



Article

Beyond the Quantified Self: Thematic exploration of a dataistic paradigm

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Abstract

This article investigates the metaphor of the Quantified Self (QS) as it is presented in the magazine *Wired* (2008–2012). Four interrelated themes—transparency, optimization, feedback loop, and biohacking—are identified as formative in defining a new numerical self and promoting a dataist paradigm. *Wired* captures certain interests and desires with the QS metaphor, while ignoring and downplaying others, suggesting that the QS positions self-tracking devices and applications as interfaces that energize technological engagements, thereby pushing us to rethink life in a data-driven manner. The thematic analysis of the QS is treated as a schematic aid for raising critical questions about self-quantification, for instance, detecting the merging of epistemological claims, technological devices, and market-making efforts. From this perspective, another definition of the QS emerges: a knowledge system that remains flexible in its aims and can be used as a resource for epistemological inquiry and in the formation of alternative paradigms.

Keywords

Biohacking, dataism, feedback loop, optimization, Quantified Self, transparency, *Wired*

Introduction

The creative use of metaphors in media helps us to think about an emerging issue or problem and grasp the unknown and the unforeseen, but it also imposes political and economic assumptions and aspirations (Wyatt, 2004). Depending on how the object or experience is conceptualized, metaphors are structural, orientational, or ontological

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(Lakoff and Johnson, 1980). Ontological metaphors, such as “the Quantified Self” (QS), presented in *Wired* magazine, allow us to refer to, quantify, or identify particular aspects of a phenomenon; the QS supports the notion that various self-tracking tools and applications, including emotion trackers, food trackers, and pedometers, offer an effective opportunity for people to understand their bodies, minds, and daily lives as a series of quantifications that can be examined and acted upon (Lupton, 2013a, 2013b, 2014). As a metaphor, the QS does not only define a new numerical self but also promotes a framework within which such a self operates. From this perspective, *Wired* is using the notion of the QS to capture certain interests and desires for the future, while ignoring and downplaying others.

By tackling the underlying themes of the *Wired* discourse, the aim is to promote a research agenda that detects the linking and merging of epistemological claims, technological devices, and market-making efforts. *Wired* is a major player in the technology market, and the way it has promoted the QS extends to questions of business models, consulting opportunities, and investments, thereby contributing to the hype and financial speculations that surround self-tracking tools and applications. Rather than analyzing this kind of more conventional market-making, however, we approach the technology market as consisting of various kinds of practices, facilitating tools, and epistemic functions; markets do not exist as stable formations, but rather reveal themselves in the very act of their making (e.g. Araujo et al., 2008; Knorr Cetina and Preda, 2007; Pantzar and Ruckenstein, 2015). In light of this view of the market, the way in which *Wired* has promoted the QS is noteworthy: by virtue of its activities in this direction, it is participating in epistemological work that is modeling an emerging market—a data-driven market¹—characterized as a field filled with promise that is in a state of active development in various professional areas, including healthcare, urban planning, research, media, and marketing (see, Nafus, 2014; Nafus and Sherman, 2014; OECD, 2013; Swan, 2012, 2013).

From a scholarly perspective, the eclectic and fiercely optimistic market-making efforts of *Wired* could perhaps be seen as trivial and unworthy of closer examination. Characteristic of the *Wired* discourse are declarations of historical and cultural disjuncture (these ruptures have included the end of media, the end of the economy, the end of history, and, more recently, the end of science), accompanied by announcements of the beginning of new eras of economic prosperity and technological advances. Undoubtedly, the programmatic statements in *Wired* that endorse the new era of a data-driven research paradigm trivialize future developments. Yet we suggest that exploring the QS metaphor offers conceptual guidance in tracing historical continuities in the ways technologies are repeatedly positioned to master, contribute to, and encourage certain themes such as transparency and optimization, meanwhile raising more nuanced questions about datafied life (Ruckenstein and Pantzar, 2015). In other words, by exploring the features of the QS, we are more equipped to analyze how the QS metaphor might mislead us in our efforts to understand what the sharing, analyzing, and discussing of personal data promotes in the everyday. Rather than simply arguing against the metaphor, it is more useful to unpack the elements that comprise it and use them to direct critical inquiry (Wyatt, 2004).

