



LUND  
UNIVERSITY

# The Digital Turn, a Corporeal Return

## Sensory Self-tracking with the Contraceptive App Natural Cycles

Isa Chen

Lund University  
MSc in Media and Communication  
Department of Media and Communication  
Supervisor: Magnus Andersson  
Examiner: Tobias Linné  
August, 2017

## Abstract

This study explores lived experiences of Natural Cycles, the world's first approved contraceptive app through which women can track their fertility by logging daily readings of their body temperature. Seeking to address the lack of in-depth empirical studies within the field of self-tracking, especially relating to gendered self-tracking, the study draws on 12 qualitative interviews with women based in Sweden. It sets out to understand the role and meaning of Natural Cycles for these women in their everyday life. More specifically, the study takes an interest in how they engage with personal data, and with their bodies, as they handle, perceive and manage certain risks.

On the one hand, self-tracking practices are inherently bodily as they revolve around recording and monitoring aspects and behaviours of the body. On the other hand, previous research has suggested that self-tracking entails a shift towards disembodiment as they argue that personal data come to define how people feel, sense and make sense of their selves and bodies. This also builds on an understanding of self-tracked data as a more reliable and objective insights, compared to bodily sensations.

The findings of this study make the case for the opposite, and points to the centrality of the body in self-tracking practices and experiences of Natural Cycles. In bringing new ways to visualize the body, both through the increased physical self-awareness and through digital data visualizations which produce an *othering self-gaze*, NC offers new ways of feeling, relating to and understanding one's lived body. The findings further illustrate how people engage not only visually, but with all their senses, as bodily symptoms become the key to self-knowledge and self-understanding, and a way to daily negotiate, (re)contextualize and value the built-in ambiguity of personal data.

A corporeal turn has been introduced across social research during the twentieth century – turning against a social constructionist view by bringing the materiality of the body back into focus. However, most of current research employ socio-material perspectives which, curiously, are often criticized for losing the materiality and agency of the human actor. This study brings empirical arguments for how socio-material and phenomenological perspectives can be used together in understanding how self-tracking practices and experiences do not need to be directed at escaping the materiality of the body but rather, these can be way of returning and intensifying it. Moreover, while self-tracking devices are often seen as the vanguard of technology, NC enables a kind of embodiment which entails a return to corporeality in a double sense: through the re-focus on the physical body, as well as the re-connection to a “natural” – as opposed to enhanced or augmented – body.

The findings of the study illustrate, and argue, thus for a continued discussion on the sensory dimensions of self-tracking and the qualitative nature of personal data. The study further adds to the discussions on everyday data practices, where engaging with imperfect personal data is an integral part of these practices rather than a temporary exception. In fact, the findings show how the ambiguity of data both forces, and encourages the women to engage even more intensely, and creatively.

Key words: *sensory self-tracking, self-monitoring, female embodiment, contraceptive app, fertility tracker, personal data*

## **Acknowledgements**

Firstly, I would like to thank my supervisor Magnus Andersson. Your invaluable support, enthusiasm, and guidance have been integral to this project.

I would also like to thank Helena Sandberg, who at an early stage of the process provided advice and encouraged me to go further with my topic. An extended thank you goes out to all the people within the Department of Media and Communication in Lund, as well as my fellow classmates. These years have, truly, been my pleasure.

A further big thank you to the interviewees: the flesh, bone, and heart of this study. Thank you for sharing so generously with your stories and experiences.

An immense gratitude goes out to the army of women that have stood behind me: all of you amazing women in my life! Special thanks to Caitlin, Kriszti, Emma, Hanna and Lili for seeing, and sometimes pulling, me through – from the first to the last page.

Lastly, I want to thank the ones who demands it the least, but deserves it the most. To my parents, for your endless love and unwavering support. Thanks to my father, for the catchphrase of my life: “I got it from my daddy”. Thanks to my mother, for always speaking my truth, even when I cannot. You are my inner voice of reason, and joy.

## Table of contents

1. Introduction .....	1
1.1 Living with contraceptives, media tech and female bodies .....	1
1.2 The aim of the study .....	2
2. About Natural Cycles .....	4
3. Exploring self-tracking in everyday life: when data and body meet.....	6
3.1 The lived body: feeling, sensing and making sense of data .....	8
3.2 The human-data-assemblage: doing and becoming with digital data.....	11
3.3 The frictions of data practices and the ambiguity of data.....	13
4. Researching with, and for, women.....	15
4.1 The case of NC .....	15
4.2 Starting from women’s everyday life: qualitative in-depth-interviews.....	15
4.3 The process: recruiting, interviewing, analysing.....	16
4.4 Validity: capturing everyday life and body .....	19
4.5 Research ethics and considerations: let’s talk about sex(ual health) baby.....	20
5. Living with one’s body: unpacking sensory self-tracking .....	22
5.1 Discovering the naturally regular body .....	23
5.2 The naturally regular body – a body open for irregularities.....	28
5.3 Tracking for control.....	35
6. Concluding reflections .....	37
6.1 A whole new embodied world.....	37
6.2 Zooming out .....	41
7. References .....	44
Appendix A: interview guide .....	50
Appendix B: data coding example .....	51

# 1. Introduction

## **1.1 Living with contraceptives, media tech and female bodies**

There are many alternative terms for self-tracking: personal informatics, personal data, personal analytics, the quantified self, and lifelogging. What they all seek to describe, with varying emphasis, is practices in which information about bodies and behaviours are logged, archived, monitored, collected and measured for different purposes (Lupton 2016c). As self-tracking has moved into the traditionally male-coded domain of technology, it has become masculinized. When thinking about typical self-trackers, it is rarely women that are brought to mind. Rather, it is the tech-savvy nerdy men that are frequently used as examples in discussions around self-tracking.

However, self-tracking practices have, in fact, traditionally been female-coded practices. Writing a diary, looking at oneself in the mirror every morning, controlling the daily intake of calories; women have monitored their bodies and daily lives throughout history, with and without the aid of digital technology. Nowhere is this more apparent than in the area of reproductive and sexual health, and the risks connected to it.

When the contraceptive pill was released during 1950s and 1960s, it was considered a way for women to empower themselves. Through technical intervention, they could overcome “Nature” and the restrictions of the biological body. Enabled to protect themselves against the risk of undesired pregnancy, women could take control over their bodies, and thus, their lives.

Today, over 500 000 women in Sweden use contraceptive pills (TT Nyhetsbyrå 2015). The overall trend is, however, negative. During the last decade, the use of contraceptive pills has declined with 13 % among women in the ages of 25-34 years (TT Nyhetsbyrå 2015). One of the reasons why, can be hinted in the 821 reported complaints of side effects that the Swedish Medical Agency has received the last 10 years, counting from 2005 to 2015. These reports entail stories of blood cloths, depression, weight gain, and even death (TT Nyhetsbyrå 2015). What was once seen as paving way for female emancipation has come in dubious light, prompting the question on what kind of freedom women actually won.

Instead, there is now an increasing distrust against hormonal contraceptives – a trend that is transnational. This is reflected by the surge of self-tracking apps that can be used by women who want to become or protect themselves against pregnancy, or simply track their menstrual cycles for practical reasons. Fertility apps, ovulation calendars, period trackers, pregnancy

trackers – these apps are being downloaded by millions of users as a quick overview of top health and fitness apps on Google Play will reveal (Google Play 2017). What they have in common is that they all offer ways to monitor one’s fertility by tracking ovulation and/or menstruation as well as other cycle-related symptoms (mood, acne, pms etc.). The focus of this study will be on one of these apps, namely, the world’s first approved contraceptive app: Natural Cycles.

While self-tracking is often seen as the result of technical advancements, and followingly, a phenomenon typical of “the modern age”, it is far from anything new. Ovulation monitoring was recorded as a contraceptive method already in 1918, and tracking the menstrual cycle has been a female everyday practice since 1920 (Schmechel 2016:277; Wilkinson et al. 2015:456). Tracking the menstrual cycles was, however, originally not conducted by the desire of the women themselves. Instead, it was an idea pushed and promoted from the field of gynaecology which at the time was a male-exclusive practice (Schmechel 2016:277). It joins an historic trend where male bodies are seen as the norm, whereas women, through their female bodies, have been constructed as the inferior “Other” whose unpredictable, and dangerous, body needs to be controlled through surveillance and policing (Ibid.)

Contrasting with this, self-tracking apps often present themselves as being part of a female empowerment through self-knowledge and self-understanding. For instance, Clue, which is a period and ovulation tracking app with 4 million users in 190 countries (Szirmai 2016). In an interview with BBC, founder Ida Tin states: “Clue is all about empowering women. It allows women to make better individual health decisions, and to improve their overall well-being” (Gering 2015). Glow, another period and ovulation tracking app, “empowers women everywhere to take control of their reproductive health” (Glow 2017). And Natural Cycles writes: “Learn for life. [...] Get to know your body and unique cycles, so you can make those big decisions in the future“ (Natural Cycles 2017).

## **1.2 The aim of the study**

To this background, Natural Cycles offers a case full of intriguing tensions and contradictions. The goal of using the app is for the women to become the expert of their own bodies. At the same time, they have to rely on technology where scientific knowledge, gained through “scientific methods” in form of self-tracking and monitoring, is understood as the key to embodied knowledge. Natural Cycles aims to empower women, through science and technology which historically have been both male-coded, and used as an instrument of power over women and their bodies. It sees liberation, in constant monitoring and surveillance of the

body. It echoes the promises of the contraceptive pill – presenting itself as a way for women to empower themselves, and to take control over their bodies and lives. At the same time, women are kept as the main responsible for reproduction. And so, the question needs to be asked once again: what kind of freedom have women in fact won?

This study, in its modest scope, will not be able to answer this question fully or even partially. However, it will strive to shed some light on how one, at least, can begin. In doing so, it will focus on women's everyday life, and risk as a fundamental dimension of it – as opposed to only investigating Natural Cycles as a form of risk management. The latter alternative poses a far too narrow understanding of Natural Cycles as *both* a contraceptive and a self-tracking app, which opens up for new forms of interaction, and ultimately, new ways of living with one's contraceptives. As the old method of fertile tracking moves into technology, Natural Cycles is enmeshed into the fabric of everyday life through the seamfulness of their new host – the smart phone. The smart phone serves as both a tool and a space of everyday life through which Natural Cycles pervades daily life in a way that other traditional contraceptives are not able to. Natural Cycles also differs from traditional contraceptives as it has a *voice*. It can remind its user to measure more frequently, send encouraging messages or celebrate the one-year-anniversary of their union – complete with emoji hearts. “Our app goes beyond contraception”, as Natural Cycles put it themselves (Natural Cycles 2017).

The aim of the study is therefore 1) to understand the role of the Natural Cycles app in women's everyday life, particularly how the data produced using the app is lived through and in women's everyday life as they handle, perceive and manage risks related to reproductive and sexual health, and 2) to explore the kinds of empowerment that are made possible through self-tracking devices and apps such as Natural Cycles. The research questions are the following:

- How is data lived (as in used, interpreted, experienced) in women's everyday life as they are perceiving and managing certain risks?
- How is this data positioned to bodily sensations? And how are bodily sensations experienced in relation to data?

In unpacking these questions, phenomenological and socio-material perspectives will be employed. They offer the opportunity to re-think relationships between body and the world; overcoming dualisms such as technology and body, body and mind – and most importantly, simplistic notions of power as simply being exercised over, or exercised on. Thus, they can also provide new ways of unpacking self-tracking practices and experiences, as well as everyday

risk management that take place through these. What these ways entail, will form a third research question, namely:

- How can socio-material and phenomenological perspectives add to our understanding of concepts and practices of embodiment and selfhood through contemporary self-tracking technologies?

