CHAPTER 4

Tracking (in)fertile bodies

Intimate data in the culture of surveillance

KRISTINA STENSTRÖM
DEPARTMENT OF HUMANITIES, UNIVERSITY OF GÄVLE, SWEDEN

ABSTRACT
Surveillance culture promotes self-improvement through quantified self-knowledge. Digital devices and mobile apps are developed for self-tracking practices, and individuals collect and analyse data about their bodies and habits for numerous purposes. One area of self-tracking involves fertility tracking, through which women track symptoms and signs relating to their menstrual cycle, also called intimate surveillance. Previous research has shown that self-tracking technologies and software often leak data and affect and (re)produce understandings and knowledges of (female) bodies. This chapter explores the following: What are the imaginaries and practices of intimate surveillance among women who use digital apps or wearables to self-monitor their fertility? Through eleven interviews with women who engage in fertility self-tracking, I found multilayered motives and understandings in relation to self-tracking practices, where potential risks are appreciated. Simultaneously, the possibility of fertility self-tracking is seen as a general positive that enables self-knowledge and a sense of empowerment and ownership.

KEYWORDS: intimate surveillance, intimate data, fertility tracking, self-tracking, mobile apps

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Introduction

An overall focus on self-knowledge and self-surveillance has sparked digital practices where individuals collect information about their bodies and habits through digital devices and software, often referred to as self-tracking or quantifying self. At the same time, an increasing number of mobile apps and digital tracking devices targeting fertility and reproduction are being developed and used for the "intimate surveillance" of subjects and their bodies (Levy, 2019). Technologies such as these are most often designed for women and female bodies, as they generally map menstrual cycles or ovulation or focus on in vitro fertilisation treatments or maternal care. Apps and devices are increasingly connected to artificial intelligence (Johnson, 2014; Lupton, 2016a, 2020; Thomas & Lupton, 2016), which captures and analyses intimate and potentially sensitive data about users, such as ovulation, sexual activity, and medical information (Levy, 2014; Mehrnezhad & Almeida, 2021).

Fertility-tracking apps are often framed and promoted by developers as tools of self-awareness that are more precise and accurate than women's own experiences and interpretations of their bodies and symptoms. The quantification of fertility data is commonly framed as a chance for self-improvement through knowledge that can "impose order on otherwise disorderly or chaotic female bodies" (Lupton, 2015: 446–447), which at times leads users to trust quantifications over their own memories and interpretations (Rettberg, 2018). Users also report that self-tracking and related practices can foster feelings of agency through "a sense of identity, ownership, self-awareness, mindfulness, and control" (Ayobi et al., 2020: 1). Furthermore, data are shareable in social media outlets (Johnson et al., 2019) that may function as "social venues" where self-tracking is discussed (Kent, 2018: 73). Subjects engage in and share self-tracking data as benefits seem obvious, while drawbacks, such as digital trails and commodified and shared data, often remain hidden or abstract.

Drawing on Lyon (2018) and his theorisation of surveillance culture, I explore the imaginaries and practices of intimate surveillance through eleven interviews conducted with women who engage in fertility self-tracking practices. "Intimate self-tracking practices" assemble a variety of actions – such as monitoring bodies and collecting, interpreting, and sharing data – and are facilitated by the combination of human action and technology, such as devices, apps, and their features. Here, imaginaries are theorised through what Charles Taylor and colleagues (2003: 23) have called "social imaginaries", which are defined by the way they are shared by large groups of people, or even entire societies, in a way that legitimises certain practices and understandings as important, true, or even real. Digital (surveillance) practices, which now make up central parts of our social and daily lives, are understood to simultaneously be the product of and produce surveillance culture. Practices and imaginaries are always entangled and intertwined and continuously constitute and reproduce each other. These terms are used here to illustrate

how surveillance permeates both individual and collective thought and action on and through multiple levels and facets of the everyday. This chapter explores the following question: What are the imaginaries and practices of intimate surveillance among women who use digital apps or wearables to self-monitor their fertility?

Surveillance culture and self-tracking practices

We are digitally monitored and surveilled in several ways in our everyday lives, and our personal data are harvested for commercial reasons (Zuboff, 2019). While surveillance per se is not a new phenomenon, Lyon (2018: 9) has pointed to a participatory turn in relation to surveillance, where subjects actively engage in the surveillance of others as well as themselves: In novel ways, we comply with but also resist and "even initiate and desire" surveillance. Similarly, Whitaker (1999) has claimed that we are all part of a "participatory Panopticon", as we not only allow but also actively engage in surveillance of ourselves and our habits. Surveillance culture seeps into everyday life in a myriad of ways and is, for instance, manifest in the mundane activities of updating or checking social media channels, where we simultaneously check on others and allow ourselves to be monitored, both by other social media users and by companies that store and share our (meta) data (Marwick, 2012; van Dijck, 2014).