The self-tracking practices that lie at the heart of the QS are not new, but rather represent the continuation of a long history of technologies of the self (Foucault, 1988): people have monitored their eating, drinking, expenditure, sexual behavior, and many other

practices in the past, and research has linked this kind of self-monitoring to the making of subjectivities (Rose, 2007). The metaphor of the QS in *Wired*, however, is selective in how it positions “the new” and presents history, particularly in terms of its being part of, and building on, a continuum that sees the self and the body as reflected and entwined in technological development and innovation. Norbert Wiener (1948: 24), the father of cybernetics, suggests that the 20th-century age of communication and control marks a shift toward treating the body as an integral part of the information system in terms of incoming and outgoing messages. The digital age, figures the body as a smarter machine that can be extended and enhanced if needed (Lupton, 2013b). *Wired* proposes, as described below, that self-measuring devices offer information to people about their minds and bodies in a manner that not only resonates with Wiener’s cybernetic worldview (Tomas, 1995) but also complements it by suggesting an erasure of the separation between information generated by the body/mind and by computers. In light of the data-driven market, the way in which *Wired* promotes the QS through imagining the self is particularly significant, because it positions self-tracking devices and applications as interfaces and communication devices that energize engagements with technology that push us to rethink selves and the everyday. From this perspective, we are also dealing with processes that Nigel Thrift (2005) has termed “knowing capitalism” in which knowing ourselves and others by means of technological devices becomes an integral part of shaping and accelerating the reproduction of the technology market.

Building on a disciplinary matrix

The metaphor of the QS acts as an interface that both constructs knowledge about the self and aims to change the framework in which that self is enacted. The methodological approach used for tackling this interface builds on a discourse-centered approach to culture, the basic principle of which is that the discourse circulating in a social entity constructs the world in which the entity is situated or situates itself (Urban, 1996). By attending to the epistemological claims relied upon by the social actors who innovate and propagate the QS in *Wired*, the goal is to explore how technology promoters shape the future by presenting certain knowledge claims, thereby participating in larger trends in capitalism including social, political, and economic initiatives. As we will demonstrate, at the heart of these claims is a belief in “dataism” (Van Dijck, 2014), an approach that grants data an agentive role in knowledge formation. In the context of the QS, personal data streams, including information on genetic material, physiological reactions, and everyday movements, are set in a larger framework of communication, whereby personal data are seen as suggestive and agentive, in the sense that it furthers new modes of conduct and relating to others (Harris et al., 2014). In short, the data call for managing previously hidden aspects of the personal, such as quantified stress levels or genetically based risk evaluations, in a routine way.

We argue that the dataistic emphasis links the QS metaphor to a claimed and forcefully promoted paradigm shift in research and society that builds on the transformation of various individual and social phenomena into quantified data, thus allowing for real-time behavioral tracking and predictive analysis (Mayer-Schoenberger and Cukier, 2013; see also Van Dijck, 2014). In order to explore what this new paradigm might look like in

relation to the QS, we returned to the classic work of Thomas Kuhn (2012 [1962]) that argues that protagonists of a new paradigm typically claim that they can solve the problems that led the former paradigm into crisis by combining existing knowledge in a new and unexpected manner: “Within the new paradigm, old terms, concepts, and experiments fall into new relationships one with the other,” as Kuhn (2012 [1962]: 148) puts it. Because of this changed perspective, it is almost impossible to translate the new wisdom into the language of the old paradigm, suggesting an incommensurability that provokes new kinds of discussions and speculations and little linear progress of knowledge.

Stimulated by the Kuhnian framework, we suggest that, in developing the ontological metaphor of the QS, *Wired* borrows elements and departs with them from established disciplinary frameworks, such as rational choice theory or medical research. While the *Wired* discourse is obviously not disciplinary in a traditional academic sense, and discussing the writer-entrepreneurs of the magazine in such terms is unorthodox, doing so allows us to emphasize that influential knowledge work, in the form of the production of metaphors and key concepts aimed at altering our understanding of the world, takes place outside the academic community. By using such metaphors, researchers are incorporated into market efforts, sometimes without even realizing it. Therefore, a detailed assessment of the political and economic interests and aims that are being channeled through such metaphors and paradigms is a scholarly asset (Wyatt, 2004).

Kuhn (2012 [1962]) later replaced the term “paradigm” with the more precise “disciplinary matrix” by which he referred to “the common possession of the practitioners of a particular discipline” (p. 181). He then identified four areas where disciplinary continuities (or turbulence) could be recognized: symbolic generalizations (shared formal expression), metaphysical paradigms (shared models and beliefs), values (widely shared principles guiding scientific practice), and shared commitments. Although we have not focused on all these aspects, or not in the manner Kuhn intended, we have been guided by the idea of a disciplinary matrix and propose that the model is suited to analyzing *Wired*. In the language of Kuhn, the magazine can be defined as a matrix launcher that attacks established disciplines and their methodological choices. In the course of our work, we modified Kuhn’s approach and explored the shared commitments promoted by *Wired*, paying particular attention to the symbolic generalizations and discourse devices that *Wired* is using to accelerate circulation of self-tracking ideas. It became apparent that *Wired* is formulating a discourse based on well-known elements from other contexts, meanwhile combining them in a manner that proposes a new kind of self. Indeed, this goal is evident even in the “origin myth” of the QS as it was described by Gary Wolf, contributing editor of *Wired* magazine in July 2009 (available online):

