

Introduction Self-Tracking, Embodied Differences, and Intersectionality

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Abstract

This introduction to the Special Section "Self-Tracking, Embodied Differences, and the Politics and Ethics of Health" situates self-tracking technologies and practices within the contexts of neoliberalism, gendered and racialized health inequalities, and questions of social justice. It argues that intersectional STS analyses are needed to address the complex ways in which self-tracking technologies draw on, and may reinforce, colonial and racialized hierarchies, gendered histories of surveillance, and normative assumptions of ability and embodiment. The introduction outlines the four key areas of concern that the Special Section articles address: tracking mental health, tracking moving bodies, tracking reproductive health, and art interventions.

Introduction

Self-tracking technologies represent the confluence of a number of issues, themes, and materialities that have been central to feminist technoscience

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scholarship over several decades. These include embodied differences and intimate and invisible bodily processes as objects of technological intervention as well as questions of biopolitics, surveillance, and normalization. In self-tracking technologies, the relations between technological development, capitalist logics, biological processes, and agency are being negotiated in ways that have far-reaching consequences for how we live as situated individuals and communities in the twenty-first century. There is, then, a lot at stake for feminist intersectional analyses of health and medicine—and feminist STS more generally—when considering the role of self-tracking technologies in contemporary self-care and healthcare landscapes. This Special Section emerges from a shared understanding that nuanced and detailed feminist analyses are urgently needed to unpack the complex ways in which self-tracking technologies may both enable and disrupt normative expectations and configurations of health and embodied differences.

Self-tracking is a practice that involves monitoring and recording details of one's activities, body, and life, with the aim of achieving self-knowledge and selfimprovement. While human beings have tracked themselves in this manner for centuries—for instance, measuring height and weight, or tracking menstrual cycles—self-tracking has been transformed in recent decades through the development of digital technologies such as smartphones, apps, and "wearables." Such technologies enable continuous monitoring of bodies, activities, and physiological states in the name of health, fitness, and well-being. Often worn on, or carried by, the body, self-tracking devices monitor and quantify physiological states in order to produce biometric data on bodily activities and processes, such as one's exercise, calorie intake, mood, heart rate, reproductive cycles, sleep, and other health-relevant information. These data, much of which were previously only accessible in the realm of biomedicine, can be gathered, managed, shared, and visualized by individuals, who often utilize social media platforms to do so (Lupton 2015). Promising "self-knowledge through numbers" (Wolf 2010), selftracking technologies herald a novel data-driven conception of the body and health for the information age. Underpinned by a logic that sees the human body as an assemblage of data and information flows, genetic, molecular, vital, psychological, biological, and otherwise, these technologies are both intimate and remote, affecting individuals' personal lives and self-conceptions, while also shaping broad socio-political understandings of health, life, and the human body (Dolezal 2016).

Frequently commercially developed and implemented under neoliberal paradigms, these novel technologies concretely mark the fusion of information

technology, biomedicine, and a neoliberal market agenda. As such, they instantiate not only the increased technologization of medicine but also the encroachment of markets within healthcare. The promise of control and mastery of one's health that these technologies offer is countered with a set of biopolitical anxieties regarding technological encroachment into personal life and the neoliberal emphasis on individual responsibility for health, well-being, and self-knowledge. Concerns about control, surveillance, privacy, distribution of health resources, and ambiguity regarding outcomes, means that these technologies are far from straightforwardly beneficial.