One type of self-surveillance entails the practices of self-tracking, or "lifelogging", where data about habits and bodies are collected, analysed, and shared through digital wearable devices and associated software. The number and variety of mobile apps designed to be used in daily life have grown exponentially during the last decade, not least those designed for self-tracking (Healy, 2021). While individuals have long been tracking personal data – including data relating to fertility – the combination of access to wearable devices and software that can log and process an increasing amount of data has led to a steady rise in the interest in self-tracking (Lupton, 2016a; Rettberg, 2014; Sanders, 2017; Wissinger, 2017).

Dataveillance, which monitors and collects information about subjects "for unstated preset purposes" (van Dijck, 2014: 205), often leaves individuals both unaware and without access to the information collected about them. In contrast, self-tracking presents data to the collecting subjects themselves, who are invited and encouraged to engage in and analyse their own data and its implications (Lupton, 2016b). Lupton (2016b) has noted that self-tracking is becoming increasingly common in contexts where subjects might have little choice regarding participation, such as the workplace, public health, insurance, and so on, and distinguishes between modes of self-tracking that illustrate different levels of voluntariness and independence, ranging from "private self-tracking" to "exploited self-tracking". Private self-tracking is distinguished by being self-initiated and voluntary and undertaken solely for

personal reasons and is often connected to motives such as better self-knowledge or the "optimisation of the self". Exploited self-tracking, on the other hand, entails the repurposing of data for commercial reasons to benefit third parties as well as illegal uses of personal data through hacking, for instance.

Digital self-tracking is used in Swedish healthcare for instance regarding childhood obesity (Hagman et al., 2022) and asthma (Ljungberg et al., 2019). This is part of an ongoing investment to implement e-health services in a broader way in Sweden. E-health entails health services that are supported by electronic processes and communication, such as online appointment booking and meetings, as well as the use of self-tracking apps. The government agency Swedish eHealth Agency (2022) is dedicated to issues regarding e-health, and the Swedish government has presented a vision for e-health (Government Offices of Sweden, 2016) to develop such services. Self-tracking is not used routinely in Swedish fertility care but is often initiated by patients themselves before or during fertility treatments (Stenström & Winter, 2021).

Irrespective of whether subjects themselves initiate self-tracking or the practice is suggested by practitioners, there is tension between potential positive and negative outcomes and effects. The literature on self-tracking practices often boils down to questions about whether quantification and ratings stand for empowerment or negative surveillance (Shore & Wright, 2018). Didžiokaitė and colleagues (2018) have pointed to a tendency to understand self-tracking as an "either or" activity, where the Quantified Self–movement and its famous slogan, "self-knowledge through numbers", have been understood as synonymous with self-tracking. The authors claimed that a more nuanced understanding of tracking practices is needed, as numerous users have very moderate goals for their tracking and do not work to "optimise" themselves. Furthermore, everyday users may only use their devices for a short period of time through very basic functions, in contrast to the understandings of avid self-trackers who reinvent their entire outlook on life, and ultimately, *themselves*. Other authors have also identified a need for a more nuanced perspective on self-tracking, as engaged individuals are often not only or primarily on a quest for "objective" numbers or quantified "truths". Kennedy and Hill (2018), for instance, have highlighted that data and their visualisations engage an emotional response among those who produce and take part in them, thus making them more complex and multifaceted than analyses of self-tracking and associated data suggest. Similar to Sharon and Zandbergen (2017), who considered self-tracking as a mode of mindfulness, resistance to social norms and a communicative aid that goes well beyond data-fetishist claims of quantification as a bearer of truth or objectivity, I argue that there is a need to understand and inject nuance into the different meanings that self-trackers attribute to their practices. Thus, in this chapter, I explore how self-trackers navigate the multifaceted understandings that motivate and affect their practices and choices related to intimate self-tracking.