But two years ago, my fellow *Wired* writer Kevin Kelly and I noticed that many of our acquaintances were beginning to do this terrible thing to themselves, finding clever ways to extract streams of numbers from ordinary human activities. A new culture of personal data was taking shape ... With new tracking systems popping up almost daily, we decided to create a web site to track them. We called our project the Quantified Self. We don’t have a slogan, but if we did it would probably be “Self-knowledge through numbers.” ([Know Thyself: Tracking Every Facet of Life, from Sleep to Mood to Pain, 24/7/36] Archive.wired.com/medtech/health/magazine/17-07/lbnp_knowthyself?currentPage=all)

In the course of analysis, we explored the roots and dimensions of the QS as they are represented in *Wired*. The discussion, therefore, does not deal with the QS community in terms of meet-ups and conferences, even though Gary Wolf, who launched the QS notion in the magazine, is also one of the main protagonists of that community. We return later to the fact that the QS movement has been influential in developing wider salience for the QS concept outside *Wired*, criticizing and reaching beyond the themes introduced in this article (Nafus and Sherman, 2014). First, however, we focus on *Wired* as the arena supporting the QS, arguing that the magazine has constructed an effective metaphor for urging a new dataist paradigm for research and society. We uncover theories of knowledge and epistemic functions that promote market-driven datafication of life and suggest that our thematic analysis calls for exploring in a more detailed, contextualized, and critical manner the social and material engagements with self-monitoring devices and the data that they generate.

Examining the discourse of the QS

Wired has a recognized history of advancing a techno-optimistic agenda, one set in motion by celebrated forces of the cyber culture world including Stewart Brand, Kevin Kelly, and Nicolas Negroponte, and the developments that led to its launching in 1993 explain its mission to act as an agent of change (Frau-Meigs, 2000; Turner, 2006). Since the late 1960s, Brand (and others associated with various Whole Earth publications) had been linking information technology to New Communalist politics of personal and collective liberation; this work was seen as an extension of the 1960s' consciousness movement. The new digital generation set out to dismantle hierarchies; they wanted to destabilize dominant corporations and governments and create a collaborative society, interlinked by currents of information. Politically, the digital advancements suggested by *Wired* are ambivalent; the magazine promotes a communal spirit of peer-to-peer collaboration, but the mission could also be interpreted as an extension of an American libertarian tradition: digital technologies enhance individual liberty, only to confuse individual freedom with corporate deregulation (Frau-Meigs, 2000; Turner, 2006.)

A typical *Wired* article integrates newly developed gadgets, scientific findings, and ideology, narrated in an appealing manner and visualized with clever infographics. The blurring of the journalistic content with marketing is noteworthy. Many articles are written in the format of a user test, although no conventional testing, aiming at objectivity, has been conducted. As Fred Turner (2006) notes, *Wired* articles are not merely written to depict and analyze current events; they actively create formats and language for representing and disseminating knowledge (p. 254). Therefore, we treat *Wired* as a forceful motivator of professionals in various fields: technology developers, entrepreneurs, venture capitalists, researchers, policy makers, and the media. The QS is a relative newcomer to other influential discourse devices launched by the magazine, comprising an effective metaphor similar to "the new economy" or "crowdsourcing."

In order to demonstrate the role of *Wired* in the construction of the QS, articles published in the magazine which discussed the QS and related phenomena between 2008 and 2012 were analyzed. The empirical data consist of 41 articles selected from 60 issues (see Appendix 1). After a classification of the material by more general subjects, such as

personalized medicine, optimization, experimentation, correlations, and big data, we delved more deeply into individual themes and tried to find links between them in order to identify common references: scientific viewpoints such as systems or rational choice theories, for example, and the authors and researchers mentioned in the articles. By doing so, we identified key articles with headings like “How to live by numbers/exercises,” “Live smarter, live longer,” “The body hacker,” “Healthy numbers,” and “The feedback loop”; these drew our systematic attention to four themes which emerged clearly from the material: transparency, optimizing, feedback loop, and biohacking. Since the aim was to identify the underlying elements of the new paradigm, we did not look for the exceptional in the articles, but rather focused on themes that are not unusual in techno-optimistic and futuristic discourses (see, for example, Delfanti, 2013; Tomas, 1995; Wiener, 1948). For instance, the theme of transparency links the QS to modern notions of control, the idea being that by making unknown aspects of life detectable, we can govern them more efficiently (Edwards et al., 2010).

The July 2009 issue provides perhaps the clearest articulation of the themes explored. Gary Wolf acknowledges in an article, “Know thyself” (quoted above), the many pioneers in the development of the QS. This is a typical motif as, in order to establish the historical stability and authority of their creation, the articles frequently discuss early forefathers to, or adopters of, the QS, such as Frederick W. Taylor, Norbert Wiener, or top athletes. Wolf also refers to the renowned psychologist, Mihaly Csikszentmihalyi, who was experimenting with real-time emotion-tracking in the 1980s. With new tools, the article claims, we are witnessing the emergence of a radically new type of knowledge and reflective capacity: in addition to physiology, tracking tools are increasingly chronicling psychological states, moods, and emotions. The self and the surrounding world are described as being filled with the potential for measuring, thereby promoting discoveries including new scales of observation. When arranged into a disciplinary matrix, one starts to see how the identified themes feed into each other, proposing a data-driven outlook on life (see Table 1), while, in the course of discussion, it also becomes obvious that the four themes are not always complementary; there is considerable dissonance and disagreement in their application that illustrates the non-linear development of the discourse through speculation.