There is a rich and growing literature that addresses some of the anxieties and concerns that have arisen as self-tracking technologies have proliferated. Concerns regarding the consequences of viewing human life primarily as a "digitized data assemblage," to use Deborah Lupton's term, have been explored in a number of texts that interrogate the personal and socio-political ramifications for primarily data-driven understandings of the body and health (e.g., Berson 2015; Dolezal 2016; Roberts, Mackenzie, and Mort 2019; Smith and Vonthethoff 2017). The connections between markets, self-tracking, and governance have been explored, for example, in terms of work and expectations of self-care and optimization placed on employees, extending both inside and outside the workplace (Moore 2017; Till 2019). Researchers have highlighted that as personal and medical health data are made available to employers and private companies, the parameters for what constitutes appropriate health and health-related behavior is increasingly determined by commercial interests while also being potentially implicated in one's broader professional, social, and economic success (Tanninen 2020). Other scholars interrogate the overemphasis on personal responsibility and self-regulation that self-tracking technologies instantiate, placing an undue burden on individuals to manage their own health and health outcomes via consumer choices while occluding the impact of social and cultural determinants of health (e.g., Schüll 2016). Likewise, scholars have addressed anxieties regarding privacy and ownership of personal data, where data generated by self-tracking technologies is a commodity that is exploited by corporate entities for profit and surveillance, usually without the knowledge of the original generators of these data (e.g., Lupton 2016). At the same time, scholars have interrogated the complex ways in which self-trackers negotiate the assumptions of markets, app designers, or healthcare providers, create communities, and engage creatively with data (Pantzar and Ruckenstein 2017; Weiner et al. 2020). Crucially, such negotiations and engagements are not always voluntary but may be structured and curtailed by questions of life, death, and disability, as Laura

Forlano (2017) and Stephen Horrocks (2019) have shown previously in *Catalyst* in the context of type 1 diabetes. Furthermore, researchers have also highlighted how self-tracking technologies engender not just new kinds of digitized and quantified knowledge but also foundational uncertainties that self-trackers need to tackle (Bergroth 2019).

While these analyses of self-tracking technologies raise important questions about the problems and pitfalls inherent to these technologies, there has been less attention paid in recent scholarship to the role of gender, race, disability, class, and age in practices and imaginaries of self-tracking. Yet self-tracking technologies are loaded with normative assumptions regarding the human body and its health, ability, gender, and class. The generalized "user" of self-tracking technologies is a homogenized and socially dislocated subject. For example, these technologies assume that bodies fit within a certain range of variation, that bodily functions follow a regular pattern that allows algorithms to turn physiology into data, that people live their lives in circumstances that enable routinization of selftracking practices, and that gendered and racialized bodies can be detached from their social, cultural, and geopolitical locations. In addition, self-tracking practices feed into the production of highly normative bodies, extending the neoliberal and patriarchal regulatory mechanisms of the wellness, health, beauty, and fashion industries into increasingly self-managed, self-regulated, and intimate domains (e.g., Sanders 2017).

At the same time, self-tracking technologies have also become increasingly specialized, addressing specific demographic groups, such as women seeking to avoid pregnancy or people with depression or anxiety wishing to anticipate mood changes. Normative assumptions about bodies, identities, and "normal" life course continue, however, to structure these increasingly targeted technologies and their modes of datafication. Furthermore, as self-tracking technologies promote a highly individualistic notion of health, they downplay and sidestep a more communal and socially determined understanding of health. Not only does this intensify the pernicious politics of personal responsibility that is characteristic of neoliberalism, but also has profound consequences when considering socially disadvantaged and marginalized individuals and groups who may not have the social or material resources to engage in projects of self-transformation, self-optimization, or self-improvement. Intersectional feminist analyses are needed to interrogate how the technological and social developments afforded by self-tracking practices can enable new forms of structural inequality.

This Special Section contributes to these debates through eight articles and one Critical Commentary that represent a range of feminist intersectional perspectives. Approaching self-tracking as a biopolitical (re)orientation toward the interiority of bodies in the context of increasingly commercialized healthcare, the Special Section asks how self-tracking technologies and techniques are used, reshaped, or resisted by users and communities situated differently within social structures of power. It situates self-tracking technologies within the larger dynamics of societal change, such as changes in the gendered and racialized responsibilities for care—especially self-care—and the neoliberal restructuring of institutions of medicine, education, and work. Under neoliberalism, "health" has become an individual achievement, where the onus of responsibility for good health and health outcomes is largely placed back on the individual through an emphasis on the importance of self-reliance and self-control when it comes to lifestyle, behavior, and health outcomes. Individuals are encouraged, and sometimes "nudged," to find their own solutions for poor health and health management, often through consumer choices within the private sector. These neoliberal logics are precisely some of the most significant drivers behind individual engagement in self-monitoring practices through the use of commercial self-tracking technologies.