Tracking fertility

As a subgroup to general health-tracking devices and apps, self-tracking also extends to the intimate realms of fertility and sexual life. Several mobile apps used to track menstruation or fertility have been developed. Fertility-tracking apps are part of the wider neoliberal zeitgeist of self-control and self-optimisation, where active engagement in and with fertility and related symptoms is often framed as beneficial, or even necessary, for achieving or avoiding pregnancy or maintaining general health (Ford et al., 2021; Kressbach, 2021). Bodily signs and symptoms that may be tracked include body temperature (which increases after ovulation), mood, energy levels, libido, cramping, vaginal discharge, heaviness and colour of flow, pain, and discomfort. Beyond this, users may also log sexual activity, exercise, intake of alcohol or medications, and so on (Ford et al., 2021; Levy, 2018).

Digital fertility tracking is used to indicate the fertile window in a menstrual cycle, either to avoid or achieve pregnancy (Hamper, 2020). Several fertility-tracking apps offer predictions about potentially fertile days and ovulation days after they have been used for a period of time and users have added enough data for the algorithm to make assumptions about future or past fertility. There are, however, also apps that work more like notepads, as users themselves mark fertile periods based on their bodily symptoms or different fertility awareness methods, where cervix position, discharge, or other symptoms are noted to identify the fertile window of a menstrual cycle. Fertility-tracking apps usually present some form of data visualisation, for instance, graphs, charts, and calendars (Hamper, 2020; Kressbach, 2021). Presenting data as easily reviewable bars and charts contributes to a sense of gamification that motivates users to add more data (Whitson, 2013). Fertility-tracking technologies and associated data are often framed and promoted as "assisting" and "making life easier".

Importantly, however, technology does not innocently measure what is "real" but is both shaped by and shaping the phenomena they are a part of (Johnson, 2020; Lupton, 2018; Wajcman, 2004). Several authors have pointed out that the relationship between humans and technologies maintains and creates understandings, knowledge, and perceptions about fertility and bodies (Andelsman, 2021; Hamper, 2020; Healy, 2021; Lupton, 2018; Stenström & Winter, 2021). Lupton (2018) has also pointed to the "human-data assemblages" in her description of how self-tracking data coproduces understandings and knowledge about human bodies and how humans thus "become with data". Fertility self-tracking creates and maintains understandings, relating to gender in particular, as apps exclusively target women and female bodies.

Fertility-tracking technologies and the collection of fertility data form and affect understandings of fertility and female bodies in several ways. First, as Levy (2019: 687) has claimed, "the act of measurement" legitimises certain forms of knowledge and experiences, while others become invisible. As data

are collected and quantified, some sets of data are deemed meaningful and valuable while others are excluded, which in turn coshapes bodies and medical knowledge. Second, apps and tracking (re)produce constructions of femininity and female bodies in other ways. Kressbach (2021), for instance, argued that menstrual- and fertility-tracking apps reinforce discourses of menstrual concealment. In line with a general construction of femininity as free from "abject fluids" or secretions, menstrual- and fertility-tracking apps often use menstrual jokes and euphemisms, which, according to Kressbach, underline menstruation as a taboo subject, as it is concealed linguistically. Healy (2021), on the other hand, claimed that apps and algorithms are designed to compose and present reproductive femininity in particular ways and are thus part of the medicalisation and control of the female body. This type of tracking and quantification can potentially function as continuations of the medical gaze that has been understood to normatively fragment, objectify, and surveil the female body (Balsamo, 1997; Frost & Haas, 2017; Pollack Petchesky, 1987; Seiber, 2016; van der Ploeg, 1995).

Furthermore, much of the information that can be entered into apps tracking menstruation and fertility – and which is needed to make estimations about fertility and fertile periods – can be regarded as especially sensitive and intimate. Much of this data relates to both health and sexual life and can be as detailed as the time of day sex took place or the number of orgasms experienced (Levy, 2019; Shipp & Blasco, 2020), and potentially also relates to intimate life events and issues such as infertility, pregnancy, or abortion (Mehrnezhad & Almeida, 2021). Shipp and Blasco (2020) have found, however, in their review of menstrual-tracking app privacy policies, that app developers frequently fail to consider data about fertility or sex as sensitive. Furthermore, privacy policies are often written in a complicated language and lack the appropriate level of detail, which may obscure how and what data are collected and shared. Healy (2021) argued that due to the increasing commercialisation of fertility data, apps and their terms of use often remain nontransparent regarding how collected data are used and how they might be distributed further to other parties. Data may be stored on commercial platforms and shared with third parties, such as advertisers or employers (Kuntsman et al., 2019; Mehrnezhad & Almeida, 2021; Shipp & Blasco, 2020). Novotny and Hutchinson (2019: 354) noted in their feminist critique of the fertility-tracking app Glow that its "data collection policies erode user agency and, thus, disempower users, the app functions to be supportive of the company rather than its users". They called for a redesign of the app – and others like it – for more transparent practices for gaining access to user health data.