This research question is connected to the two aforementioned ones. While the first two research questions are of empirical nature, and therefore will be mainly investigated on an empirical level, the last research question is theory-oriented. As such, it will be addressed on both a theoretical as well as an empirical level.

## 2. About Natural Cycles

Natural Cycles, from now on referred to as NC, is a Swedish company that was founded in 2013 by particle physicist Elina Berglund Scherwitzl and her husband Raol Scherwitzl. They offer a fertility and contraceptive app, with the same name, through which women can track and predict the days of the month when they are fertile by logging daily readings of their body temperature (Natural Cycles 2017). While the app utilizes an old contraceptive method of basal body temperature monitoring, it does so by incorporating the method within and through technology – employing a unique algorithm developed by Elina Berglund Scherwitzl herself (Natural Cycles 2017).

NC have currently around 100 000 users in 190 countries (Carlsson 2016). In 2016, NC were forced by the Swedish government institution Medical Products Agency and the Swedish Advertising Ombudsman to change the content of their marketing by removing all references to contraceptives (Aronsson 2015). The NC app was thereafter issued with a warning text: “Natural Cycles is a fertility monitor and [it] gives you an indication of when you are fertile it should therefore not be used as a contraceptive and [it] does not either protect against sexually transmitted diseases” (Natural Cycles 2016). However, as of 2017, NC is the world’s first and, up to date, only approved contraceptive app – and they market themselves accordingly, even stating that the app is even safer than the contraceptive pill (Natural Cycles 2017b).

### *How the app works: functions and the science*

The app has two settings: prevent and plan, depending on if the app is used in the aim of becoming pregnant or protecting oneself against pregnancy. In the latter case, women can either abstain or use other barrier contraceptives (e.g. condoms) if they have sexual intercourse during their fertile days.



The algorithm of NC is based on the assumption that there are only six days during the menstrual cycle in which a woman is fertile and can become pregnant if she has unprotected sexual intercourse (Natural Cycles 2017d). Based on daily readings of the body basal temperature which are measured with a thermometer and manually inserted into the app, NC can calculate and predict these days. The body basal temperature is the lowest temperature that the body reaches once it rests. It must be measured immediately after one has awakened from sleep, before any physical activity – getting out of bed included (Natural Cycles 2017d). The body basal temperature fluctuates in relation to the menstrual cycle – rising with 0.2-0.45 °C when ovulation occurs (Natural Cycles 2017e). In order for the app to work the most sufficient, NC advises its users to measure their body basal temperature at least 4-5 days per week (2017f).

In addition to daily readings of body basal temperature, users can add ovulation test results, the days of their period, write notes, and log when they have had protected and unprotected sexual intercourse. The algorithm of the app does however not include the two latter (notes and intercourse) when it calculates and predicts the fertile and non-fertile days of the month.

When the body basal temperature is inserted into the app, it gives direct feedback in form of green (not fertile) and red days (fertile). There is also a calendar view, where users can see their predicted fertile and non-fertile days, as well as expected dates for ovulation and menstruation. It furthermore provides both visualisation of the users' temperature curve in form of graph, and statistics based on the user's individual cycle (e.g. the average length).



Image credit: Natural Cycles (2017c)

Finally, the app has a message inbox where NC can send reminders, information and survey requests as NC conducts their own studies, and an achievement page where users are rewarded with *achievements* when she has performed certain tasks e.g. confirmed her e-mail or inserted her first temperature measurement.

### 3. Exploring self-tracking in everyday life: when data and body meet

Lupton, a key theorist within the field of self-tracking, has repeatedly stressed the necessity of bringing in critical perspectives, in order to move beyond currently used approaches such as instrumental, cognitive or behavioural psychology which mostly focuses on the validity, functionality and effectiveness of apps in guiding or changing people's behaviour (Lupton 2014a; 2014b; 2014c). In doing so, she has also pointed out the need for more empirical studies in this field, a need echoed by the small, but growing body of empirical studies within the field of self-tracking. These have all pointed out the *situated* uses and meanings of self-tracking apps and devices. For instance, Nafus & Sherman (2014) found that data is re-contextualized as people shift between different roles, and shifting priorities. Nafus (2016b) argues furthermore that the value of data is often found in the specific life context of the self-tracking individual. Similar recordings were found by Choe et al. (2014) and Li et al. (2011), in form of the role of self-reflection in self-tracking practices. Self-tracking apps were not only used by people to track and change their behaviour but to reflect back on their everyday lives (ibid). Rooksby et al. (2014) and Oxlund (2012) have both illustrated how the motivation and use of self-tracking devices are rooted in people's everyday life, life phases and life histories. People made sense of self-tracking in terms of their "lives, worries, hopes, interests, careers" (Rooksby et. al 2014:1171).

What connects these empirical studies is that they all bring forward the argument that people must be understood as always being more than simply users. However, there are currently very few in-depth empirical studies that investigate how people practically engage with data on a day-to-day-basis. While previous empirical research have found that self-tracking is undertaken to support long-term goals (Nafus & Sherman 2014; Rooksby et al. 2014; Ruckenstein 2014), interpreting and sense-making of digital data are still conducted on a day-to-day basis as people live their lives. Digital data are "done over a range of lived activities" (Rooksby et al. 2014:1171). Still, the importance of everyday life tends to be the conclusion of these studies rather than the object of study – which is the desire of this thesis. It aims to start where other studies end.

There are even fewer in-depth empirical studies which take women's everyday life as their point of departure. The majority of the previous empirical research on self-tracking apps is based on people within the *Quantified Self* community (see Choe et al. 2014; Li et al. 2011; Nafus & Sherman 2014; Smith & Vonthehoff 2016). This community, and company, was founded in 2007 by Gary Wolf and Kevin Kelly. They offer international meetings, meet-ups and

conferences, as well as a website with a user forum, for people who engage in self-tracking (Quantified Self 2015). While the community is open for everyone, the majority of its users are men.

Some of the other empirical studies on self-tracking devices include women (for examples, see Mol 2000; Oxlund 2012; Ruckenstein 2014). However, in both of these cases, this goes unaddressed which prompts the question: when analysing the differing roles that users take on, or are put in, as they are self-tracking, what about gender roles? Lupton (2016b) and Schmechel (2016) have respectively employed Foucauldian perspectives in theorizing on the female subjectivity created through self-tracking practices and technologies, “the reproductive citizen” as described by the former. Together with Thomas, Lupton conducted a discourse analysis of pregnancy and fertility apps, through which they argue that these apps reproduce and build on normative understandings of gender roles and femininity (Thomas & Lupton 2016). Technology is far from a politically neutral object, which has been pointed out especially by scholars within the field of feminist techno-science studies. Technology is socially shaped and as such, it is always implicated in power relations (Wajcman 1991).

Considering the vast, and growing, number of self-tracking health apps and devices specifically targeting women, the lack of research on gendered self-tracking is disconcerting. This study will therefore focus on *women*, and how they *live* with personal data. More specifically, it will address female embodiment in relation to self-tracking practices and experiences in everyday life. While the body will stay in centre of attention, it is its relationship to data that is of analytic interest: how women experience, sense and feel personal data, and what they do with personal data. Phenomenological and socio-material perspectives will be employed due to their shared focus but differing approaches to relationality between the body, self, and data. In addition to these, the literature review will also include previous literature on self-tracking, especially literature on the new ontologies and embodiments that personal digital data/technology bring with them. The literature review will furthermore refer to previous empirical studies of self-tracking, and in doing so, references to the same studies will be appear multiple times, in both phenomenological arguments as well as socio-material ones. While many of the empirical studies have been undertaken with a socio-material approach (for examples, see Mol 2000; Pantzar & Ruckenstein 2014; Lupton et al. 2016), phenomenological and socio-materialistic perspectives frequently overlap – the latter often being described “post-phenomenology”. Furthermore, and as already described, there is a lack of empirical studies on self-tracking apps and devices to draw on. The study will not use any theoretical perspectives on risk. As

mentioned in the introduction, the focus will be on the everyday lives of the women who use NC. Risk, in this study, is only of interest as one of the everyday practices and experiences lived with and through NC. Following the argument made above, people are always more than users. Likewise, they are also always more than contraceptive users.

Moving on, the remaining literature review will be divided into three parts. The first draws on a Merleau-Pontian phenomenology in sketching out the centrality of the body as people engage with and through digital data. It will also discuss if this engagement leads to an intensified embodiment, or ultimately, disembodiment. The second part brings in socio-material perspectives in discussing entanglements of human actors and technology, thereby moving to a more fluid perspective of the relationship between data and body as the boundaries between these become more blurred. Throughout both parts, it will become apparent how living with data is not a straight-forward process, but one filled with ambiguities, uncertainty and contradictions. The third, and final part will put attention to these dimensions through a discussion on “frictions” that are created as people live with, through and alongside data.

### **3.1 The lived body: feeling, sensing and making sense of data**

This approach builds on the philosophical tradition of phenomenology, drawing specifically on Merleau-Ponty (1962). Here, the body emerges as the main site for understanding, experiencing and making sense of the world. Merleau-Ponty (1962) understands subjectivity as embodied: to be-in-the-world is to inhabit a physical body through which we are in the world, and through which we come-into-being as we perceive the world. In this sense, the subject and the world exist in relation to each other: they are “born together” (Bullington, 2013:23). This embodiment is furthermore to be understood as intercorporeal and intersubjective. As Weiss (1999:5) puts it: “the experience of being embodied is never a private affair, but is always mediated by our continual interactions with other human and nonhuman bodies”. As the world has increasingly become datafied and mediatized – some even going as far as arguing that we no longer only live with media but “in media” (Deuze 2012) – digital technologies have become fundamental in how we experience the world. They are a part of our sense-of-being-in-the world, and as such, digital data have implications for how we understand and experience others as well as ourselves.

Although there is a world outside our bodies, the only way we know it is in experiencing it through and in our bodies. These experiences form the everyday world in which the human actor lives her daily life, i.e. her “life-world” (Merleau-Ponty, 1962). This lifeworld consists of “values, beliefs, assumptions and cultural practices [...] it constitutes the meaning of everyday

life” (Bullington, 2013:22). Understanding the meaning and role of self-tracking apps starts therefore from the human actor and her life-world, where self-tracking apps are not investigated as material objects in first hand but as lived experiences which take place in people’s daily lives.

Overcoming the Cartesian split, the mind and the body are seen as inseparable parts of the embodied subject (i.e “body-subject”). The body is thus understood as “feeling” body where sense- and meaning-making of reality is not only grounded in the mind but in our whole body (Blackman 2008). As found by Lupton et al. (2016) in their research on cycling commuters using self-tracking devices, engaging with data involved drawing on all senses. These findings are described by Lupton (2017:7) in another article on the topic of “data sense” as followingly:

[..] these self-trackers also engaged in complex acts of data sense-making that involved drawing on their past experiences of self-tracking their cycling trips, their sensory knowledge of how their bodies felt at the time of the rides (whether or not they were feeling tired, injured or ill, for example) and their sensory judgements of the weather and spatial conditions in which the trip took place (how windy or hot it was, how much traffic and other road users there were inhabiting the same spaces, whether the roads were slippery with rain and so on).

Lupton (2017) argues therefore that people’s sensory engagements with data are fundamental in understanding how they make sense of data. Fors (2017) has furthermore brought attention to how perception is not only “optic but also haptic”. She coins the notion of ”mundane frictions”, in discussing how people engage with digital pictures through touch as they are “stroking, pointing, clicking, pinching, tapping” on their screens (Fors 2017:10).