Transparency in the quantified world

In constructing a dataist outlook on life, the *Wired* discourse strongly endorses the transparency created through the collection and examination of personal data. In an interview titled “Doctor impatient” (*Wired*, February 2012: 34), Eric Topol, Professor of Genomics at the Scripps Research Institute, describes how improved transparency promises a ground-breaking perspective onto the self:

With genetic gadgets you can get a DNA sequence, you can get biosensors that record nearly every physiologic metric from blood pressure to brain waves, you can get a digital scan of any part of the body. These tools offer a window into each person that was unfathomable a few years ago.

Transparency is typically discussed in an unquestioning manner: it is not treated as problematic that giant corporations, such as Google and Facebook, are far from

Table 1. Disciplinary matrix of the Quantified Self in *Wired*.

	Transparency	Optimization	Feedback loop	Biohacking
Theories of knowledge	Every aspect of the world can be quantified Transparency is achieved through data analysis and correlations	The calculating self can be perfected Evidence-based normativity Rational choice theory	Control theory Systems theory Data generated through tracking modifies actio	Self-experimentation Each individual is different Human needs are not stable or universal
Symbolic generalizations and discourse devices	The end of science Visualization Data analysis Applied mathematics Everyday maps Google	Target levels Normalcy Statistical criteria Top athletes	Metering and displays Thermostat Personal computer Cyborg	Life is a journey Overcoming mind-body dualism The biohacker Tim Ferriss
Shared goals and related action	Transparent view of self and life Transparency equals new wisdom	The task of the self is to calculate optimal choices Calculation optimizes performance	Setting up feedback loops for behavioral change	Self-quantification is a mission in life Experimentation leads to self-understanding Lives can be created

transparent in their data practices and exploit users’ personal data in exchange for free online services (Van Dijck, 2014). Instead, the message of transparency is replicated in relation to a plethora of topics including exercise, popularity, female orgasm, political unrest, “poop bugs,” the customer’s mind, and gene sequences; all these, claims *Wired*, can be followed and understood better when quantified. The repetition of this message speaks of the discursive work involved in establishing the position of something new: reiteration is required for the discourse to be recognized, solidified, and circulated more widely (see Urban, 1996). The underlying assumption is that people are data-hungry and eager to take advantage of the growing amounts of data generated by sensors, satellite images, and search engines. Here, however, also lies the greatest insecurity; one needs to figure out how to work with the material in order for it to promote transparency. As argued in a themed issue addressing the “end of science,” “The biggest challenge of the Petabyte age won’t be storing all that data, it’ll be figuring how to make sense of it” (*Wired*, July 2008: 120).

Despite recognized insecurities and the current shortcomings of data analysis and contextualization, the *Wired* writers exhibit confidence and optimism that the compartmentalization of the self and the body into separate data sources, such as physiological stress, eating rhythms, or changes in body weight, will be overcome with the aid of greater comprehensive analysis, along with machine learning that offers a more holistic personal and personalized view. This, according to Chris Anderson, the editor-in-chief of *Wired*, in an influential and much-cited article² titled “The end of theory,” is the “Google way” of introducing stabilizing patterns and order to data flows and offering transparency:

Google conquered the advertising world with nothing more than applied mathematics. It didn't pretend to know anything about the culture and conventions of advertising—it just assumed that better data with better analytical tools, would win the day. And Google was right. (*Wired*, July 2008: 108–109)

Anderson argues that the wealth of accessible data offers a radically different way to produce knowledge, one that is based on correlations rather than on the causalities or taxonomies favored by traditional approaches. He continues, “Out with every theory of human behavior from linguistics to sociology. Forget taxonomy, ontology, and psychology” (p. 109). In another article, titled “Trials and errors” (*Wired*, January 2012: 108), the criticism is directed at reductionism and analytical work that aims to find causality (for instance, chemistry, biology, or medicine) without acknowledging that humans are participants in complex bio-social fabrics. Diagnosing the cause of chronic back pain is used as an example of continuing to search for a correlation between pain and physical artifacts even if it is proving a dead end; in fact, the cited study on which discussion is based found that “non-spinal factors,” such as depression and smoking, were closely associated with episodes of serious pain:

For too long we've pretended that the old problem of causality can be cured by our shiny new knowledge. If only we devote more resources to research or dissect the system at a more fundamental level or search for ever more subtle correlations, we can discover how it all works. But a cause is not a fact, and it will never be. (*Wired*, January 2012: 108)

The transparency view presented in *Wired*, and particularly the methodology for achieving transparency, interlinks with statistical correlations and data analysis that are given a new form by way of infographics in which applied mathematics and clever visualizations replace grand theories, scientific hypotheses, and psychology. In concrete terms, mapping the data is treated as a practical tool for promoting transparency, as is visualization which is seen as a means of reducing and summarizing the data into a form whereby it can be interpreted (Ware, 2004): comparisons, classifications, and movements emerge in visualizations suggesting patterns that can redefine the meaning of “healthy” or “being in pain.”