The Special Section articles explore, on the one hand, the extent to which selftracking technologies are able to recognize embodied gendered, racialized, or classed differences, and, on the other hand, how some of those differences are turned into profit—and for whom. Several of the articles explore the ways in which gender, race, age, or class shape engagements with and experiences of selftracking technologies, identifying places where creative or unanticipated uses of self-tracking technologies emerge, and evaluating their implications for feminist politics. Some articles also explore how self-tracking technologies articulate global and postcolonial power hierarchies, and how they make sense (or fail to make sense) as ways of managing health and well-being in different global and local contexts, such as Ethiopia, China, or North America. The articles are motivated by a shared concern: what happens to ideas of risk, health, or responsibility when self-tracking is extended to intimate embodied processes, such as reproductive health, to areas shaped strongly by social and structural inequalities such as mental health, or to bodies and locations perceived as "other" by the market? Through their rich range of methodologies and concepts, the articles in the Special Section demonstrate what kinds of feminist methods may help us unpack the socio-political logics and implications of self-tracking.

The rest of this introductory essay outlines four themes through which the articles included in the Special Section engage critically with self-tracking technologies: tracking mental health, tracking moving bodies, tracking reproductive health, and art interventions.

Tracking Mental Health

Self-tracking technologies typically monitor bodily processes and activities, whether heart rate during exercise, hours of sleep and rest, or quantifiable changes in the gendered body indicating ovulation. Although one underlying goal of technologies such as smart wristbands has been stress management and relaxation, the explicit extension of digital self-tracking technologies into the realm of mental health and psychiatry is a more recent development (Davies 2017; Pritz 2016; Stark 2020). Crucially, mental health self-tracking technologies seek to quantify something essentially intangible—moods, sensations, felt orientations and turn the complex and ambiguous connections between embodied processes and mental illness into presumably manageable data. This datafication and selfsurveillance of mental health has also significant implications for gender and intersectional differences. As mental health and illness are not only biomedical but also sociocultural phenomena, they are deeply entangled with questions of inequality, privilege, and embodied differences. It is therefore crucial to understand how self-tracking of mental health and illness may invoke and reinscribe ideas of gendered, racialized, or class-associated differences, or cement problematic ideas of disembodied mind.

The Special Section opens with two articles that address ethical and political concerns arising from the self-tracking of mental health and mental illness. Lindsay Weinberg's article "Mental Health and the Self-Tracking Student" investigates how the WellTrack app, marketed to and adopted by many North American universities, has emerged as part of a larger shift toward digital education governance and the neoliberalization of higher education. Weinberg argues that the app responsibilizes students for their mental health and their adjustment to college life while sidestepping structural and societal factors that reinforce inequalities at university. The article shows how the promotion of the self-tracking student as a key to improving student mental health fails to unpack the ways in which racialized and gendered histories precondition students' lived experiences of communal safety and personal well-being. The article also raises concerns about how students are encouraged to share private data with corporations for profit.

Suze Berkhout and Juveria Zaheer's article "Digital Self-Monitoring, Bodied Realities: Re-casting App-Based Technologies in First Episode Psychosis" continues a similar line of careful intersectional critique of the neoliberalization of mental health. Berkhout and Zaheer explore the growing use of digital self-tracking technologies for symptom monitoring in the context of first episode psychosis. Based on their ethnographic work within the clinical treatment of first episode psychosis, Berkhout and Zaheer ask what happens to lived, embodied experience of psychosis when experience is captured for and transformed through digital technologies of quantification. The article identifies and critiques the idea of progress and "curative paradigm" that, the authors argue, underlie the use of digital self-monitoring technologies in psychiatry.

