied to quotations that were related to the descriptions listed underneath each code. Note that some are broad or non-specific; these were used to catalogue quotations that were later reviewed again to gain more specific insight.

agency  
Discuss people using agency in relationship to technology.

beauty and style  
Mentions beauty, style, or other appearance-related descriptor.

blind spot  
Discusses “blind spots” of current technology (areas where something is needed but not being made, new areas where people have not developed, etc).

capitalism and corporation  
Umbrella tag for anything related to capitalism, markets, market logic, corporations, or corporate power.
choice
Mentions the importance of individual choice (in regard to participation, privacy, etc)

community
Mentions community or group identity.

consumption
Related in some way to consumption of products or consumer culture.

control
Talks about some entity controlling something. For example, this could be users controlling an aspect of self, companies controlling users, or any other variation of the theme.

creepy
Uses the word “creepy” in relation to quantified self wearable technology.

criticizing critics
When authors express criticism about another person/author’s critique.

cultural lag
Instances where there are no social/cultural/legal scripts to deal with a situation that arises.

current tech - negative sentiment
Expresses a negative sentiment about current technology (specific piece or tech in general). This does not include sentiments like “this product is low quality,” but rather things like “it’s dangerous to sell a product based in junk science.

current tech - positive sentiment
Expresses a positive sentiment about current technology (specific piece or tech in general) This does not include sentiments like “this product is high quality,” but rather things like “this represents a breakthrough in innovation.”

data direction
Indicates that a user is taking, or should be taking, cues for behavior from data or technology.

data for good
Discusses of data itself and/or the collection of data in general has a net positive effect on some aspect of society.

data for not-so good
Discusses of data itself and/or the collection of data in general as a danger to some aspect of society.
desire
Expressing a desire for a piece of technology or using related language (saying you love a product, calling it sexy, etc).

discomfort of other
Expresses discomfort with a piece of technology from a non-user (e.g. feels uncomfortable around people wearing it, wary about its current or potential uses).

discomfort of self
Expresses discomfort with a piece of technology from a user (e.g. not sure what to do with it, wary about using it).

doubt
Expresses doubt about whether or not products or technology in general really work.

emotions
Umbrella tag for anything related to emotions.

enchantment
Umbrella tag for enchantment related quotations.

excitement
Expresses excitement about a product, company, or the general current/future state of the world in relation to quantified self wearable technology.

externalization of self
Mentions the process of taking something internal (e.g. heart rate, dreams) and making it external (e.g. collecting to upload to a database, sharing on Twitter).

fame and celebrity
Mentions either a specific celebrity, or about the ideas of fame in regards to a product, company, or figure in the technology world.

fantastical description
Uses a fantastical/fictional character (e.g. Batman) or setting (e.g. Asgard) to describe a piece of quantified self wearable technology.

filling needs
States of describes how technology fills a need for users.

fine line
Discusses or warns readers about boundaries that technology is crossing or could cross.

fitness
Umbrella tag for anyone discussing physical fitness.
fun-nes of product
Describes products as toys or games, or expresses the sentiment that products are supposed to be fun to use.

future orientation
Directs readers to think into the future of technology, not to dwell in the present state (e.g. this is the first generation of products but here is the potential).

future tech - negative sentiment
Expresses a positive sentiment about technology (specific piece or tech in general) that does not currently exist.

future tech - positive sentiment
Expresses a negative sentiment about technology (specific piece or tech in general) that does not currently exist.

future tech - speculation
Speculates about what the future of technology will hold, in general or for a specific area/product.

gender
Mentions gender (e.g. “for men”) or uses gendered language (e.g. “feminine style”) in relation to products.

good or bad?
Unclear whether something is good or bad.

health and wellness
Discusses non-medical understandings of health and wellness (e.g. “feeling better,” “feeling stronger”) in relation to products.

human/technology relationship
Umbrella tag for anything discussing the relationship between tech and people

humanity
Mentions humanity or human-kind in general and its relationship to technology.

tid related
Umbrella tag for anything related to children and/or parenting

language of gossip
Uses language that sounds tabloid-like (e.g. describing a product as “leaving nothing to the imagination”).
luxury and exclusivity
Discusses technology in terms of how luxurious or exclusive it is (e.g. “premium style,” “limited edition”)

managing the body
Discusses a method of bodily management by technology (e.g. "It coaches users with real-time analysis of their foot-striking position and stride."), or the application of scientific methods to the body.

mechanized body
Uses language that portrays the body as a machine (e.g. “fine tuning”).

medical
Discusses technology in terms of medical benefits or medical treatment (e.g. life quality improvement for patients wearing COPD sensors).

natural
Uses the word “natural” to describe technology.

natural versus unnatural
Discusses what is “natural” or “unnatural” for technology to do.

personal data
Any personal data revealed online by product users. Can be in picture, table, or any other format.

personal fulfillment
Expression by a user that technology helps them feel purposeful, happy, or otherwise personally fulfilled.

personalization
Talks about expressing individual user identity in or through a product (e.g. “make it your own”).

personifying technology
Uses personifying language to describe technology.

possibility
Discussing specific possibilities for the future.

privacy and security
Umbrella tag for expression of thoughts on the issues of privacy and security in regards to technology.

reflexivity
Discusses self-reflection, mindfulness, or reflexivity in connection with technology.
reluctance
Expresses reluctance at using quantified self wearable technology (a specific product or in general).

resistance
Mentions actively resisting technology (not just commenting on it).

robots and cyborgs
Mentioning robots or cyborgs; comparing technology or people to robots or cyborgs.

science
Umbrella tag for discussions of the scientific underpinnings of a piece of technology (e.g. how accelerometers collect data)

science is magic
Compares science to magic or otherwise expressing that science/technology is in some way mystical.

science is progress
Expresses that science/technology represent progress in society.

science fiction/science fact
Compares current/future state of technology to science fiction.

scientific management
Discusses managing the body or emotions with scientific principles.

self building
Umbrella tag for expressions that relate to the idea of constructing the self.

self improvement
Discusses using technology for personal betterment.

sensuality and sex
Describes technology in terms of sensuality or sexuality (e.g. “wearables need to be sensual”)

shade
Uses flippant sarcasm and insult (commonly referred to as “shade”)

stats
Umbrella tag for interesting statistics.

surveillance
Umbrella tag for specific mentions of surveillance.
*tech talk*
Discusses specifications or other technical aspects of how a product works.

*tech as tool*
Expresses the idea that technology is a tool to achieve goals, either specifically or generally.

*tech for work*
Discusses the current/future role of technology in the wearable workplace.

*the future is now*
Expresses the idea that society has reached a point that others envisioned long (or not so long) ago.

*thought community - tech*
Uses language that articulates the boundaries of the tech world or contrasts the tech community with other communities (e.g. “if you don’t know what this is you haven’t been reading our blog very long”).

*transformation*
Discusses the transformation of technology, of society by means of technology, or of people by means of technology.

*trend spotting*
Explains what the next trend will be.

*true self*
Expresses the sentiment that a truer version of the self is being discovered or uncovered by means of technology.

*uselessness*
Expresses confusion as to how a product is supposed to be used or why it exists.

*user identity*
Mentions the identity of a consumer or user in relation to the product (e.g. "wearables need to be sensual and need to represent you as a person").
Works Cited


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