Optimizing health and performance

Optimization complements the theme of transparency by adding assumptions about people's self-awareness and behavior to the disciplinary matrix. With the aid of digital technology, particularly in the tracking and monitoring of the self, optimization becomes not only possible but also desirable (Viseu and Suchman, 2010). As *Wired* describes in an article titled “Track. Analyze. Optimize,” a data-driven health revolution promises to make us all better, faster, and stronger (July 2009: 81). The same optimizing mode is replicated in “The *Wired* guide to health” that describes data-driven ways to become happier, healthier, and even a bit smarter:

Improving your health isn't about mindlessly slogging through workouts and eating rabbit food. It's about using your brain to optimize your body. You need to think about how your

inputs—exercise, nutrition, sleep, information—can boost your outputs—performance, wellness, longevity (*Wired*, October 2012: 109)

The optimization theme is easily detected, for instance, in the titles of the *Wired* articles (see Appendix 1), and builds on normative assumptions, supposedly based on scientific findings, about people's optimal performance. The articles tell us, among other things, that willpower is a limited form of mental energy that should be saved for important tasks, and that one should learn to read scientific reports, check one's genome, know whether to caffeinate or nap, do the right thing at the right time, be informed about one's poop bugs, and avoid unnecessary medication. A similar message is replicated in an article titled "Better living through science" (November 2011) that claims to offer scientifically based optimal advice on how to navigate in a crowd, how to evenly microwave food, and how to find a soulmate. In terms of optimization, the critical take on mainstream scientific inquiry suggested by the goal of transparency is more ambivalent. Here, the *Wired* writers seem to suggest that in their optimization quest, people should trust scientific evidence that might be based on (simple) correlations. As a disciplinary matrix theme, the concept of optimization is more straightforward and goal-oriented: it reflects values and commitments that rely on normative notions. People are treated as machine-like beings who should adapt to externally given and fixed criteria: the task of the self is to calculate optimal choices that are dictated by evidence-based target levels. Yet, as we will demonstrate below, the *Wired* articles also question these ideas, underlining the fact that should a dataist view of the self and life become more commonplace, questions must arise as to how, and for what purposes, the data could and should be used (Nafus, 2014; Ruckenstein, 2014). The theme of optimization remains, however, an important stabilizing element of the QS by maintaining a solution-oriented quality that promises improvement to all.

Feedback loops for behavioral change

Depending on the context of its usage, the third identified theme, the feedback loop, adds to, and departs from, the transparency and optimization themes. As suggested above, *Wired* eclectically combines and builds on historical sources, and thus the feedback loop is discursively linked to forms of command and control of information. Integral to the discourse is support for the efficiency of the feedback loop accompanied by scientific evidence, with credit given to Albert Bandura, a Stanford University psychologist and pioneer in the study of behavior change and motivation in the 1960s. Important for the argumentation is also the work of Norbert Wiener (see above) and practical feedback loop applications in the fields of psychology and sports sciences. Thomas Goetz, the executive editor of the magazine, argues for the validity of the feedback loop in the following terms:

In the 40 years since Bandura's early work, feedback loops have been thoroughly researched and validated in psychology, epidemiology, military strategy, engineering and economics (In typical academic fashion, each discipline tends to reinvent the methodology and the terminology, but the basic framework remains the same.). (*Wired*, July 2011: 130)

The power of the feedback loop, according to *Wired*, lies in the fact that it does not control or manipulate people, but rather places control in their own hands. Information gained through tracking is displayed to subjects, preferably in real time, so they can make connections based on previous experiences and modify their behavior accordingly. According to Goetz, the basic premise of a successful feedback loop is as simple as that of a home thermostat: *Action, Information, Reaction*. As he explains in a commentary, titled “Advantage: Cyborgs,”

The most brilliant entities on the planet ... are neither high-end machines nor high-end humans. They're average-brained people who are really good at blending their smarts with machine smarts ... Ultimately, the real question is what sort of cyborg you want to be. (*Wired*, April 2010: 42)

Here, the *Wired* discourse resonates with Donna Haraway's (1991) cyborg view, which suggests that self-transcendence can be reached when machines and humans become integrated. Evidently, *Wired* writers do not endorse Haraway's socialist-feminist overtones; they tend to be oblivious to questions of ethnicity and gender in general, and often blindly male-focused—magazine covers feature men and leading articles recount the successes of exceptionally smart male entrepreneurs (Frau-Meigs, 2000: 231). For *Wired*, the practical uses of feedback loops are more important than their theoretical and ethical implications: specifically, how feedback may be effectively executed with self-tracking devices and sensor technology. In the data-driven world of *Wired*, feedback loops can be produced in a plethora of activities including driving, exercising, sleeping, and eating; the key idea is that it is of value to get feedback information in a format that is easily digested and actionable. In light of feedback loops, people are approached as computer-like information processors, or “autocorrelating servomechanisms,” a living part of a dataistic apparatus that allows the reflection and regulation of specific movements and behavior.