Tracking Moving Bodies

One of the primary targets of commercial self-tracking technologies is the realm of fitness for healthy populations. Sustaining a multibillion-dollar global industry, fitness and well-being self-tracking apps and wearable devices are utilized by elite athletes and ordinary gym goers alike, where the self-monitoring of physical activity and biometric information is used to track activities, usually with the aim of improving performance. Existing literature exploring the use of fitness apps and wearables focuses on questions regarding self-optimization, looking at the relationships between physical health, digital data, and projects of selfmanagement for privileged subjects in the Global North (e.g., Fotopoulou and O'Riordan 2017). Less scholarly attention has been paid to how the use of fitness tracking technologies is shaped by and embedded in differing socio-cultural, economic, and environmental structures and utilized by individuals or groups in the Global South or from racialized, stigmatized, or minority communities (Lupton 2017, 3). The articles by Hannah Borenstein and Xin Liu in this Special Section decenter the usual assumptions about who utilizes self-tracking fitness technologies, exploring power dynamics along with intersectional and environmental nuances of the tracked moving body in Ethiopia and China, respectively.

Hannah Borenstein's article "Tracking Work from the Wrist: Surveillance of Ethiopian Women Athletes for Capital" discusses the use of GPS watches among elite women athletes in Ethiopia. The article highlights the potentially problematic colonial dynamics of labor extraction, where the data produced by African women's work is owned and utilized by sports scientists in a commercial sports company lab in the United States. Drawing on her own ethnographic fieldwork, Borenstein points out how purportedly a *self*-tracking technology has

been repurposed by coaches, employers, husbands, and others as a tracking device that ensures the surveillance and micromanagement of women's bodies. The article raises important questions about colonial legacies in global sporting labor markets, along with feminist concerns regarding the control, surveillance, and exploitation of women's bodies that is enabled through tracking technologies.

Xin Liu's article "Keeping Fit in the Smog: Health, Self-Tracking and Air Pollution in Postsocialist China" analyses the phenomena of the "smog jog," where individuals go jogging in air marked by high levels of pollution, and how this is intertwined with social media use and environmental politics. Analyzing social media posts on the popular Chinese platform Sina Weibo, Xin Liu explores the themes of "negotiation" and "enjoyment" in relation to self-reported smog jogs where users balance the risks of ingesting pollution and the psycho-physical benefits of jogging. As she demonstrates through her analysis, individual health is a complex idea, negotiated between self-regulation, environmental conditions, political exigencies, and social dynamics. The self-optimization afforded by self-tracking via apps and social media is tempered by environmental adversities and a lack of environmental care that many Chinese social media users feel should be provided by the state.

Tracking Reproductive Health

Self-tracking around reproduction has been a topic of particular interest for feminist scholars. Reproductive technologies include ovulation sticks and kits as well as mobile apps that enable recording of symptoms, bodily sensations, and changes in body temperature, and turn such information into personalized charts or indications of "fertile" days that can then be used by self-trackers to guide their sexual activities. Ovulation and fertility apps are often connected to interactive online platforms, and marketed as allowing the user to join peer communities. Feminist analyses have recorded the ambivalences inherent in these technologies (e.g., Hamper 2020; Wilkinson 2020). Reproductive self-tracking technologies have been seen as enabling women to know their bodies in new ways, gain a sense of embodied agency, and work actively toward achieving or avoiding pregnancy. At the same time, there has been growing concern about what happens to intimate data when it is collected, managed, and capitalized on by companies designing the apps, or what forms of embodied knowledge about reproduction are excluded through the datafication of invisible bodily processes.