These claims stand in stark contrast to the language of empowerment, self-fulfilment, or self-knowledge often used to promote apps designed to track fertility or menstruation. Ford, De Togni, and Miller (2021) showed in their interview study that women using fertility-tracking apps feel empowered

when engaging in "hormonal health" through self-tracking, as this gives them a sense of control over their bodies and emotional lives. However, the authors argued that the very setting that enables and promotes engagement in fertility and hormonal self-tracking is deeply embedded in surveillance capitalism and is, in fact, disempowering in its furtherance of neoliberal self-management. In this chapter, I aim to further explore both the cultural context and the concrete practices associated with fertility self-tracking, which are understood not solely as "positive" or "negative" but bear the potential for both empowerment and exploitation.

Methodological approach

For this study, eleven semistructured interviews were conducted with ten Swedish women and one Finnish woman, who all used different apps and digital technologies to monitor their fertility. Participants were recruited primarily via two Swedish Facebook groups: one focusing on fertility-awareness methods[1] and the other focusing on measures to increase fertility. These groups, which I was somewhat familiar with after doing research for a different study, were chosen and approached as they were expected to include numerous members engaged in fertility self-tracking. Both groups contained frequent posts about fertility tracking, and participants often shared screenshots from their fertility-tracking apps. After approval from group administrators, I published a post where I presented myself and my research interest and requested members interested in being interviewed to contact me. Three interviewees were recruited from my extended network.

Interviewees were between 27 and 38 years old and used one or several of the following mobile apps designed for fertility tracking: Clue, Fertility Friend, Flo, Kindara, Natural Cycles, Premom, and Read Your Body. Interviews were conducted between July 2021 and January 2022 and lasted from 45 minutes to 2 hours each. Due to the Covid-19 pandemic, seven interviews were conducted via digital video-conferencing software, while three were performed in person and one via e-mail. The single e-mail interview was initiated by a participant who preferred to communicate via text. Interview questions focused on how the monitoring and surveillance of bodies is carried out through a combination of digital (apps, etc.) and nondigital (thermometers, ovulation tests, etc.) technologies; what data are collected, where, and with whom they are shared; and how interviewees felt about self-monitoring in regard to privacy. Interviewees were encouraged to take the lead and focus on issues in relation to fertility tracking that they found most important and interesting. Follow-up questions were posed for clarification or for interviewees to expand on particular issues. Most interviewees showed me their apps and typical entries during the interviews or sent me screenshots via e-mail, for me to get a sense of their usage. I also downloaded most apps and familiarised myself with their features.

All interviews were conducted in Swedish, recorded, and subsequently transcribed verbatim for analysis. According to Braun and Clarke (2006: 86), this phase of the research process entails the first phase of analysis as "patterns of meaning and issues of potential interest" are identified during data collection and processed. During the next phase of analysis, I was inspired by a "hybrid approach" to thematic analysis that incorporates data-driven inductive coding and a deductive template of a priori codes (Fereday & Muir-Cochrane, 2006). Whereas the coding of the collected interview material served as the inductive component, the broad categories presented by Lyon (2018) as central to surveillance culture – namely, surveillance practices and surveillance imaginaries – were used for deductive analysis. While Lyon (2018) provided a broader analytical frame to approach surveillance as a cultural and timely phenomenon, inductive coding of the interview material allowed for the identification of further dimensions and facets relating to intimate surveillance, and fertility tracking in particular, to appear.

The coding consisted of first identifying categories as described by Vaismorandi and colleagues (2016), understood as the descriptive and explicit manifestation of the participants' accounts. Transcribed interviews were colour-coded and resulted in the initial codes of 1) self-tracking practices (how, what, when); 2) corporeal self-knowledge (when particular symptoms usually appear and why); 3) emotional self-knowledge (when particular symptoms and emotions usually appear and why); 4) sense of control; 5) sense of agency (identity, ownership, self-awareness, mindfulness); 6) resistance towards standard medical knowledge and methods; 7) resistance towards standard knowledge and suggestions presented by self-tracking apps and technologies; 8) unease or concern about surveillance from developers or third parties; and 9) unease or concern about one's own behaviour (feeling triggered or forced to track, etc.). The coding was done iteratively and recurrently, carefully reading and rereading the material and identifying recurrent ideas and issues therein, as suggested by Vaismorandi and colleagues (2016) and Braun and Clarke (2006). Second, I developed semantic themes and subthemes through interpretation. Third, following Aronson (1995: 2), I developed a "storyline" where "themes that emerge from the informants' stories are pieced together to form a comprehensive picture" of their experiences. Quotes were translated into English for the purposes of this chapter.