While the digital data produced through self-tracking apps are inherently bodily as they record aspects of the body, a phenomenological investigation of self-tracking can entail asking how people relate to the technology. For instance, by placing emphasis on felt and sensed dimensions of self-tracking: how does it feel to use a self-tracking app? Several studies have pointed to the highly emotional experiences that self-tracking can be (Mol 2000; Rooksby et al. 2014; Ruckenstein 2014; Smith & Vonthehoff 2016). These dimensions can be found in practical aspects (as difficulties with incorporating a device within daily routines), as people discover both possibilities as well as limitations of their bodies – and as they fail or succeed in reaching their goals with self-tracking (Mol 2000, Pantzar & Ruckenstein 2015, Ruckenstein 2014). In this sense, while data itself is disembodied as soon as it is stripped, and isolated, from the body – it never stays disembodied. As people engage in making sense and meaning of data, it inevitably becomes embodied: we feel, sense and experience data as we encounter and engage with it. A phenomenological approach to self-tracking thus illustrates an argument for understanding self-tracking as more than solely an instrumental or rational endeavour.

But our sensory engagements with digital data do not only involve feeling and sensing data. It also entails feeling and sensing ourselves with the aid of data, as self-tracking apps and devices can grant us access to previously taken-for-granted or invisible dimensions of our body. In offering new forms of visibility of our bodies, digital data provides new ways of relating to one's body. As Ruckenstein (2014:103) notes: "[...] one's heart which is not only an object of permanent monitoring [is] also transformed into an object of emotional attachment: heart and their beating start to matter more". In doing so, digital data can also encourage people to be more aware of their bodies and to take the time and effort to listen to bodily signals (see Mol 2000, Oxlund 2012). This can make self-tracking into an exciting and pleasurable experience as people embark on a journey of self-discovery where the data generates stories about bodies and selves, and become part of people's narratives of themselves. This is for instance described by one of the lifeloggers in the empirical study by Smith & Vonthethoff (2016:14) who summarized a whole year of data into a visual report in order to reflect on "the kind of person I was that year". In this sense, people are made both objects as well as subjects through the intimate gaze of self-tracking apps and devices.

At the same time, digital data can also create a distance to the body by rendering it into numbers which can overshadow and replace "the thinking" of the body, as data is seen as more objective and trust-worthy insights into daily life compared to bodily experiences which are seen as unreliable and subjective (Nafus & Sherman 2014; Ruckenstein 2014; Wiedemann 2016). For instance, in the empirical study conducted by Smith & Vonthethoff (2016:13), one of the research participants started treating the data produced by the self-tracking device as more reliable insights into his emotional state than his own intuition. Taking one step further, Williams (2013: no page number) a technologist and designer who engaged in a one year long ethnographical project where he used personal informatics as an aid in weight loss, describes how the data was not only seen as more true, but how it became a lived truth as the data took precedence over his bodily experiences, making him "feel weaker" when he did not consume a certain amount of protein or "feel fatter" when he overconsumed sugar.

This is furthermore discussed by Berg (2017) in his account of the self-tracking devices Moodmetric and the Ōura. He shows that while these devices promote and build on a holistic view of the body in which knowing your body becomes equated with knowing yourself and your life, they simultaneously assume that the people cannot attain these by their own senses and bodily capacities (Berg 2017:7). In other words, people need technology both in capturing bodily experiences (for instance, in "seeing" emotions) and in making sense of them (Ibid.). In

this sense, it can be argued that self-tracking is a move leading to disembodiment rather than embodiment, as the labour of sensing and feeling the world is outsourced to self-tracking devices (Hong 2016).

### **3.2 The human-data-assemblage: doing and becoming with digital data**

Even though a phenomenological account sees experiences as interrelated as they are lived out as the human actor relates to the world, it is still the human body that remains the vehicle for these relations. In contrast, socio-material perspectives understand technology as both a material object as well as an actor who *participates* in their relationships to human as well as other non-human actors (Lupton 2016c). Viewing technology as simply a tool to be used by the human actor is a too narrow understanding of the relationship between these two. Followingly, socio-material perspectives focus on the relationship between humans and technology as these interact, rather than the human actor and her experience of the technology in question.

Socio-material perspectives recognize that it is not only people that do things with data but data also do things with people. In other words, influence is exercised in both directions. For instance, in studying diabetes patients who used blood sugar measurement machines to track their blood sugar levels, Mol (2000:19) found that these devices in fact changed what patients defined as “normal” blood sugar levels. Instead of using the blood sugar measurements machines to stay above a certain level of blood sugar, the patients aimed to come as close as possible to this level i.e. the border of hypoglycaemia. She therefore states: “A diagnostic technique never merely register facts. It intervenes in the situations in which it is put into use” (ibid).

The agentive force of data has been previously discussed in relation to self-tracking metaphors such as “the quantified self”, “a data-driven life”, “you are your data”, “living by numbers” (Didžiokaitė et al. 2017; Lupton 2016c; Oxlund 2012) where the numbers and insights of digital data are seen as the key to both understanding, and optimizing one’s body, self and life (Smith & Vonthethoff 2016). It is in relation to these discourses that the majority of previous empirical research has addressed the topic of interaction. In doing so, they have mostly employed Foucauldian perspectives in discussing the agentive force of data, drawing on concepts such as governmentality, surveillance and bio citizens in self-tracking (Lupton 2016b; Meißner 2016; Wiedemann 2016). In doing so, they have showed how digital data is re-contextualized as users shift roles, and how users transgress normative notions of health through “soft resistance” by

redefining the use and meaning of the self-tracking apps and devices (Meißner 2016; Mol 2000; Nafus & Sherman, 2014; Rooksby et al 2014). Moreover, although the retirees in the study by Oxlund (2012) did start narrating their health in terms of numbers, they related to these numbers in different ways. Consequently, they also lived by numbers in different ways (Oxlund 2012). The research on interaction has thus, up this point, revolved around the user, and the ways in which /s/he can resist or reject the imperatives and affordances of the app.

Offering an alternative view, Haraway (2003, 2008) argues for the potential of a productive relationship between human and non-human actors through her notion of “companion species”, which positions humans and non-humans as partners who live together with each other. Using the example of humans and dogs, Haraway (2003:24) sets out to “tell stories about relating in significant otherness, through which the partners come to be who we are in flesh and sign.” She illustrates how humans and dogs have co-habited and co-evolved throughout history; shaping each other through their shared lives. It differs from Merleau-Ponty’s interrelational ontology where human actors relate to other bodies and material objects as they are-in-the-world. Instead, Haraway works from a relational ontology which understands the relationships between non-human and human actors to be co-constitutive. Applying Haraway’s relational ontology can entail looking into the processes and nature of the interaction between people and technology. One example can be found in the study of Lomborg & Frandsen (2015:121) where digital data is discussed as a form of communication between apps and the users, from which they *both* can learn with and from each other. Specifically, Lomborg & Frandsen show how exercise apps become personalized as these adapt their feedback in relation to old and new data inserted by the users, which in turn, makes users more responsive and willing to act on the messages of the app.

Taking a more radical approach to Haraway can involve shifting attention from relationships to *practices* of relationships. Namely, how relationships are enacted and what is “produced” as these relationships are enacted. Integral to this approach, is the concept of human-digital-data-assemblages: entanglements of digital data, material objects and human actors which in their interactions represent, and perform, different versions of the body and self. By introducing an element of performativity, an even more dynamic and fluid view of the relationships between non-human and human actors, as well as the actors themselves, is put forward. Instead of asking what the app and the user are together, the questions are: what do they become, and what is being “done” as they come together? For instance, what can the body become as it learns from



and with digital data? What kind of bodies are being configured and reconfigured through different entanglements?

This puts the aforementioned case of Williams (2013) in a new light. His experience of feeling weaker when he did not reach a certain intake of protein is not a result of disembodiment where digital data replace bodily sensations. Rather, it is a new form of embodiment attributed to an assemblage, where Williams feels his body with, through and alongside digital data. The entanglement of his physical body, human action (not eating protein), digital data (showing the amount of protein that he has consumed and thus representing a body lacking protein) all come together to configure an experience of “a weak body”. A weak body is thereby not an object which exists in itself. It is brought into existence, as it is lived in various ways through different entanglements – some with digital data, some without. Thereby, the visibility and understanding of the body gained through self-tracking apps do not only offer people the opportunity to see their bodies in new ways, but also to do and feel them in new ways through everyday data practices. Digital data becomes more than simply a mirror as it alters and participates in the perception; the experience itself. However, as people learn to feel their bodies in new ways, there might be a clash between how their bodies feel, what the digital data tells them and how this makes them feel. Therefore, everyday data practices also involve confronting, interpreting and negotiating clashes between multiple bodies and selves that are represented, felt and experienced through different entanglements (Lupton 2016a). These clashes will be further explored in the last part of the literature review.

### **3.3 The frictions of data practices and the ambiguity of data**

As the user, data and body come together, frictions are created. It can be “tracking fatigue” where the newfound awareness of data creates anxiety rather than relieves the user of it – as expressed by one of the participants in the study conducted by Choe et al. (2014, no page number). It can be the difficulties in domesticating data; in incorporating it into daily routines. It can be practical issues, found in the materiality of the self-tracking devices, for instance as people wear them on their bodies and carry these with them (Ruckenstein 2014). It can be a clash between the haptic and the optic: what people see and what people feel. It can be the inherent tension created as digital data is supposed to offer superior insights, despite never being able to capture the full complexity and experience of life, or the body. Although data and body can grow together, and learn from each other – the latter will never be fully aligned with the former. As Mol (2000:19) explains it: “[...] while people with diabetes are encouraged to persistently live in a calculative mode, they are expected to simultaneously accept that their

bodies never behave according to the rules and refuse to completely fit into carefully made calculations.”

These frictions can lead to people disengaging (Nafus 2016a) or eroding the trust in data (Smith & Vonthehoff 2016), but they offer also opportunities: for learning and intensified engagement (Fors 2017), discovering new entanglements which can lead one to unexpected insights (Nafus 2016a) or relating to our body in new ways as we recontextualize the data when we make meaning of it (Meißner 2016). However, while frictions are mentioned in these studies, it is not discussed more in-depth on how people engage with and within frictions – even as it has been illustrated through this literature review that these frictions are an inherent part of self-tracking experiences and practices. It is briefly mentioned by Ruckenstein (2014:78) who found that people did not ascribe the fault to the self-tracking devices when these failed. In fact, they still trusted the digital data and wanted to in fact increase their tracking in order to make sense and find explanations which could support the data. Rooksby et al. (2004:1169) noted that participants came to understand, and to some extent, accept that the accuracy and precision of digital data would not always measure up exactly to reality – for instance, the length of a run captured in a self-tracking app compared to the actual length of the run.

Frictions can also be created due to the ambiguity of data, and the difficulties in engaging within this ambiguity. Digital data is “decontextualized by nature” – as they come into being, they are immediately isolated from the body they once originated from (Meißner 2016). Thereby, there is always a “built-in-vagueness” of data as it is not always clear how it was generated, how it can be interpreted and what people are to do with it (Nafus 2016a). In her study of sensor devices (which measure the energy efficiency of households), Nafus (2016a) found that data could often become “stuck” or “dead”. There were variables that all could affect the reading in different ways, and it proved difficult for people to pin down what had actually caused a “high” reading. Consequently, people did not know how to interpret, or use the data, and the readings of the sensor device became useless (Nafus 2016a). Similar findings were recorded by Choe et al. (2014) who found data interpretation to be one of the most common problems that people encounter as they engage in self-tracking which they attributed to people either tracking too many things, or lacking “scientific rigour” (e.g. not tracking consistently). The latter is opposed by Nafus (2016a) who sees the lack of context as the main challenge.