Three articles in this Special Section contribute to these feminist discussions in crucial ways. In "The Cyclic Self: Menstrual Cycle Tracking as Body Politics," Laetitia Della Bianca investigates the ambiguity in how the users of period tracking apps emerge both as objects of biopolitical and capitalist governance and as actors whose period-tracking practices reach beyond optimization. Della Bianca employs and develops the concept "cyclic self" to capture how users of period tracking apps conceptualize, negotiate, and live their embodied relationship to the practices of tracking menstruation. Drawing on her interviews with period tracking app users from ten countries, Della Bianca points toward the multiple ways in which the normative idea of a uniform, measurable female reproductive body falls apart in actual period tracking practices. The article also draws crucial attention to the multiplicity of period app users and the complexity of the situations in which period tracking apps are made to make sense as tools of reproductive health.

Celia Roberts and Catherine Waldby's article "Incipient Infertility: Tracking Eggs and Ovulation across the Life Course" interrogates the future-orientation underlying the expanding field of fertility-tracking technologies from ovulation biosensing to perimenopausal apps and ovarian reserve testing. Drawing on their research contexts in Australia and the UK, Roberts and Waldby inspect the connections between fertility tracking as personal search for future fulfilment and the capitalist logic of commodification of biological processes. Tracing the idea of infertility as an incipient process that needs to be anticipated and encumbered, the article shows how fertility has become increasingly conceptualized as an asset with potential future value. Roberts and Waldby argue that this has posited fertility as an embodied and temporally organized capacity that is no longer directly attached to reproduction. At the same time, it places increasingly intense demands on individuals to manage proactively their reproductive futures.

Sarah Fox and Franchesca Spektor's article "Hormonal Advantage: Retracing the Exploitative Histories of Workplace Menstrual Tracking" continues these feminist discussions of optimization in the context of menstruation and the workplace. Their article critically examines the popular framing of period tracking as a feminist project that enables women to achieve a personal advantage at work and in personal life by optimizing and utilizing their hormonal status. Fox and Spektor carefully situate these recent individualizing discourses of menstrual "deficit" and menstrual optimization within a historical lineage that, their analysis shows, is deeply entangled with corporate interest. The article also seeks to imagine how period tracking in the workplace could be used to alternative, communal ends,

such as worker mobilization and collective bargaining. This move makes visible that the often taken-for-granted link between self-tracking and personal optimization is not the only way that self-tracking communities can be conceptualized. This is a theme that the final two contributions on feminist science and art, introduced next, also engage with.

Art Interventions

Self-tracking technologies are also making an impact in creative arts, where a growing number of artists are using data from self-tracking technologies as a means to create visual art. For instance, the American "data artist" Laurie Frick (www.lauriefrick.com) uses data about her own life—such as her steps around her Brooklyn neighborhood tracked on a FitBit, or her daily feelings and mood states tracked on the online diary Moodjam—to create "handbuilt work from personal data," resulting in large-scale installation pieces that visually represent her "experience" via patterns and colorscapes (Urist 2015). Feminist technoscience scholars, and Catalyst editors, Nassim Parvin and Anne Pollock (JafariNaimi and Pollock 2018) have also engaged in using data as an experimental medium through which to create visualizations, as a type of art work, to catalyse feminist reflection and conversation. In their "experiment," they created visualizations of heart rate to open up creative space in feminist technoscience scholarship regarding data, embodiment, and visualization. In this tradition of "data art," artist Gemma Anderson's cover image, Growing Una and Cosmo, visually depicts the data of the times and durations of breastfeeding her newborn twins that she collected in a notebook for over a year after their birth. This image shows the material and affective labor of early motherhood that supersedes the increasingly popular practice of tracking breastfeeding metrics. Other data artists are using the creative medium to express and articulate anxieties about self-tracking and life-logging. For instance, art installations such as Proto/Meta's Data Identities (2015) along with Alex Rothera and James Krahe's Playful Self: The Anxiety of Data, Calmed with Tea (2015) explore the pitfalls, and potentially pernicious outcomes, of having biometric data stand in for personal identity, where human life can be reduced to data sets that can be monitored, compared, and quantified.