Results

I found that the interviewed participants could be divided into two primary groups based on their engagement in established fertility-awareness methods. To my surprise, the engagement in fertility awareness also reflected attitudes towards surveillance issues such as data collection and privacy. The results are presented through four sections. First, I provide a descriptive characterisation of the concrete practices that participants engaged in to surveil them-

selves and their bodies, for instance, what data were collected and how, but also what apps were chosen and why. The following sections delve deeper into surveillance imaginaries as I present participants' reflections on their engagement and negotiation in matters of (self-) surveillance as a cultural and societal phenomenon.

The collection of "intimate" data

Are surveillance and privacy still appropriate terms to discuss voluntary and active engagement with tracking and checking online, Lyon (2018) asked, or should we understand imaginaries and practices of, for instance, social media or self-tracking in a different light? Furthermore, which data is considered "intimate" – and why – in a time when so much data is collected and shared in different contexts?

All participants in this study engaged in self-tracking their fertility through at least one of the following mobile apps designed for fertility tracking: Clue, Fertility Friend, Flo, Kindara, Natural Cycles, Premom, and Read Your Body. All interviewees used fertility-tracking apps to "get in tune" with their bodies, either to avoid hormonal contraceptives or to better identify their fertile periods in order to achieve or avoid pregnancy and track different indicators of fertility and their general well-being, such as quality of sleep, mood, and exercise. Some participants added information about whether they had consumed alcohol or caffeine.

The choice of app depends partly on the motivation for fertility tracking: An app such as Premom is designed for those planning a pregnancy, and Natural Cycles, for instance, can be set to either support the planning, or the prevention, of pregnancy. Another factor affecting the choice of app or the development of self-tracking practices relates to participants' views on privacy, ownership, and control, as well as self-awareness, both in relation to app developers and their motives and in relation to technology and algorithmic choice and interpretation. Each interviewee expressed awareness of potentially sharing their data both with developers and third parties when engaging in self-tracking through devices and apps, either through intentional harvesting or through data leaks. Participants could, however, be divided into two primary groups that, while sharing several of the concrete self-surveilling practices associated with fertility tracking, were marked by somewhat different motives and perceptions regarding their engagement with fertility tracking and their relationship with data sharing.

The first group was engaged in established fertility awareness methods and characterised by choosing apps that claim to not share data with third parties. This group emphasised their own autonomy and authority in relation to algorithmic interpretations and primarily chose apps such as Read Your Body, which does not present assumptions or interpretations about fertility.

Instead, users "close" and "open" their fertile window in the app based on their physical symptoms. This app is customisable, as the user controls and adds what values and categories should be included, such as temperature or cramping. The second group consisted of individuals who were not trained in fertility awareness but who used fertility apps as a method to either achieve or avoid pregnancy. This group more often chose apps such as Natural Cycles, which is preprogramed to a higher degree and also makes suggestions and interpretations about the fertility status of the user. Thus, there is a difference between the two groups in the way they engage in and affect the "act of measurement" (Levy, 2019), as the first group, to a certain degree, added to and injected nuance into *what* was measured and quantified.

All interviewees except one tracked their body temperature to indicate fertile periods during their cycle, typically using an oral thermometer. One participant who was engaged in fertility awareness measured her vaginal temperature, as she experienced that this gave her the most accurate readings, and thus a clearer and more even statistical curve in her app. When taking the basal body temperature, the most reliable results are achieved by taking readings when waking up and at the same time every morning. Several participants, primarily those engaged in fertility awareness, instead used a "Tempdrop", which is a device that is placed on the upper arm before going to bed and kept there during sleep. The Tempdrop device does several readings of the body temperature during the night, which can then be transferred to an associated app, or another app, that presents the statistical results. Participants selected this choice because maintaining the habit of waking up at the same time every morning to take their temperature was found to be inconvenient and difficult. The group engaged in fertility awareness also engaged in several additional nondigital practices to surveil their bodies and cycles, such as checking their vaginal discharge or the position of their cervix.