It can be argued the meaning and use of digital data is always in flux as it shifts depending on the life context of the self-tracking individual in question. But it does not escape the fact that this person, eventually, must find the digital data meaningful in some way, or the app will

eventually be relinquished or replaced with another – as noted by Nafus & Sherman (2014) as the self-tracking individuals in their study switched freely between different apps. But how do people use and engage with data which is “ambiguous”, “uncertain”, “stuck”, “dead” or possibly even incorrect? What happens when data is understood as imperfect, but still expected to offer more objective and reliable insights both into bodily experiences (as well as compared to these)? These are some of the questions which the study will explore in the analysis.

On a final note, the ambiguity of data is also intriguing from a risk perspective, especially considering the role of embodied knowledge and experiences in deeming risks related to reproductive and sexual health. For instance, Rivano Eckerdal (2011) noted in her empirical study that women’s inquiry and interest of a certain contraception were often based on the experiences of their friends. This gendered trust is supported by Lowe (2005) who found that female patients seeking contraceptive consultation trusted female health professionals more than doctors, based on the assumption that the former had used contraceptives themselves and thus would have “real expertise”, as opposed to knowledge gained during formal medical training.

## 4. Researching with, and for, women

### 4.1 The case of NC

The study does not involve any other fertile apps, devices or monitors, even though these can be employed as a contraceptive method similar to NC. Rather than a representative example, the strength of using NC as a case example can be found in the desire, and argument, that self-tracking practices and experiences are situated. Focusing specifically on one app allows for a more in-depth understanding of the different uses and experiences of the same apps, and across different situations. It is thus as a contextualized example, that NC can provide insights into experiences of living with other fertile apps and monitors, and more broadly, self-tracking health-related apps and devices. In line with the argument put forward by Mol (2000:20), it is about asking “what *may* this technology do under which specific circumstances” rather than pinning down what the technology does. Rather than proving or capturing the phenomena of self-tracking, NC offers an intriguing site for exploring and learning more about it.

### 4.2 Starting from women’s everyday life: qualitative in-depth-interviews

Risks are not only technical or scientific issues, but also social and political matters as they are unequally distributed across social hierarchies. In this case, risks connected to reproductive and sexual health are part of a historical trend where women have been risking their bodies during

all stages of reproduction: protection, pregnancy, abortion and childbirth. Taking a feminist standpoint approach begins with recognizing that reproductive and sexual health risks are largely a part of specifically *women's* everyday life, and followingly, research needs to start off from their experiences as they hold an epistemologically privileged position (Harding 2008).

Feminist standpoint theory sees knowledge as inevitable situated as “what we know is inseparable from where we are situated when we produce knowledge” (Jackson 2010:53). In other words, there is no “god trick” as Haraway (1988) puts it. Women do not have access to more “objective” knowledge. Rather the value lies in that they can offer knowledge specific to their embodied position(s). Their situated knowledges can be understood as they 1) inhabiting a body that can conceive (i.e. female embodiment), 2) live in a social, historical and cultural context where inhabiting a body that is coded as “female” has certain implications and 3) as both the objects and subjects of self-tracking, they have unique insights. As Nafus (2016b) notes: “[...] The observational powers of a diabetic to understand her own glucose levels are quite high; in a sense she has more ‘data’ than a lab does because she can see what else is going (stress, lack of sleep and so forth).”

This study seeks therefore to understand the phenomena of self-tracking, by *asking* how it is experienced, used and felt specifically by women, in their day-to-day practices and experiences. The method of qualitative in-dept interviews was chosen, deeply rooted in a phenomenological tradition which aims to understand social phenomena as situated, lived experiences (Kvale 1996:52). What matters is the reality that people perceives it to be (Kvale 1996:52). Thereby, it is also broadening the scope beyond what traditional and male-dominated Western science has defined as knowledge and truth – definitions which have served to marginalize and exclude ways of knowing that are traditionally coded as female (e.g. embodied forms of understanding) (Hekman 1977:365). This is relevant considering a historical context where female health issues have been ignored as women are not only absent as researchers but also as research objects (Harding 2008:58). Moreover, it ties in with the research questions of this study as they specifically desire to unpack self-tracking as more simply material objects, but material objects which are experienced, felt and lived.

### **4.3 The process: recruiting, interviewing, analysing**

#### *Recruiting*

The interviewees were recruited on Facebook through posted requests. These posts were shared through my own personal network, as well as in specific Facebook groups such as Snippsnack i Skåne, Snippsnack, Natural Cycles users, and the official Facebook page of Natural Cycles.

The purpose with the interview was stated as discussing the interviewees' experiences of the app, specifically on the role and meaning of the app, and how they use and experience the app in relation to aspects such as everyday life, risk and relationships.

My criteria for appropriate interviewees was not set on the basis on finding women who could represent a wider population. Instead, my sampling was based on providing "a close-up, detailed or meticulous view of a particular experience" (Seale 2012:216). In other words, I set my criteria aiming to find women who shared the experience of self-tracking and of using specifically NC, rather than women who could represent a certain group of self-tracking women. The sampling criteria were therefore kept to a minimum: women over the age of 18+ who either had used or were currently using NC as a contraceptive. The reason for the age limit was the ethically sensitive topic of sexual and reproductive health (which will be further addressed in a following section).

The youngest interviewee was 23 years old, the oldest 36 years old. They had all used other contraceptives before using NC. At the time of the interviews, some still used NC while others had quit using it. It also varied how long they had used the app (from 4 months, to over 2 years) and when they had started using, alternatively, stopped using it. They all had differing backgrounds and lifestyles, even as they all either were working or studying at university full-time. All but one of the interviewees were in long-term, heterosexual relationships at the time of use.

One of the interviewees (Sandra) used NC as a fertility app, as opposed to a contraceptive. This was not known to me until the very start of the interview. She was included in the empirical material as NC ultimately emerged as 1) an experience going beyond simply risk management, and 2) a form of risk management targeted at more than protecting oneself against unintended pregnancy. Does this mean I could have also included women who use NC as a fertile app in the study? Possibly. However, the latter differ as they hope to relinquish the app as soon as possible, if and when, they become pregnant whereas I was interested in both short-term and long-term users of the app.

### *Conducting interviews*

Seale (2012:209) describes qualitative in-depth interviews as a medium with a flexible character as it "to, a certain extent, allows interviewees to speak in their own voices and with their own language". In this sense, qualitative in-depth interviews can be used both as a way of giving voice to women's everyday stories as well as giving the women in question a voice. Conducting

two pilot interviews at the start of the study further convinced me that it was crucial to keep a broad approach to the phenomena of self-tracking in fulfilling the latter, as the interviewees gave widely differing accounts of their self-tracking experiences. The interviews took therefore a semi-structured form. This allows for a fixed but flexible framework in which the interview guide is organized around certain themes, and suggested questions relating to these themes and the research questions of the study (Brinkmann & Kvale 2015). The themes were: 1) the decision to use NC: background, motivation, expectations, 2) social aspects, 3) everyday life, data and usage and 4) body, health and relationships (for more information, see interview guide in Appendix A). Following a phenomenological approach, the aim was to unpack these themes in regard to the human actor's lived experiences (Brinkmann & Kvale). These themes served therefore more as conversation starters rather than obligatory talking points. Some themes were greatly expanded, while others were only briefly touched upon – all depending on the experiences of the interviewee in question.

Creating a safe space for the women to share their stories was a priority. Individual interviews were therefore the preferred choice considering the personal, and possibly private nature, of the experiences of a contraceptive. As far as possible, the interviews were conducted face-to-face in the private homes of the interviewees. Three of the interviews were conducted through Skype, the remaining in person. The duration of the interviews ranged from 45 minutes up to 2 hours, lasting until the topic was exhausted and the same replies started to re-occur.

As experiences and practices are to be situated and contextualized, one is faced with the problem of judging when the context is rich enough. The stories are to be found in the details, but it is also easy to get lost in the wide array of information. Originally striving to conduct as many interviews as possible, I had to re-assess the sample size – ultimately stopping at the number of 12 interviews which includes one of the aforementioned pilot interviews. By then, similar stories had started re-appearing across the interviewees – signalling a “saturation” (Rudestam & Newton 2014:125) of data where the gathered material is rich enough. As every interviewee always bring their own unique and situated experiences, full saturation is never possible (Rudestam & Newton 2014:125). However, 12 interviews proved to be suitable number considering both the scope of this study, and its aim to tell a story consisting of several stories.

### *Analysis*

After transcribing the recorded interviews, thematic content analysis was applied, beginning with open coding of the empirical material, which were thereafter developed into broader

categories, and finally, overarching themes (Seale 2012). Thematic content analysis is useful when seeking for patterns and themes based on “what a phenomenon, event or social interaction ‘looks like’ for the individuals of interest” (Seale 2012:367). Again, this ties in with the phenomenological approach, and the heavy emphasis on the women’s lived experiences, that underlies this study. Finding a way to bridge between the empirical material and theoretical concepts meant, in my case, constantly going back and forth between developing a theoretical framework and re-reading the empirical material, – “immersing” myself in the data (Seale 2012:368).

#### **4.4 Validity: capturing everyday life and body**

When conducting interviews, the issue of intentionality and meaning always remains as there is not always a clear reason as to why we do certain things, nor can we always explain our actions. This also concerns bodily sensations and experiences, which can be especially hard to put into words – especially as they might take place on a level which is not directly conscious; available for us. One way out of this conundrum, is to include a focus on practices, in addition to lived experiences – thereby not being fully dependent on the ability of the interviewees to narrate their experiences. However, practices can, equally, be difficult to put into words as day-to-day practices are often mundane and taken-for-granted. As such they are forgotten, or simply not thought of.

Re-enactment proved to be one of the ways to bring back everyday life, back to life. For instance, by asking the interviewees to scim through, re-interpret and draw on examples from their archive of digital data in the app. I also asked interviewees to imagine, and simultaneously describe, a regular morning when they measured their body temperature – right from the moment their alarm clock goes off. In this way, they became their own ethnographers, inviting me to their daily life. Employing “strategical naiveness” proved also to be useful (Frykman 2006:68): “re-discovering” the app through the experiences of each individual interviewee. For instance, by asking each interviewee to explain how the app works (as in technical and practical aspects). This way, the interviews took an ethnographical form where the boundaries between participant observation and interviews are blurred (Pink 2009).

Naturally, these re-enactments will never be able to fully capture these practices and experiences, which are lived out in its everyday and bodily complexity. Does this mean that the meaning of everyday life is inevitably lost, when it is taken out of its context? First of all, Geertz (1973:20) argues: “[...] it is not necessary to know everything in order to understand something. Second, as the word “re-enactment” implies, it not a question about a neutral re-playing or re-

telling of events by the interviewees. Instead, knowledge is viewed in a social constructionist sense where knowledge (and research in social sciences) is not mirroring an objective truth, but rather it provides a tool for viewing the constructed reality we live in, and envisioning how it could be different (Burr 2015:2p). The interview is to be understood as a space for exploration where knowledge is constructed between, and together, the interviewees and the researcher. The interview provides its own context, which allows for an intense form of interaction between the researcher and the interviewee where the latter can describe and reflect on her experiences, and where they both can discover and learn new things during the interview (Pink 2009:8).

#### **4.5 Research ethics and considerations: let's talk about sex(ual health) baby**

The Act concerning the Ethical Review of Research Involving Humans (SFS 2003:460) defines certain kinds of information as specifically sensitive. Among those, are all information related to the topics of health and sexual life (Sveriges Riksdag 2017). It is not forbidden to treat sensitive information when consent has been given by the interviewed subjects. However, due to the nature of the information, specific measurements must be taken to protect the personal integrity of the interviewees.