Biohacking discoveries

The final theme of the disciplinary matrix, biohacking, challenges and departs from the idea that people engage in self-optimization within a pre-given context. This theme is more loosely put together in its aims and provides self-trackers with a more active role in shaping the QS, which resonates with the following statement: “Our mission as quantified selves is to discover our mission” (see, Swan, 2013: 87). In the *Wired*'s QS discourse, biohacking is a field of interactions, not just concerned with health and wellness performance but also applicable to other areas of life including consumption, sociality, or sexuality. Moreover, biohacking is practiced in order to raise questions about the purpose, value, and applications of personal data. As Christopher Kelty (2010) puts it, “The hacker's innovation is a re-configuration, and it is one that values openness, transparency, and modifiability” (p. 2).

Essential to the mix is the inventive and explorative role of the hacker, with an emphasis on the practical and creative capacities generated by involvements with tracking devices and personal data (Roberts, 2012). *Wired* writers describe the biohacker as

capable of moving between different dimensions of life, experimenting with both body and mind in the greyer or darker corners of everyday existence. In an interview with Gary Wolf (December 2010), Tim Ferriss is introduced as the author of a bestselling book, *The 4-Hour Body: An Uncommon Guide to Rapid Fat-Loss, Incredible Sex, and Becoming Superhuman*, which describes a regimen of self-experimentation, including manipulation of hydration, that raised his interest in physical endurance and the extremes of life. Ferriss explains,

When you have good data, such as pound-per-hour loss rates, you can learn quickly through trial and error. I also read a lot about electrolyte balance. I wanted to find out what was just below the threshold of life-threatening (*Wired*, October 2010: 158)

For a biohacker, human wants, needs, and goals can be established and transformed through experimentation: self-quantification is treated as a method for discovering and demonstrating individual diversity in areas such as sleeping, eating, drinking, or exercising. This is a problematic starting point for any normative image of rationality or science-based wisdom, which assumes given criteria of normality and consistency. Therefore, it is perhaps not too far-fetched to suggest that the theme of biohacking is the most disruptive element of the QS metaphor in terms of dominant modes of knowledge. Biohacking promotes the idea that aggregated data and averages are not enough, and that each individual is different. People can engage in body/mind work, which takes a plethora of forms that change people's relationship to bodily and mental functions, individual organs, or body fluids. For instance, as described in an article entitled "Blood simple" (*Wired*, December 2010: 200), measuring blood composition effortlessly and in real time, possibly by ultrasound, changes the relationship with one's blood: "Blood becomes data, and in these numbers lies knowledge about your current health, your risks for disease, and potential response to treatment." Thus biohacking, as *Wired* presents it, promotes a view of the self whereby one can test one's limits and experiment with life in ways that can introduce contradictory elements to prominent notions of health and well-being. From this perspective, biohackers are potentially controversial in their theorizing and modeling of life, whether it is in the field of food choices or physical exercise. Seen this way, *Wired* promotes the idea of entrepreneurial individuals becoming the ultimate authors and creators of their own lives.

From transparency to biohacking

The four themes identified as formative for the disciplinary matrix of the QS in *Wired* demonstrate a peculiar mix of theories of knowledge that range from behavioral economics and engineering to sports and data analysis. The magnitude of scope—from transparency to biohacking—historically, conceptually, and in its ramifying effects, means that this discussion has provided a thematic outline rather than a comprehensive analysis. We suggest that this outline is useful in identifying political and economic issues at stake in the metaphor of the QS and its links to data-driven market formation. As Sally Wyatt (2004) reminds us, "[I]t is important to continue to monitor the metaphors at work to understand exactly what it is that they are doing" (p. 248). We have argued that the QS

promotes a notion of the self that ties in with market-making efforts by positioning self-tracking devices and applications as interfaces that motivate technology engagements which push us to rethink bodies, minds, and the everyday. At the heart of the QS is a computational logic that emphasizes the revelatory power of data: self-knowledge, *Wired* articles claim, is established with data flows and data analysis.