In both groups, several participants logged their sexual activity. A few participants explained that information and data about sex felt more private and intimate than data about their fertility or related symptoms. This is explained by the feeling of sex as something that is clearly chosen, while hormonal shifts and symptoms are something that happens beyond the control of conscious decisions. When sharing her charts with me, one participant removed her entries related to sex, while showing me the rest of her logs.

Several participants from both groups took part in what could be called an extended digital engagement in issues related to fertility self-tracking. This engagement takes place across their fertility apps, social media, and diverse online fora. Some apps, such as Fertility Friend, offer "galleries", where users can post and share their anonymised charts for others to compare and discuss similarities and differences, for instance, when sharing the same diagnosis or fertility issue. One participant explained that she used this function frequently, but without posting her own charts. In this way, charts from other

users – and thus, in a sense, other bodies – became part of the interpretative work this participant did in relation to her own body and fertility. As most of my respondents were part of Facebook groups engaged in fertility awareness or fertility overall, these are also frequently used: Participants read other member's posts and charts or pose questions about both fertility and tracking methods. Some participants also shared their own data, most often in the form of charts.

Thus, what emerged from my interviews was that participants typically shared an interest in surveilling their fertility because they found it helpful for their overall well-being, allowing them to avoid hormone-based contraceptives or identify specific symptoms and their timing (I return to this shortly). Several participants had also invested in additional digital devices specifically to monitor their fertility, such as the Tempdrop device. Most participants' interest in fertility self-surveillance also extended to the practices and results of others or to share their own data with others, thus making corporeal surveillance and interpretation a partly collective endeavour. Thus, the sense of "intimacy" of intimate data related to specific spheres and contexts of identified networks, such as friends or family, or a specific identified individual, such as me, whom they had met face to face. However, "intimate" details in the data could be shared with unidentified others without issue.

Living in and with surveillance culture

> In the end, you kind of surrender, you are surveilled anyways. You kind of only hope for the best. Like, accept all cookies. (Interview with Tina)

Participants clearly reflected on their (self-)surveillance practices as part of a wider cultural tendency. While not referring explicitly to "a culture" of surveillance, participants returned to both the factual circumstances and the sense of being watched and surveilled in close to all their daily practices. Several interviewees expressed concern that they are surveilled and self-surveilled through several everyday practices and devices, such as bank and credit cards, cards for public transportation, a myriad of apps that can track a user's geographical position, shopping habits and patterns, interactions, and so forth:

> I've grown up with Facebook, Instagram, Google, and Gmail. I know they collect data about me and how I use websites. I feel uncomfortable about it, but at the same time it's become an essential condition of our time. It's like, "Okay, this is what you must accept to use these services", that have become the dominant way for us to interact. (Interview with Anja)

Participants expressed clear awareness of their own surveillance practices, and their place in a surveillance culture overall, by acknowledging that

their whereabouts and data are likely collected and stored. While participants do experience some issues relating to the continuous surveillance of their daily habits and lives as worrisome or unpleasant, all of them still expressed a level of acceptance of this order and societal reality. In terms of imaginaries, participants conceived of surveillance as a societal necessity and expressed that there were no ways of functioning properly in a society that relied so heavily on the collection of data and information without complying with that way of living and acting. Thus, participants identified compliance and understanding regarding surveillance, both on an individual and a societal level, which indicates a (social) imaginary of surveillance as unavoidable but also as necessary and beneficial in certain respects. At the same time, however, another competing societal narrative raises critiques and concerns regarding digital surveillance. Trying to accomplish an existence free from – or even with a reduced amount of – shared information and data would be like trying to turn back time. As this is impossible, the right thing, instead, is to stay informed and alert and to harvest the positive effects of surveillance:

> With all technology, it's in the back of your mind, who can get hold of this information? However, still, I just think, this is the way we must live now. In addition, I feel like, if someone wants to analyse my data – well, go ahead! The positives outweigh the negatives. (Interview with Maja)

Participants expressed some concern about the risk of their fertility data and its links to intimate life events, such as pregnancies (Mehrnezhad & Almeida, 2021), leaking or winding up in unforeseen or unintended contexts. However, several participants expressed that they felt more comfortable with the idea of their data ending up as part of a faceless collection of data "somewhere", while they might not want to share their data even with friends. Some participants also expressed that they wished for their data to be used for research on women's health and other "collective good" purposes. Generally, interviewees were more focused on the risk of their data or information ending up among their identified networks, namely, among people they know and who know them. This also extends to Facebook groups and other identified social media, where participants were willing to share intimate details with strangers while being restrictive about even posting everyday updates within their networks of "friends". Thus, privacy is divided into spheres, where the most important sphere is among identified "real life" contacts, among whom respondents may be very restrictive with information sharing. As stated above, the "intimacy" of intimate data presupposes identified networks, and the sense of intimacy regarding data subsides to a degree when data are collected by "faceless" third parties.