The act does not apply to studies conducted at an undergraduate or advanced level, but only to established researchers. However, for “the greater good of science”, established scientists are allowed, in certain cases and to some degrees, to undertake research which can have physical and psychological impacts on research subjects. In this sense, it can be argued that students obey under even stricter requirements as they, due to their status as students, are not allowed to bend requirements in any way.

At the start of every interview, each interviewee chose their own code name which was used from then on, in all stages of the research. When the interview had finished, their contact information was deleted. They were given my personal e-mail in case they wanted to contact me (none did so). Not keeping any record of the personal names and contact information of the interviewees meant that there was no opportunity for gathering additional data or clarification of already gathered data. All references that could be related to a specific person were thereafter deleted in the transcribed interviews, for instance, the names of their partners and friends, the companies where they worked etc. At the same time, erasing all forms of personal information is not possible as this study specifically aims to situate the experiences and practices of self-tracking in the specific lives of the interviewees.



The ethical guidelines by The Swedish Research Council (Vetenskapsrådet 2002) are comprised of four main requirements: 1) *informing* the participating interviewees regarding the purpose of the study and their rights as interviewees, 2) obtaining their *consent*, 3) maintaining their *confidentiality*, and 4) only *using* the gathered data for research purposes. Following these guidelines, the interviewees were welcomed to share as much or as little, and to be as private or open, as they felt comfortable with. Being aware that health, and especially, in relation to people's sex life, is sensitive information, and for some, also highly private issues while at the same time knowing that researching a contraceptive app would inevitable lead the interviews into these areas posed a challenge. Therefore, it became fundamental that the interviewees were made aware of that the interviews were conducted on *their* terms and at their convenience – especially considering the unequal power relation between the interviewer and the interviewee. The interviewees were informed that they could end their participation or revoke information that they had shared, during any point of the interview and up until the publishing date of the thesis. I also explained the purpose of the research to be everyday life (focusing on the meaning and role of the app in people's daily life), and how they live with it, rather than focusing on sex life per say (e.g. how they use the app when they have sex). Finally, I explained that all of the material from the interviews would be deleted once the study was finished. After disclosing this information, oral consent was obtained, and recorded.

When conducting the interviewees, topics of sexual life, sexual health and general health, were frequently touched upon. These seemed to be personal but far from private topics. This might be attributed to the fact that most of the interviewees were recruited from public or semi-public (i.e closed but not secret) Facebook groups where they, if not actively engaged in discussions on Natural Cycles or sexual and reproductive health, were visible as members. This implies that they, to some extent, might feel comfortable discussing these issues. Furthermore, agreeing to the interview can also have been appealing to those women who already could consider discussing these topics.

Taking an approach to interviews as a “social event” (Seale 2012), the interviews assumed an informal form, similar to what (Rapley 2004:15) describes as “two people, often relative strangers sit down and talk about a specific topic”. Still, I was both surprised and touched, as the interviewees shared freely, and generously, their personal stories and intimate details of their lives. While I did not share my own experiences of using a contraception/fertility monitor during the interview, I did adapt a conversational style bearing close resemblance with my friends. In leaving the role of a detached researcher, did I also leave research as a valid project?

I would argue not. In understanding women's everyday life, personal involvement serves as a pre-condition for being invited to share the experiences of the women (Oakley 1981:41, 58). There is, however, a risk that the casual nature of the interviews led to interviewees sharing information which they in afterhand regretted. But as mentioned above, they were given the opportunity to ask me to exclude any previously shared information up until the publishing date of the study, which none of them did.

Finally, sexual and reproductive health are topics to be treated with respect, especially considering that these are often moral and sensitive, issues. The researcher needs to be careful as to not intrude on the privacy and integrity of the interviewees. At the same time, it is also imperal that there is a balance, as these issues can easily be rendered even more stigmatized if the researcher avoids engaging when the interviewees do share views and experiences related to sexual and reproductive health. While these issues can be highly emotional experiences, they are also mundane – not only as part of women's everyday life but also, as it emerged in the interviewees, as a talking topic. When asked if contraceptives are a usual discussion point among her friends, Maja said: "It is almost all we talk about, who people slept with, what contraceptives and STIs people have [...]". Or, as Jenny explained it: "all ways lead there".

## 5. Living with one's body: unpacking sensory self-tracking

While every story is unique, what connects all interviewees across life phase, age, family situation, occupation and so on, is that they are women, who use the NC app. They are not users, who happen to be women. Being women is the pre-condition for using the app, and I have therefore chosen to refer to my interviewees either as "interviewees" or as "women", rather than users.

Moving on, I will employ the terms of "women" and "female", to refer to people who inhabit a physical body that can become pregnant. These are of course not synonymous with each other. Being a "woman" does not have to mean that one has a uterus, and likewise, having a uterus is not exclusive to those who identify as women. I am aware that using the word "women" to denote a person with a uterus, means excluding people who are not ciswomen (people whose gender identity corresponds with the sex they were assigned at birth). A more inclusive term would be "uterus bearer". However, all of the interviewees were ciswomen, and their stories of NC were told from this embodied position. One does certainly not have to be a ciswoman to use NC, but it might entail other experiences, some of which this thesis will encompass, but still, cannot claim to tell per default.

In the following analysis, the study will focus on how we can understand everyday data practices and experiences as living with, and together with NC app. In doing so, it will be discussed how living with NC through daily practices and routines, and in risk management, is essentially a way of living with one's body. The analysis is divided into three parts. The first part describes how women come to explore and understand their bodies through digital data representations as well as self-tracking practices and experiences. That is, as a "naturally regular body". Part two explains the co-dependency between the app and the body. It furthermore introduces yet another dimension of the naturally regular body, as a body which is also open to be affected. The third and final part sets out to describe how this body – as both a naturally regular body as well as a body open to be affected – is turned into a tool of control, and an overall kind of risk management.

### **5.1 Discovering the naturally regular body**

When women engage with the app, they also engage with a certain representation of their body. The measurements of basal body temperature, the temperature curve, the red days (fertile days), the green days (non-fertile days), the cycle statistics, the expected due dates for menstruation and ovulation – all of these different data promote a certain way of seeing and understanding the body.

The body represented through the app is, first of all, a *reproductive* body. It has green days, red days, ovulations and menstruations. Second, it is a *natural* body which has, as the name of the app puts it, *natural cycles*. The definition of "natural" can be found in the marketing of NC, who describe themselves as a natural contraceptive method because they are non-hormonal and non-intrusive (Natural Cycles 2017a). This view was also shared by the interviewees who explained *natural* as "being free of hormones" (Jasmine, Gloria, Karin), and *unnatural* as "putting something in one's body" (Karin), "putting weird things in my body" (Anna), "pressing garbage into my body" (Lina), "inserting hormones that one should not have" (Lovis) and "having something unfamiliar in one's body" (Sandra). Third, and most importantly, it is a *naturally regular* body. It has menstrual cycles, to which a temperature curve as well as reoccurring bodily events (e.g. menstruation and ovulation) are tied. An "inner logic", as Jasmine and Anna described it.

As the women use the app, they thereby engage with a body which is visualized and represented as reproductive, natural and regular. More specifically, a body which is natural and reproductive, and thereby naturally regular. Followingly, NC introduces a shift in awareness as women can see and understand their bodies in a new way:

[...] I started to reflect over that it is cycle, which is crazy, when you have had your period since you were 13 or something. That you, not until you are over 30, start reflecting over that it is a cycle and re-occurring symptoms [...] that my mood is affected and that I act in different ways during different times of the month. [...] it is interesting that I can understand myself a bit better, why I react in different ways and that I can connect my mood and how my acts to something that is natural, that it is not something that simply is spontaneous. (Kristina)

Engaging with their bodies as a naturally regular body becomes a daily experience and routine as women insert readings of their body temperatures into the app every morning, track their fertile and non-fertile days, track expected dates for menstruation and ovulation, and as they learn and play with different functions of the app. It is further encouraged by NC, who reminds and rewards women when they engage with the app. For instance, by sending celebratory messages (“Nice [temperature] curves!”, “Keep up the good work!”, “A new cycle begins, for more information on your cycle, check your cycle statistics”, “Your ovulation is on its way”). There are also “achievements” and levels (“pro-cycler”, “star cycler” etc.) which the women are rewarded with based on the extent and the amount of time that they have used NC. Women can, in other words, keep track of their tracking.

Despite that self-tracking devices often revolve around tracking different aspects of the body and bodily behaviours, there are differing opinions as to whether self-tracking practices entail intensified embodiment or disembodiment. While Hayles (1999) has discussed the potential of digital data as a “prosthetic extension” which enhances and extends the senses of the body, Smith & Vonthethoff (2016) and Hong (2016) argue that self-tracking devices replace rather than enhance the body’s role in sensing and feeling. Digital data become the truth of our experiences, as “data is fetishized to the point where they come [...] to speak on behalf of the embodied referents they represent” (Smith & Vonthethoff 2016:8). Mol (2000), and Oxlund (2012) point to the same phenomenon as they discuss how people using self-tracking practices define and narrate their health through numbers, rather than bodily sensations. However, in the case of NC, numbers are part of the body’s menstrual cycles. They are part of the representation and understanding of the naturally regular body, and as such, they do not deflect but rather redirect the attention to the body as a feeling, sensing body.

First of all, the naturally regular body is not only a visual representation in the NC app, but also a sensory experience. Perception is, as Fors (2017) argues, optic *and* haptic. Seeing involves more than just our eyes: in seeing we also engage with other senses. The temperature curve, the calendar where bodily events such as menstruation and ovulation occur every month, these are also felt and sensed. NC teaches women to track and monitor their bodies by helping them to legitimize and recognize bodily sensations, as well as making sense of these by connecting them to the menstrual cycles. The interviewees grew a new physical self-awareness as they tracked

their bodies in various ways. For instance, by adding notes in the app about sore breasts, checking and feeling one's general state, researching on internet for common symptoms of ovulation during ovulation, or noting the amount of cervical fluid and other bodily changes. Followingly, Sara found that her reoccurring yeast infections would almost always occur specifically after ovulation. Sandra's suspicion that her stomach cramps were connected to her ovulation was confirmed. Anna discovered that she would frequently get acne outbursts and mood swings in relation to her cycle. In this way, several of the interviewees tracked both bodily symptoms which were cycle-bound (and thereby re-occurring), as well as bodily symptoms which they thought to be unusual – hoping that the latter could possibly be discovered and explained as, in fact, cycle-bound. Some of the interviewees also described how their bodies physically changed as they replaced hormonal contraception with the NC app. Interviewees experienced a variety of new physical sensations, e.g. longer menstruation, increased menstrual cramps, increased sexual desire and increased lubrication when sexually aroused.

Second, NC does not only enable new ways of experiencing the body as a naturally regular body, but it also proposes new ways of doing this body, in performing embodiment, and it participates in creating these experiences. Even if the NC app, in similarity with the above-mentioned Hayles (1999) argument, leads to intensified embodiment, the view of digital data as simply a “prosthetic extension” of the body fails to capture the relationship between data and body. For instance, although ovulation will take place in the body no matter if the woman consciously perceives it or not, the phenomenon of ovulation in which the woman experiences it, becomes a co-performance acted out and experienced through the different entanglements of bodily sensations (stomach cramps), the app signalling that ovulation is soon to be expected and results of ovulation tests which gradually grow more positive.