Data engagements are discussed in *Wired* in a highly individualistic, even idiosyncratic manner.³ The discourse claims that people need data streams and algorithms in order to reflect on, and engage in, self-discovery and self-exploration. Thus, smartphone applications, monitoring devices, and sensors are posited as mediators and interpreters of knowledge rather than the human body and intellect. The individualistic emphasis further ties in with digital hierarchies: the QS metaphor suggests that data-driven life, enabled by personal data flows and feedback mechanisms, is a real possibility for those who have access to monitoring technologies and can use them in ways that empower the fulfillment of personal and professional goals. Yet without appropriate resources, skills or aims, technological newness can actually incapacitate and disable, with the end result being that we no longer know ourselves or other people. In this scenario, instead of the promised openness and transparency, people must increasingly rely on closed computational systems as knowledge formation becomes intimately tied to technological advances—in the form of algorithms, for instance, that construct and shape ways of seeing and knowing ourselves and others (Bucher, 2012).

The QS metaphor promotes the aspirations of the individualistic, technological elite in a manner that consistently downplays the fact that data are not a solution, but rather a starting point. The data-driven quest for knowledge privileges correlation and real-time prediction over explanation and historical comprehension in a manner that is problematic from a number of perspectives, including that connected to the meaningfulness of correlations and their lack of context (boyd and Crawford, 2012). Even if patterns emerge from the data, their relevance, utility, and value depend on the questions addressed and the contexts in which those patterns are explained and used. In its aims of transparency, for instance, analysis of the data also obscures the social processes and practices needed for contextualizing and making sense of it, thereby efficiently depoliticizing questions of knowledge production (e.g. Andrejevic, 2014; Graham and Shelton, 2013).

We suggest, however, that if the Kuhnian disciplinary matrix for the QS is not treated in a solutionist manner, but rather as a schematic aid for raising questions about people's relationship to self-quantification, the thematic configuration of the QS can in fact be used for working against the obvious limitations of the metaphor. This kind of research move requires that the theories of knowledge underlining the disciplinary matrix (see Table 1) need to be rephrased as research questions. In other words, epistemological claims advanced as formative for the data-driven paradigm should be rethought as epistemological inquiries. Instead of claiming that "every aspect of the world can be quantified," or that "data generated through tracking modifies action," we should ask, "Which aspects of the world can be quantified by means of self-quantification?" and "How do the data generated through tracking modify action?" It is precisely through these kinds of questions ("What is needed for a feedback loop to aid in behavior change?"; "How does transparency advance self-discovery?") that the social movement arising from the notion of the QS has attracted people and energized the communal sense-making set in motion

by social engagements connected to self-quantification (Nafus and Sherman, 2014). This also underlines the intensely personal and social nature of data, emphasizing the heterogeneity of aims in ways that people take advantage of the knowledge produced by self-quantification and put it to use. For instance, biohacking can be adopted in order to experiment, connect, and learn, gaining value in relation to the social and communicative processes that it promotes, and adding to the possibilities of rethinking and re-enacting health and well-being in a manner that can promote alternative health paradigms.

As has been argued elsewhere, people tend to trust, and get excited about, visualized personal data (Ruckenstein, 2014), a tendency linked to the “objective” aspect of self-quantification: monitoring the data is perceived to produce “hard facts,” including numerical evidence and statistics, and there is a general belief in the safety and certainty of numbers (Lupton, 2013b: 27). Quantification is adopted, for example, when claims to knowledge seek to gain trust and credibility beyond the bounds of social, professional, or scientific communities (Porter, 1995). While quantification techniques and devices register facts, they also rework their value. From this perspective, self-tracking data can be framed in contradictory ways: to further processes of inequality and social sorting focusing on behavioral profiles and predictive categories, or to sharpen and strengthen more human-centric aims and initiatives. Seen this way, the QS is a knowledge system that remains flexible in its aims: the quantification is not only about optimization and perfect feedback loops, but it can also become a resource for raising new kinds of questions and perspectives for inspection.

Conclusion

The unpacking of the metaphor of the QS suggests that the political and economic aims channeled through the promotion of datafied life need to be persistently evaluated and re-politicized. The analysis presented here has highlighted some ways in which future promises, corporate interests, technological advancements, and everyday aims become entangled. By doing so, the article underlines the need to explore how the themes presented, from transparency to biohacking, become defined as fields played out and practiced in relation to self-quantification and other data-driven efforts. For instance, it is crucial to study how transparency or visibility offers, or fails to offer, vistas and visualizations of people’s lives, professional knowledge, and technological systems (Bucher, 2012).

The discursive work in *Wired* reflects and promotes a data-driven world where digital devices and the data they generate have rapidly become a part of commercial, governmental, and academic practices. Various kinds of personal and social initiatives are being imagined and materialized with the aid of data, and self-tracking practices are expanding to new areas as the collection and analysis of personal data are implemented in different social contexts and institutions including insurance companies, schools, work places, and healthcare facilities (Lupton, 2014; Ruckenstein, 2015; Till, 2014; Williamson, 2015). Each of these settings proposes its own ways of working with, and building on, personal data, and more detailed understanding of the ways in which self-tracking data are used for various purposes is needed. Alongside the themes identified in this article, an area meriting investigation is how specific self-tracking devices and the data they

generate materialize new forms of sociality and politics. Meanwhile, capitalistic developments, including those taking place in the media, comprise an integral part of these processes in that they pave the way for the data-driven market and cater to the citizen-consumer who knowingly and unknowingly lives a life based on data streams.