Taking control and being empowered

> It would be fair to share how the body works and then leave it to everyone to make up their minds about what protection to use. It's absurd that it all falls on women. Not only when you have a partner, but always. What if someone wants to sleep with you? You better be ready! Because, once a month I have an egg, and all these men walk around with their sperm all the time. (Interview with Tina)

All participants who engaged in self-tracking of their fertility expressed that they have learned a lot about their bodies. Nearly all participants raised concerns over the fact that girls and women are routinely offered hormonal contraceptives rather than counselling and information about how their fertility actually works. Participants linked this to an overall patriarchal view of women and their bodies, where women are often expected to take sole responsibility for family planning and contraceptives, while simultaneously not having the choice to decide for themselves about the best option for their hormonal health. Routine information that is distributed to women (and men), according to participants, is based on an average menstrual cycle of 28 days, where ovulation occurs on the fourteenth day of the cycle. This, however, is far from reality for everyone, as there are considerable differences between women, which is largely ignored in the information given in schools, by physicians, and through the overall societal narrative about female fertility.

Several participants who engaged in fertility awareness also expressed that several apps developed for fertility tracking reproduced and cemented inaccurate or dated knowledge about fertility or menstrual cycles, in line with the findings of Andelsman (2021), Hamper (2020), and Healy (2021). Additionally, they felt that fertility apps would sometimes not truly inform users about how and why certain interpretations about fertile periods were done, but only presented estimations. This, in turn, led to users remaining dependent on apps while not learning about their own fertility.

All participants attributed a sense of agency and empowerment to their self-surveillance practices in relation to fertility. However, those participants who were engaged in established fertility awareness methods found these methods to be the most meaningful and important features in developing self-awareness and a sense of control and empowerment in relation to their own bodies and fertility. The group of participants who were not engaged in fertility awareness and who used "mainstream" apps, on the other hand, felt that app use in itself was greatly helpful in introducing them to new knowledge and adding to their self-awareness. This was made possible through features such as information texts and through insights participants gained through app use, as they added information and identified patterns and recurrent symptoms through the overview the app offered:

> The apps, fertility awareness overall, feel slightly like concurring yourself. Even if you can't control everything, you still feel like you have an understanding… control the understanding of yourself. (Interview with Nina)

The sense of being empowered was also linked to and negotiated through the use of self-tracking technologies and apps. Where close to all participants expressed concern about patriarchal attitudes and lack of knowledge about female bodies and fertility, the fear or concern about the loss of ownership and control extended to the use of self-tracking technologies, primarily among those participants who engaged in fertility awareness methods. These participants also expressed an attitude, as well as attempts, to achieve and maintain a sense of independence, and thus empowerment, towards self-tracking technology and apps themselves. Those participants who were most actively engaged in fertility awareness also expressed a more deep reliance on their own interpretations of their physical symptoms, and they gave tracking apps and devices less room to influence their interpretations and assumptions about their fertility, physical state, or overall health. For them, resisting or negotiating the interpretations presented by algorithms and predefined categories was simultaneously a way to resist and negotiate dominant medical narratives or "knowledge" about female corporeality.

The other group of participants who were not actively engaged or knowledgeable about fertility awareness did not express the same scepticism regarding interpretations or suggestions made by technological devices and apps that they used. They instead focused their concern on how their data might be handled and found self-tracking devices, associated software, and algorithms to mostly be helpful in interpreting bodily signs and symptoms. Here, participants' own bodies and their understanding of their own symptoms come together with and illustrate a wider social imaginary of self-optimisation and self-knowledge. This is done in part through a celebratory understanding of technological opportunities. However, the corporeal is also understood as a potential site of resistance, as its true knowledge of bodily symptoms is understood to crystallise the limitations of technological ability, which cannot trump self-knowledge.