Third, digital data and the app serves as an aid for women as they embark on a journey of self-discovery. Rather than feeling or sensing one's body less by letting digital data “speak” for the body, many of the interviewees expressed a desire to feel *more*. For instance, by learning embodied skills with the aid of digital data, and through self-tracking practices:

“[...] in the future, it would be fun if I could feel myself when I get my ovulation for instance, and if I use this [contraceptive] method every month, maybe I will find something that always happens that point of time, for instance, discharge, if it hurts somewhere, some even feel that they get a sting in their stomach and those kinds of things. So, of course, during those times of the month, I might be a bit extra aware”. (Gloria)

Engaging in self-tracking practices is a way to *feel* one's body. Kristina described how relieved she felt as she finally had a “natural”, and a “real” cycle where it varies in her mood, how she

feels emotionally, and that she becomes swollen. In this sense, NC becomes a tool in living with one's body.

Feeling one's body also becomes equated with knowing one's body. NC opens up a world where embodiment becomes central in a project of self-understanding that characterized the interviewees' engagement with NC. The interviewees' self-tracking practices went beyond protecting themselves against pregnancy. Several of the interviewees tracked bodily symptoms in addition to their body temperatures, e.g. discharge, skin condition etc. Self-tracking becomes in this way a question of self-knowledge and self-understanding where women can learn new things about their bodies as they discover new bodily regularities. The regular cycles of the body also provide a source for self-reflection as these can have implications for one's self-understanding, as women discover certain experiences to be related to their cycle rather their personality, or something "spontaneous" as described by Kristina in the quote referred to earlier in the analysis. With the exception of one interviewee, everyone used NC both as a contraception, as well as a way of getting to know their bodies and selves. This was also expressed by Lovis, who expressed how she was interested in learning more about her body. Therefore, she did not mind the added time and effort in using NC, compared to her previous contraceptive (the vaginal ring), for instance as she researched bodily symptoms, or engaged with cycle statistics and other kinds of information provided by the app: "[...] even if the app takes care of the calculation, I want to know what lies behind, why things happen".

Previous studies of people within the Quantified Self-community (Nafus & Sherman 2014; Smith & Vonthethoff 2016; Swan 2013) found that gaining self-knowledge is integral in motivating people to start, and continue to, engage in self-tracking practices. In the case of NC, gaining knowledge about one's body was centred around self-discovery. Most of the interviewees were already monitoring their menstrual cycles to some extent, and in some form, for instance by keeping track of expected dates for their menstruation as they were planning vacations or other big events where having one's menstruation can be a nuisance. At the same time, the menstrual cycle and the bodily events related to these were a dimension of their bodies which had previously been largely taken-for-granted or invisible for many of the interviewees:

"[...] this thing with discharge and sore breasts, it has always just been a fact, you did not think of why or what it meant and so on. [...] things just happened [...] but now things have a specific reason". (Gloria)

Discovering the menstrual cycles, as well as cycle-bound bodily symptoms was therefore often an exciting and pleasurable experience which interviewees described as "cool", "awesome",

“fun”, and “interesting”. They felt “hyped”, “excited”, and “curious”. Lovis described it as an “aha experience” as she learned that her basal body temperature is connected to her fertility.

Fourth, and finally, in seeing their bodies as naturally regular bodies, women also connect, which is yet another dimension of how perception is not only optic but also haptic. Pantzar and Ruckenstein (2014:103) have noted that digital data creates “affective encounters” where the user can emotionally (re)connect to object that is measured. For some, NC was an experience that made the very mundane, the body, into something extraordinary. Discovering that the bodily signals, as the basal body temperature, fluctuate according to the cycle can transform the body into something else, something new. When discussing the science behind the NC app, Maria exclaimed: “[..] that you can calculate it, this is so damn... it is so exciting [...] it is so interesting that your temperature rises once a month, like this real, proper animal [laugh]. In this way, NC can become a source for re-imagining and re-enchanting the body. It creates a data Other which “re-works the familiar” (Thrift 2011). Through practices of self-tracking and digital data visualizations, the body is made into an object of surveillance. But in the same process, it is also made meaningful. Everyday routines are often thought of as disengaging and dull (Highmore 2001:6-7, 12). Here, it represents the opposite. The regular cycles of the body make the body into an object of wonder and pleasure, as well as the key to self-understanding and knowledge. Through the objectification of the body, it becomes a subject, with its own agency in form of its regular, natural cycles, its inner life. This is a point, which will be further addressed later on in the analysis.

To conclude, using NC does not entail a move of disembodiment but rather it entails a return back to corporeality, to embodiment. Through using NC, women come to discover and understand their body as *a naturally regular body*. By mediating the menstrual cycles of the body, and introducing self-tracking practices which are highly sensory, the body is placed at the centre of attention. What has already become apparent in the first part of this analysis is the role of self-tracking practices rather than digital data itself. Digital data may, and may not be, used in self-tracking practices which centre around cycle-bound bodily symptoms: to track, monitor, recognize, feel, sense, and find new ones, as these become a way of knowing and learning more about one’s body and self. Furthermore, when data is involved, it is not necessarily digital. Body temperatures and bodily symptoms, i.e. personal data, play a fundamental role alongside digital data visualizations and statistics. The second part of the analysis will continue the focus on cycle-bound bodily symptoms, which from now on will be referred to as “bodily regularities”. It will discuss how searching (and finding) bodily

regularities is not only an invitation of the app, a means to and of self-knowledge, but also an imposed requirement of the app. Beginning with the mutuality of data and body in using NC, and the consequences of their co-dependency.

## **5.2 The naturally regular body – a body open for irregularities**

### *Growing together: the mutuality between data and body*

Haraway (2003) sees the potential of productive, rather than oppressive or dominating, relationships between non-human and human actors. Specifically, companionships in which actors can learn and grow with, and from, each other. In these companionships, Haraway highlights “significant otherness” as the key to learning. However, applied on the case of NC, it is not the differences between the actors but rather the similarity between them that serve as the pre-condition for knowledge. The app and the woman in question are expected to change, and grow with each other to the point where they become one. That is, when the body represented in the app mirrors the physical body of the woman, or more specifically, her reproductive body.

In order for the app to be the most precise, women are advised to measure and insert readings of their basal body temperatures into the app at least 4-5 days per week. As the women’s bodies enter different phases of their menstrual cycle, the body represented in the app changes with them. When women insert new data, the app adapts its feedback (fertile and non-fertile days, cycle statistics, messages etc.) and predictions (expected dates for menstruation and ovulation) accordingly. This makes the app personalized, and thus supposedly safer, as cycles are individual, varying from woman to woman. Self-knowledge gained through self-tracking practices is therefore characterized by a dual-learning process in which both the app and the woman learn more about her body: the naturally regular body. A body which builds on the constant interaction, the loops of feedback, between the app and the woman. Following Lomborg & Frandsen (2015), data can be understood as a form of communication, in which the practices of inserting data and receiving feedback from the app are communicative acts on which the relationship between the app and the woman is built on. The NC app is not a *tabula rasa*, a blank page in which women simply can insert their body by inserting personal data. Rather, the inserted data is a way of informing the app; helping the app to *understand* the cycle of the individual woman.

There are in total six days during the cycle in which a woman is fertile and can become pregnant if she has unprotected sex. According to NC, users can expect around ten fertile days (marked in the app as “red days”) after inserting data during two to three cycles (Natural Cycles 2017d).



To the contrary of previous research on self-tracking as a means for self-optimization (see Li et al. 2011; Oxlund 2012; Ruckenstein 2014; Nafus & Sherman 2014; Smith & Vonthehoff 2016), it is thus not the body that is expected to become more optimized. Instead, it is the app with its data learning algorithm that is expected to improve its performance; gradually giving more non-fertile days (marked in the app as “green days”) as the app “gets to learn your unique cycle” (Natural Cycles 2017d). Consequently, women who use NC start with the understanding that the feedback of the app is not always correct. In fact, some of them are incorrect as the app essentially marks all of the days as fertile in the beginning. Knowing this contributed to the women being able to trust the app itself as the excessive number was seen as a part of the process in which the app was learning the cycle of the woman; a safety measure taken by the app, especially in the beginning phase. It can also be seen as an emotional process, in which women learned to trust the app. However, it still involved them taking “a leap of trust” (Möllering 2001). To prove that the app can be trusted, the women must eventually start treating the non-fertile days as non-fertile, which not all of the interviewees did. In those cases, they eventually grew disengaged with the app and discontinued their use.

The excessive number of fertile days meant thus that the feedback of the app could be questioned, and some of the interviewees also found the app to be overcautious:

*Interviewer: You said that you sometimes could interpret red [fertile] days as green [non-fertile]. Were there any other occasions when you noticed that the data wasn't entirely correct? Sara: Mm, no, it is just that they take safety before the risky, more than I might do [laughs]. [...] Like, I think that the app wants the body temperature to be elevated during a couple of days for it to be certain [that ovulation occurs] while I might have thought that it was enough with one measurement. [...] (Sara)*

However, if the women deemed that the app gave too many non-fertile days too fast, e.g. if they discovered they had not measured in accordance with the requirements or if their bodies displayed irregular symptoms (e.g. irregular periods). In those cases, the growing number of non-fertile days were not interpreted as a proof that the app had “understood” the woman’s body. Instead, it resulted in a “green day backlash” where these days, marked as non-fertile, created mistrust and suspicion. Similarly, women expected to get non-fertile days if they had measured and inserted personal data, regularly and in a correct way. Receiving non-fertile days was seen as both a proof, and a “reward” as Maria described it. There were, in other words, not only expectations of mutuality but also reciprocity.

#### *Growing together, growing apart?*

In Haraway’s (2003) relational ontology, she argues that actors can only be understood in their relations to others. On the one hand, the representation of the naturally regular body is a

relational performance. The interviewees' understanding of the body as a naturally regular body, is based in digital as well as non-digital self-tracking practices which involve entanglements of physical body symptoms, inserted personal data, and digital data visualisations and feedback of the app. On the other hand, actors can be made less understandable in relation to each other as growing does not always entail growing together. It might, in fact, entail growing apart as women do not only have to insert data regularly, but also *representative* personal data. That is, basal body temperatures which only fluctuate according to *the menstrual cycle*, as the interviewees quickly discovered that their basal body temperature also could be affected by a number of other reasons. For instance, by sleeping in the same bed together with someone else, having nightmares and moving around in bed, going to the bathroom in the middle of the night, being stressed, measuring in different spots in the mouth, spending the night at a new place, having a cold sore on its way etc. Temperatures which deviated unusually were therefore common and would occur every month. They could be divided into two categories: 1) a body temperature that was not their basal body temperature, due to measuring faults e.g. measuring after physical activity (the basal body temperature can only be measured after rest, before physical activity), or 2) a basal body temperature that had been affected, for instance due to sickness.

The easily affected nature of the basal body temperature is furthermore reflected in the user instructions given by NC (Natural Cycles 2017f):

- You should measure your temperature first thing when you wake up in the morning. You should also try to measure around the same time after a similar amount of sleep.
- Measure before getting up and out of the bed and at a similar hour every day (max variation +/- 2 hours), only record your temperature on the days that meet these requirements.
- If you are not using the thermometer provided by Natural Cycles, please make sure to record your temperature with a CE-marked basal thermometer with an accuracy of 0.01 degree Celsius.
- If you are subject to the following conditions, please do not record your temperature for the day: lack of sleep, use of medication that may affect your body temperature, extensive use of alcohol, smoking or drugs.

This meant that even if the women still trusted the app in itself, they could not *rely* on it. The expression “you are your data” are frequently employed in self-tracking discourses around digital data as superior knowledge. Here, it is rather the other way around: the data is you. It follows, if the women, or their bodies cannot be trusted, then the data and followingly the feedback of the app, cannot either. The mutuality and co-dependency between the body and digital data, between the app and the woman, means that the voluntary engagement of the women also invites for a forced one. In using NC, women have to compensate – for their own

possible short-comings in measuring and inserting basal body temperatures, and for the easily affected basal body temperatures.