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Notes

1. This market is characterized by public–private partnerships; see, for instance, “The Conclusions” issued by the European Council on 24/25 October 2013 stating that “Europe must boost digital, data-driven innovation across all sectors of the economy” and that strategic technologies such as “big data” are important enablers for productivity. http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/139197.pdf (accessed 22 May 2015).
2. Mark Graham and Taylor Shelton (2013) refer to the controversy following Anderson’s article in the academic community:

“Although Anderson’s piece has been widely ridiculed for its naïveté, it raises an important question: What do big data mean for how we do research and create knowledge? How do we position ourselves in relation to our object of study, our methodologies, our epistemologies, our funding sources, and the ways in which we understand truth?” (p. 256)

3. An oppositional stance to individualism can be found in an article titled “The buddy system” (October 2009) that asserts that the secret of health and happiness is in fact healthy and happy friends. Based on massive data on the history of social networks, the article suggests that “the individual is a romantic myth” (p. 129). Instead, joy is contagious, obesity spreads like a virus, and smokers tend to cluster. Overall, however, the emphasis in *Wired* is on individual engagements with self-tracking devices and personal data, portraying a data-driven world where people together have less agency than people with monitoring devices and data flows.

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Appendix I. Wired articles (2008–2012).

Year 2008

1. Prescription for the future. (March, p. 36)
2. Do you speak meme? (April, p. 31)
3. Finding normal. (May, pp. 23–24)
4. What we got right—and wrong. (June, pp. 172–175)
5. Times are changing. (July, p. 82)
6. The end of theory. (July, pp. 108–109)
7. Visualizing big data. (July, p. 120)

Year 2009

8. Track. Analyze. Optimize. How the shoe giant unleashed the power of personal metrics and changed the game. (July, pp. 81–85, 124–126)
9. How to live by numbers/exercises. The algorithmic workout. (July, pp. 86–91)
10. Know thyself. The personal metrics movement goes way beyond diet and exercise. It's about tracking every facet of life, from sleep to mood to pain 24/7/365. (July, pp. 92–95)
11. The buddy system. (October, pp. 126–131)
12. How to give people what they want. (November, p. 160)

Year 2010

13. Live smarter, live longer: how the data revolution from genetic testing to the iPhone apps help you make better health choices. (February, pp. 94–101)
14. Advantage: cyborgs. (April, p. 42)
15. Do you speak statistics? To understand the key issues of our time, we all have to learn the language of data. (May, p. 36)
16. Self-helpers. (July, p. 46)
17. The emotional gadgets. (November, p. 66.)
18. Invisible city. (November, pp. 186–192)
19. The body hacker. Tim Ferriss told us how to optimize the workweek. Can he teach us how to max out our bodies, too? (December, pp. 156–163)
20. Blood simple. (December, pp. 200–207)

Year 2011

21. Better living through games. (March, p. 52)
22. Healthy numbers: home health monitors. (April, p. 52)
23. How to make stuff? (April, pp. 90–107)
24. Mind reading. The new profiling technique that learns exactly what makes you tick—and buy. (May, pp. 31–32)
25. Sniffing out sickness. (June, p. 58)
26. The feedback loop. How technology has turned an age-old concept into an exciting new strategy for changing human behavior. (July, pp. 126–133, 164)
27. Better living through science: introducing our Muppet-vetted, lab-tested, peer-reviewed guide to doing everything better. (November, pp. 166–175).

Year 2012

28. Home PCR machine. (January, p. 48)
 29. How to count a calorie. (January, pp. 90–95, 110)
 30. Trials and errors. Dead-end experiments, useless drugs, unnecessary surgery. Why science is failing us. (January, pp. 102–109)
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(Continued)

Appendix I. (Continued)

31. Doctor impatient. (February, p. 34)
 32. Workout apps. (March, p. 52)
 33. GPS watches. (April, pp. 40, 42)
 34. Body monitors. (May, pp. 76–78)
 35. Popularity counts. (May, pp. 120, 122, 124, 126)
 36. Motion sensors, high-speed cameras, statistical analysis. What Olympic athletes do to be one one-hundredth of a second faster. (July, pp. 112–122)
 37. Running apps. (August, p. 42)
 38. Wired Health Conference, NYC Oct 15–16. (September, p. 101) (same ad repeated in October)
 39. Living by numbers, the Wired guide to health. Data-driven ways to be happier, healthier, and even a bit smarter. (October, pp. 109–128)
 40. Best genetic mutations that someone you know probably has. (November, p. 56)
 41. Sticker Shock. The US spent trillions on medical care—but good luck finding out the price of appendectomy or an aspirin. Here's how a little transparency can transform the health care industry. (November, pp. 140–144)
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