Optimisation and gamification

In line with identifying (self-)surveillance practices as part of a wider zeitgeist, participants also reflected on how fertility tracking was part of an overall focus on performance and (self-)control. One participant identified a false sense of control, where she would feel a momentary relief and sense of taking charge when entering her data into an app or seeing "a nice graph" created by the application based on her measurements and data. This echoes the results of Ford and colleagues (2021), who underlined the paradox between a sense of empowerment and control in the context of neoliberal self-management

that demands continuous self-improvement and endless "work" to maintain that sense. The participant simultaneously acknowledged that her careful and precise data collection had no impact whatsoever on her hormones or symptoms related to hormonal health:

> It's truly good but triggering at the same time. You feel like you end up in a kind of accomplishment. (Interview with Nina)

Both this participant and others identified that they at times were affected by a sense of force or obsession that they were uncomfortable with, by checking or comparing their charts "too often" or becoming "too" preoccupied with adding or excluding factors in their daily lives to optimise their hormonal health and, through that, their fertility and overall well-being. In these statements, participants identified the discourses of self-improvement as central to "the project of the self" and how those discourses affect and alter their behaviour and state of mind. Relatedly, several participants identified the gamification features of the apps as an active part of their periodical self-identified "obsession" with entering and interpreting data. According to Whitson (2013), gamification is often a part of surveillance, as it motivates subjects to willingly share their information through the pleasurable experience of play. Participants experienced this in the sense that their apps presented "beautiful charts" or congratulated them on a job well done. Several participants had taken breaks from self-monitoring their fertility to free themselves from the pressures and demands they experienced in relation to continuous monitoring. However, all of them subsequently returned to self-monitoring their fertility markers.

Conclusion

This chapter has explored the practices and imaginaries of intimate surveillance of women who engage in fertility self-tracking. The analysis was driven by the exploration of what and how women who engage in self-tracking their fertility go about their surveillance practices and how their imaginaries of surveillance and surveillance culture both motivate their practices and contribute to the reproduction of the cultural momentum of surveillance. Following Taylor and colleagues (2003), social imaginaries are understood as comprehension and agreement about societal conditions and legitimate actions that reach beyond individuals and are shared by a wider public. However, in this chapter, imaginaries also refer to individual motives, understandings, and concerns, which are intimately associated with (both produced by and productive of) wider social imaginaries.

In line with previous studies (Kennedy & Hill, 2018; Sharon & Zandbergen, 2017), I would like to draw attention to how individuals engaged in self-tracking have multilayered motives and understandings of their practices, in which they often understand and appreciate potential risks, but where the

effects or consequences rendered as meaningful or helpful are regarded as more important. While participants are critical and, in some cases, concerned, in most cases, they view the tracking and potential sharing of fertility data as something that is to be expected in a time and culture that relies so heavily on data collection and storage. By choosing between potential negatives and positives, participants argued that they feel they have little room to change or affect the way current societal structures revolve around information collection. Instead, they wished to benefit from the opportunities and positive aspects of this cultural moment that also offers them tools to collect and interpret data and information in an unprecedented way.

What especially connects the themes that came forth during the analysis is the sense of control that participants expressed having or seeking, primarily associated with access to information and the capacity and confidence to make interpretations. The sense of control or ownership that participants rendered important was not primarily about avoiding surveillance or the commodification of their data, but about knowing and understanding the scope of surveillance. Participants also took different measures to balance their relationship to self-tracking, such as taking time off from tracking, as associated risks are identified not only in relation to app developers or third parties, but also in relation to the well-being of participants themselves. For instance, participants sometimes experienced that tracking practices become forced or are accompanied by a sense of constraint.

On the note of ownership and control, several participants also stressed the importance of making their own interpretations of the collected data. While they used apps to collect, and sometimes analyse, data, several participants emphasised their own interpretations as primary. In part, this relates to a sentiment that several participants shared: Living, breathing humans are best equipped to read and interpret their own bodies. The sense of remaining critical towards devices, apps, and associated algorithms also extends to resisting a perceived "one size fits all" in relation to female corporeality and fertility, where self-tracking technologies both reflect and reproduce specific normative bodies.

The results of this study are, of course, dependent on the selection and distribution of participants. As this study targeted persons using fertility tracking, all involved participants were engaged in this practice. Had individuals who for some reason had chosen not to engage in digital fertility tracking been included, the results would have been different. While those most sceptical of collecting and sharing data about their fertility also likely refrained from doing so, my experience from the interviews was that participants made conscious decisions about their fertility tracking. They did not share a solely celebratory or naïve view of data collection but found that the positives outweigh the negatives.

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Endnotes

[1] Fertility awareness–based methods include family-planning methods that are based on the woman's observation of signs and symptoms of fertile and infertile periods, either to achieve or to avoid pregnancy. Fertility-awareness methods depend on both the accurate identification of fertile days and the modification of sexual behaviour to either achieve or avoid pregnancy (Frank-Herrmann et al., 2007).