To make sure that the body represented in the app and the physical body grow and change with each other, and that they reflect the same body (the naturally regular body), the women must insert representative personal data on a regular basis. “Representative” meaning basal body temperatures which fluctuate in accordance, and due to the course of the menstrual cycle. Upholding the naturally regular body, is therefore a question of engagement where it becomes the responsibility of the women to always interpret and ultimately deem the measured body temperatures either as “normal” or “deviating”; thereafter choosing to include or de-activate these temperatures. In the latter case, the measured temperature is kept in the app but excluded from the algorithm of the app. Women can also choose to not measure, if they suspect or know that their basal body temperature already is affected, for instance, if they had consumed alcohol the day before.

#### *Engaging with deviating temperatures*

*Interviewer: [...] When you say that you try to find a reason, what are you thinking of then? Sandra: Well, there was one time when the temperature dropped a little bit too early and it looked like I was almost having another, additional ovulation. So, I did some research on if you can have double ovulation, and you can, but I don't think it was that in my case. [...]* (Sandra)

[...] if I have been out until three in the morning, and wake up at eight a.m, then I haven't slept like I usually do, or if I have been drinking [alcohol] the night before, then I won't measure. It is mostly when you haven't slept as usual, or if you have been drinking the night before and feel it the morning after – not only one glass of wine but when you had more, when you feel it. And then you can see, like, that the temperature should not be elevated, by comparing with your temperature from yesterday, then you know that measurement was weird. (Anna)

[...] I can almost feel in the body, that I've slept poorly today, or that I might be getting a cold, and then I see it on the temperature, that has become elevated, and then I might have to scrap it [the measurement of the temperature] because I know that this has nothing to do with the menstrual cycle. (Karin)

Because the body is understood as a naturally regular body, irregular bodily symptoms (e.g. deviating basal body temperatures, irregular menstrual periods or simply a strange sensation in the body) are seen as always having an explanation. Interviewees explained these bodily deviations as being caused by an external source to be found in their everyday life. Even if they could not always determine which or how, they sought to explain, and if possible, correct the deviation. As the women encountered deviating basal body temperatures, they became detectives; seeking to understand if and why this temperature had occurred. As evident in the aforementioned quotes, interpreting and negotiating the meaning of deviating basal body temperatures involved drawing on a combination of different factors: felt sensations in the body (“feel it in the body”, “when you feel it”), previous activities and the possible effects of these (consuming alcohol, sleeping poorly), overall state of body (getting a cold), previous and

current information of the app (comparing the measured body temperature to earlier ones, and in relation to the cycle) and outer sources of information (conducting research on internet). As exemplified specifically in the quotes by Karin and Anna, making sense of deviating temperatures often involved drawing on bodily intuition; feeling one's body. For instance, consuming alcohol the night before did not necessarily mean that Anna could not measure her basal body temperature even if the user recommendations state this. If Anna could not "feel it" the morning after, she would still proceed with the measurements. Contrasting with the heavy emphasis on quantification in self-tracking discourses where human behaviour and bodies are translated into numbers (Lupton 2016c), it is rather the qualitative framing and contextualization of the numbers (in this case, basal body temperatures) that are central to the interviewees' self-tracking practices, and the understanding of their body and self acquired through these practices.

As the interviewees discover and engage with deviating body temperatures, they start to understand the body as not only a naturally regular body, but also a body which is open for irregularities (e.g. in form of deviating temperatures), and which is open to be affected by how we live our daily lives and as we interact with the surrounding world. This fits nicely with a phenomenological account of embodiment which involves, as Blackman (2008:103) explains, "a materiality of the body [which] is presented as a potentiality that is dynamic and open to being affected and affecting". The argument here, is that we do not choose if and when we want to be affected. We do it, as a result of being-in-the-world, as this always entail being in the world with others. The lived body is in a never-ending "dialogue with the world" (Bullington 2013). The borders of the body, is what simultaneously separates and connects us to the world (Käll 2016) – and ourselves. While the naturally regular body can tell stories about "the reproductive body" through temperature curves, and ovulation and menstrual dates, deviating temperatures can, as they are contextualized by the women, tell stories of a lived body and its relation to the world. Deviating temperatures represent and perform an affected and situated body which can tell stories of heart-break, busy work schedules or a body that needs to rest:

[...] I exercise a lot and so I've have gotten to know my body quite well – how it works with exercise versus recovery, sleep versus food. I can feel when my body, like, [when] I have done hardcore work-outs but not sleeping enough. Then I can feel that I get an elevated body temperature. It's like the app confirms, what I already feel and I think that is interesting, and then I can be like, today I might have to skip the work-out, or go to bed in time, or eat a bit more, so I don't get sick because now it is on its way. (Karin)

NC becomes a way of listening to this body, to the multiple stories that a lived body tells through changing body temperatures and other bodily symptoms. Thereby, it might be relevant to add to the aforementioned argument that data can be seen as a communication between the app and

the women: data can also, to an even higher extent, be understood as an aid in the communication between the women, their bodies and everyday lives. Through self-tracking practices, it is thus not only the bodily experiences but *bodily experiences of everyday life* which become mediated, quantified and consequently comparable. As aspects of everyday life are made visible in a new way through personal data, daily life is furthermore opened up for interventions when bodily irregularities are identified. Deviating bodily symptoms are therefore both a source of frustration as well as opportunity, where these do not only invite people to engage but also to participate. They enable a pause for self-reflection in which the interviewees seek to understand *why* deviations have occurred, and in which they can learn more about their body or the state of their everyday life. They might learn that their yeast infections are cycle-bound. They might learn that it is probably time to change their exercise schedule. The pause is in this way, as Day et al. (2014) describes it, “part of an endless movement where items and people are tracked and reconfigured”.

### *Becoming the expert*

In making sense of deviating bodily symptoms, previously found bodily regularities (temperature curves, cycle-statistics, cycle-related symptoms) create an individual notion of “normality” to which the former can be compared and contextualized with. It is through bodily regularities that deviating body symptoms can be identified. Thereby, a diagnosis can be set, in form of a causal explanation which categorizes bodily symptoms as either normal or deviating. While routines of everyday life are often depicted as a source of disengagement in its automated flow, the routines of the *body* offer the possibility for engagement. Tracking, maintaining and building on the naturally regular body by searching for additional bodily regularities, can in this sense be understood as both motivated by pleasure and excitement, as well as uncertainty and fear – as bodily regularities become a way to compensate for the ambiguity of data and the possible risks of using NC:

[...] I have not talked about it [NC] with that many, mostly with a friend and then another but she was like “no, god, that is scary”. She would never trust it but I feel that, after having used it for two years, that it is so reoccurring. Even if I have an irregular cycle, I can really see when my temperature goes up and when it goes down, and if it has gone down I know that I will have my period within two weeks – it is spot on, minus or plus one day. So, I feel safe with it actually. (Anna)

Having an irregular cycle (e.g. cycles that vary in length from month to month) is a risk as NC builds on a naturally regular body. If there is no logic to be found, then NC cannot predict and calculate the cycle. However, both Anna and Gloria found ways to negotiate this as they had found cycle-related bodily symptoms. Anna knew that when her temperature rises notably her period is due within two weeks, and Gloria knew that her breasts would become sore shortly

before menstruation. As described by Anna, this contributed to them feeling safe in using the app. But it also created a bigger space in negotiating, and sometimes, refusing the affordances of the app. Gloria, who initially followed the measuring requirements meticulously views nowadays the app more of a supportive source of information, and a complement to her own knowledge and interest in female health. She feels that she knows her body better than the app does, which she furthermore considers as overcautious in giving red days. Another interviewee, Sara, noted the exact range of degrees that her basal body temperature will rise as she enters a fertile phase in her cycle. Like Gloria, Sara could therefore bend the rules, e.g. measuring her basal body temperature even when she had not slept the required number of hours defined by NC. Eventually, Sara kept tracking by herself using a thermometer and a free-of-cost menstrual cycle app.

The knowledge of one's body, gained through self-tracking practices, could thus empower women to act against the authority of the app. In researching the *Quantified Self* community, Nafus & Sherman (2014) found several instances of when people used digital data in ways which did not align with the original purposes of the app. Instead, people found uses of the digital data which suited their personal needs, e.g. using several self-tracking apps to create a personal meditative morning ritual. They also switched freely between different apps as they went on in their self-tracking lifestyle. Therefore, Nafus & Sherman (2014) argue for a "productive user resistance", in which resistance goes beyond simply rejecting the imperatives of the app, or digital data. Resistance becomes thus a way of engaging. However, in the case of NC, rejecting the imperatives of the app can also be understood as productive. Women used the app, successfully, by rejecting some data and affordances, and embracing others. According to Gloria, critically engaging – or mistrusting, as she put it – the app serves in fact as an integral ingredient in using it successfully: "you cannot be the lazy person who thinks that the app will do the work for you". Or as Maria described it: "the knowledge is not in the app, it is in the woman". Once again, the app becomes a support for the woman in taking her own active decisions, rather than a dominating authority.

Throughout the second part of the analysis, we have explored the mutuality and co-dependency between the women and the app. This, in combination with the body being both naturally regular as well open to be affected, both invites as well as forces the women to constantly engage. Negotiating, valuing and questioning both digital data as well as personal data become part of women's everyday data practices, both as they engage with with non-fertile and fertile days as well as deviating body temperatures. Again, the uses of NC go beyond a contraceptive

as the women engage in practices of control through self-monitoring and through self-knowledge. This control centres around finding causal explanations to bodily behaviours, as a way of keeping track of one's body as well as one's everyday life. Following, the last part of the analysis seeks to further unpack the kind of control management that the naturally regular body entails, and enables.

### **5.3 Tracking for control**

It might appear that the body, as both naturally regular *and* open to be affected (and thereby, irregularities), might contradict each other. However, the kind of control management that characterizes the interviewees' self-tracking practices, is in fact contingent on these dual premises of the body. The body's reliability as a storyteller is dependent on the body being naturally regular, because otherwise the women cannot trust that when the body is affected it is due to external sources which can be found in the women's everyday life. At the same time, the body must be open to be affected, to reflect stories of not only the body but also everyday life. And, as already discussed, deviating bodily signals are identified through previously found bodily regularities.

Through introducing the practices of tracking and monitoring one's body through digital as well as non-digital data, NC becomes "a technology of noticing" (Nafus & Sherman 2014):

[...] if it happens something big in one's well-being, then you might discover it there and then it might be, or at least for me, it might be easier to take it seriously if I can see that something is happening with my body. If I can see it in my temperature, or in a temperature curve, that something isn't right – compared to just a feeling to my body. So, this is something good to keep track of, not only for your fertility. (Sandra)

[...] you got the routine now, where you check your general state [...] it is not something I actively think of but now when I talk about it, I also think that it can help me to identify when something isn't well, like my sleep for instance, I think about it more, like if I feel that I am well-rested, and those kinds of factors. (Gloria)

It can be argued, that the women's self-tracking practices revolve around setting a diagnosis on and through bodily symptoms, rather than the bodily symptoms in themselves. For some of the interviewees, NC was not only a contraceptive method but part of an overall risk management centred around *control* through setting diagnosis. While it shares resemblance with what Rooksby et al. (2014) calls "diagnostic tracking", setting a diagnosis implies an end to self-tracking as the goal with self-tracking has been reached. But in the case of NC, finding bodily regularities, or dismissing bodily irregularities, through establishing causal relationships is a reason for continuing, as opposed to ending practices of self-tracking. Having control is thus not necessarily about intervening and changing the body, in other words, a control exercised over the body. Rather it is a state of mind, a control assumed in being aware by monitoring and hopefully finding some regularity in bodily experiences. This meant that, while having irregular

cycle can be a reason to discontinue the use of NC, it can also be reason that keeps the women motivated to tracking. Karin, who recently started using NC, expected to eventually see some kind of pattern in her irregular menstruation, and explained how NC was a way to “make at least some kind of sense in this irregularity”. Similarly, Gloria stated that she could understand if someone who has regular cycles which they can predict precisely, does not need to use NC. However, as she did not have regular cycles, keeping track of her temperature felt natural because otherwise she “would not have any sense of how it is”.