In this Special Section we include two contributions that address how creative arts have both incorporated and are challenging the practices, methodologies, logics, and discourses of tracking and self-tracking technologies. First, Alessandra Mularoni's article "Feminist Science Interventions in Self-Tracking Technology" explores some of the critical interventions made by feminist artists and biohackers whose work engage with the politics surrounding women's health, biotechnology,

surveillance, commodification of genetic material, and the dominance of big pharma. For instance, Mularoni discusses the work of the artist-researcher Heather Dewey-Hagborg, whose Invisible project (http://biogenfutur.es/) offers a "product" that ensures genetic privacy, protecting "against new forms of biological surveillance," where the suggestion that one's genetic material is "tracked" by the state, national security programs, and private genomics companies implies a dystopian reality where individuals and their data, genetic or otherwise, are monitored by invisible forces. As Mularoni emphasizes, this artistic intervention "brings to the fore the ethics of traceability, specifically the power dynamic between invisible agents of sight and those who are subject to pervasive tracking." In the age of big data, self-tracking data is "lively" (Lupton 2015), where, in part, this means, these data are "open to constant repurposing by a range of actors and agencies, often in ways in which the original generators of these data have little or no knowledge" (Lupton 2016, 563). Artistic interventions such as Invisible offer important commentary on the dystopian potential for corporate control, alienation, compromised privacy, and social inequalities when data-driven identities come to dominate social life.

Heidi Tikka's Critical Commentary "The Body, the Threshold, the Cut: The Aesthetics and Ethics of Measuring in Interactive Media Art" discusses her own artistic practice, creating interactive installation art works that use sensor technologies to create relational environments where sensors "track" visitors' bodies in order to enact the artwork, encounters that Tikka calls "body sensor coperformances." Specifically, Tikka discusses her installation Mother, Child, where sensors track the actions of a visitor, which then feed into the "reactions" of a responsive video projection. Depending on the visitor's actions, the "child" cries, laughs, nurses, or falls asleep enacting "a relational event in which different modalities of bodily movements converge with audiovisual experience." As Tikka discusses, interactive art, such as Mother, Child can be conceived of as an assemblage within a relational environment, where the lines between actor, artists, spectator, artwork are permeable and unstable, and the artwork is an "ephemeral event" rather than a fixed object. The use of "tracking" in Tikka's work demonstrates how the data generated from sensor and tracking technologies have complex trajectories and potentials.

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As with most collaborative academic work, this Special Section has a history that reaches back several years. The idea for the Special Section emerged from the

symposium Monitoring the Self: Negotiating Technologies of Health, Identity and Governance, co-organized by Venla Oikkonen and Ingrid Young at the Helsinki Collegium for Advanced Studies in November 2017 as part of the Nordic Network Gender, Body and Health project, The Embodied Self, Health and Emerging Technologies: Implications for Gender and Identity, funded by the Joint Committee for Nordic Research Councils in the Humanities and Social Sciences. While the Special Section includes some contributions from the symposium participants, most of the articles included here represent novel and developing explorations of the embodied ethics and politics of self-tracking and the ways self-tracking technologies enact differences, reinforce inequalities, or enable unexpected alliances.

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Postscript: Cover Image by Gemma Anderson

The cover image, *Growing Una and Cosmo*, by Gemma Anderson, depicts the breastfeeding pattern of the artist's baby twins during the first month of their lives. It is composed of a series of twin circles on either side (one baby on the inside, one on the outside) of a logarithmic spiral (also known as a growth spiral). The image was drawn from information about breastfeeding times, sides, and nappy changes collected in a series of notebooks since the babies' birth. Although she had a sense of the "pattern" of the breastfeeding, Gemma wanted to "make visible" the pattern, and so she spent a while imagining what form this could take. The resulting image is an abstract representation of breastfeeding. Making the image involved patient care and attention, not so different to the kind required in mothering, and so the slow and laborious means of creating the image (hand drawing and painting) somehow suits the subject, the careful and patient dedicated labor of the mother. Gemma continues to visualize the breastfeeding patterns as her babies approach their first birthday. For more about her work, please visit www.gemma-anderson.co.uk.

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