Taking control can also involve letting go. When using the contraceptive pill, Jenny constantly questioned herself and her bodily experiences, not knowing if her feelings were real or only in her imagination. With NC, she could attribute certain experiences to her cycle, enabling her to let go: “when I was sad, I could check the app and think “I have pms, so that is probably why”.

A similar experience was voiced by Jasmine:

[...] when I ate the contraceptive pill, I always cried before I would get my period [...] and it was like shit, is it only because of them? But when I used NC, sure, I had to keep track if I was fertile or not but at the same time, I could disconnect from the feelings and think more like, it’s okay to be sad or angry [...]. (Jasmine)

Being in control is, in this sense, knowing when to act and when to let go, especially as certain things cannot be acted upon if they are found to be cycle-related. In the first part of the analysis, it was described how NC could transform the mundane body into something extraordinary. However, setting a diagnosis on bodily experiences can also transform the extraordinary into mundane. Being sad or angry, for instance, becomes part of the natural cycles of the body; a part of everyday life. Furthermore, reconnecting to the introduction of this study, the examples of Jasmine and Jenny point to how practices of self-tracking and monitoring are not new. Rather, they are a continuation which build on a historic context in which self-governing has been a part of women’s everyday life. Although NC introduces new ways to self-track and self-monitor one’s body, these practices had already been conducted in some form by the women as they had suffered from, suspected, or feared side-effects in their previous use of hormonal contraceptions. This was an experience shared by all of the interviewees: NC was not their first contraceptive, but their second, third, fourth, and for some, even the fifth. Using NC was considered by many as a way of regaining ownership over one’s body and bodily experiences. “Knowing that it is my pms, and not the hormones pms” (Jasmine) and similarly, “getting my own mood-swings that are a result of me and nothing else” (Gloria).



As practices of measuring, inserting and interpreting body temperatures become part of daily routines, it is not only the presence but also the absence of them that can invoke an emotional response:

Sandra: [...] I was going to a vacation to France to visit a friend who lives there. I thought I would take the opportunity to not track anything those days, so it might be vacation for real [...]. *Interviewer: And how did it feel during that period of time?* Sandra: It was super boring! [laughs] It was really like, what the hell... now I don't have any sense of my body. It felt really nice to start tracking again when I got home. *Interviewer: It felt like you did not have any sense of your body?* Sandra: Yes, and I even took my temperature in secret one of the days. I hadn't told my friend that I was visiting that I [do this], and we were sharing a hotel room. If I had measured my temperature every day, then I could have told her [but] now I thought like, I don't have to say anything. But one of the mornings, she went to shower before me, and I was like what the hell, I might as well seize the chance, so then I did it. Not because one measurement matters but it was the feeling of control. Mmm, I realize how this sounds, but... [laughs]. (Sandra)

The body remains the main tool for control, but NC is a way of “doing” this control. It ties into the affective dimensions of digital data, with the difference that in this case, it is not the digital data itself but the digital data practices (of measuring, inserting and interpreting body temperatures) that become affective as they are internalised. They become a part of bodily habits: a way to understand and engage with the world. Through self-tracking practices introduced by NC, control becomes an embodied knowledge; of knowing and keeping track of oneself and one's everyday life. And as the quote by Sandra reveals, using NC is not only a question of control. Measuring did not only make Sandra feel like she lost control, but it was also “super boring”. Reconnecting to the first part of the analysis, NC is a project of both control, and of pleasure.

## 6. Concluding reflections

### 6.1 A whole new embodied world

#### *Making sense of data with body, making sense of body with data*

Socio-material perspectives are often criticized for losing the materiality, and agency, of the human actor in their focus on data-human-assemblages where the body is configured and reconfigured. However, this study has shown how technology in fact places the woman and her lived body in the centre of attention. The app legitimizes, and encourages new ways of visualizing the body as a naturally regular body; as consisting of “natural cycles”. In bringing a new visibility of the body, both through the increased physical self-awareness through self-tracking practices and through digital data visualizations, NC also offers new ways of feeling, relating to and understanding one's lived body. Visibility is therefore maybe better understood as an *othering self-gaze*, through which the human actor learns to see her body in new, unfamiliar ways, which in its turn, can give rise to richer and deeper insights into her body/self.

An othering self-gaze through which the body becomes both an object and a subject, and where the mundane body is made extraordinary while extraordinary bodily symptoms can be made mundane. An othering self-gaze, which is characterized by both ownership as well as discovery. An othering self-gaze in which seeing does not imply a capacity of an individual human actor to reach reality in a neutral and objective sense, but rather where seeing is (re)connecting and engaging with oneself. Where seeing is relational, sensory and emotional: an “optic/haptic/affective/cognitive touch” (Haraway 2008).

Opposing the split behind mind and body, Merleau-Ponty (1962, 1965) argues that when we think, we think through and with our whole body. Still, there has been a tendency in existing studies (for an example, see Ruckenstein 2014) to reinforce this split through a focus on digital data as a visual phenomenon, and people’s engagement with digital data as primarily visual, that is, how the visibility that digital data brings with it (of body, everyday life etc.) is the key to knowledge and understanding. Thereby, the emphasis on cognitive learning and “the human mind” has often overshadowed the rest of the body. In this study, a phenomenological approach has been fruitful in illuminating that when people make sense of digital data, they draw on all senses – confirming Lupton et al. (2016) and their argument that sensory engagements are a part of people’s everyday data practices. The self-tracking practices introduced by NC are highly bodily, and women use data and self-tracking practices to reflect on their bodies and selves, as well as their bodies and selves to reflect on data. In using the app successfully, the women became dependent on the body as they contextualized and made sense of deviating data by putting it into relation with bodily symptoms which they, often thanks to the app, had learned were cycle-related.

Here, the body is not only something that women live through, but also together with as it emerges as a storyteller, in and of everyday life. This listening, and speaking, body becomes what Haraway (2008) calls “a companion specie” as it is placed in the centre of everyday experiences and practices. It is both an experience of everyday life, as well as a site for making sense of everyday life experiences in day-to-day sensory engagements with data. As the women engage with data in various ways, e.g. in detective work, tracking and monitoring bodily deviations as well as bodily regularities, conducting their own research on internet before and during their use of NC, they learn about the female body in general but also about their individual bodies. They discover a new world; an embodied world.

NC becomes an aid in communicating with the lived, feeling body, and one of several ways to living with one’s body. Ultimately, it is not only about being able to trust the app or digital data,

but to an even higher degree, trusting the body to reflect on the general state of everyday life and well-being. However, note that not everyone agreed on this holistic view of the body. For instance, when asked if she felt that she had gotten to know her body, Sara replied: “I don’t feel like I get to know my *whole* body, like I don’t feel that I get to know my blood circulation”.

*Risky co-dependency and ambiguous data: an invitation and requirement to engage*

In using NC women are also made aware of the body, as a body open to be affected. This openness of the body to the world, in combination with short-comings of the data-learning algorithm of the app as well as the human actor in form of measuring wrong or not measuring enough, invites for risk. It opens up for questioning digital as well as non-digital personal data. The co-dependency in the entanglements of the women, their physical bodies, the app, and digital as well as non-digital data, creates an uncertainty which simultaneously invites, simultaneously forces the women to constantly engage in self-tracking which revolves around control through bodily regularities. This involves *sensing and feeling* regularities in form of regular menstrual cycles or cycle-related bodily symptoms (sore breasts, pms, acne etc.). It involves *searching* and *identifying* new ones, for instance by finding bodily deviations such as deviating body temperatures and establishing causal relationships which means that these can either be dismissed as temporary, or discovered as cycle-bound. It involves *upholding, seeing* and *performing* regularity through daily data practices of inserting representative basal body temperatures which together with the algorithm of the app come together to configure and enact the naturally regular body. To summarize, it involves *living regularity* with and through one’s body – and through, alongside, and also, without the app. However, supporting the findings of Ruckenstein (2014), this study has also shown how the discovered regularity of women’s bodies is also emotional. It made self-tracking into a pleasurable and exciting experience where interviewees could learn new things about their bodies and their selves. Thus, it is central that the interviewees’ attention to bodily regularity is understood more than simply a rational tool for control.

Contrasting with previous studies (Rooksby et al. 2014; Ruckenstein 2014), engaging with ambiguous and imperfect data is an everyday data practice, rather than a temporary exception or an inherent part of data which can only be accepted. Constantly valuing and negotiating both the measured body temperatures as well as the feedback of the app, is an integral part of daily data practices when using NC. Nafus (2016a:22) argues in her account of sensor devices that these “open up a calculative path that makes clear the need for more connections than they offer”. She concludes that “data is never free of entanglements” (Nafus 2016a:22). Although

data is always interpreted by the human actor, and thus re-contextualized, encountering bodily deviations (i.e. deviating data) prompts the women to look beyond the data in creative ways as the women's self-tracking practices are rooted in the understanding that all bodily deviations have a causal explanation – some of which the women can find, others which they cannot. While measured body temperatures could be deemed as non-representative, women did therefore not engage with these as necessarily incorrect. They engaged with bodily deviations by seeking to understand why it had occurred; they looked for stories. Thereby, it is not only “correct” data that can be repurposed in different ways by people, but also incorrect or ambiguous data.

Note that these stories of the body are in fact dependent, and take place through the interplay between bodily regularities and irregularities in which everyday life can be compared and monitored, and sometimes, opened up for intervention. It is precisely in this dynamic, that the body – rather than the app – is turned into a tool of control. The body becomes a storyteller, who through deviating basal body temperatures or other bodily signals can tell stories of everyday life. It also means that the body's openness to be affected, and followingly the uncertainty and possibly flawed data, is what both creates uncertainty and risk, as well as opportunity. Thereby, flawed data does not necessarily lead to disengagement, but in the case of NC, it forces and encourages the women to engage even more intensely. And this necessity of engagement is what ultimately makes NC into a risk management that goes beyond a contraceptive, and a project of control and pleasure.

#### *The power of the natural, open body*

To the contrary of the findings of Smith & Vonthethoff (2016) who found that people perceived their bodies as insufficient and lacking as it became the object of self-tracking, using NC is not about transgressing the “natural” body. Rather it is about protecting it – for instance by using NC instead of hormonal contraception. Smith & Vonthethoff (2016:10) argue that self-tracking devices and apps replace human senses and intuition as self-trackers outsource the labour of feeling oneself to “unbodied data” (digital data that is both originated but also isolated from the body). They furthermore argue that this is rooted in a distrust of the body's capacities, as “biological forms of sensing” are understood as limited and subjective as opposed to the unbodied data which provides more objective insights (Ibid). But in the case of NC, the body is trusted because it is natural, and it is precisely its subjectivity – its openness and capacity to become affected – that is its strength. It is what makes it into not only a thinking body, but also a talking one. The natural body is not a mirror of reality, but a storyteller, and similarly, data

are not facts but rather treated as stories of the body. This is also interesting, considering the traditional understanding of the female body in Western societies. Compared to the male body, the female body has been viewed as the more “open” body, especially related to reproductive and sexual dimensions (for an extended discussion, see Grosz 1994). It is a body that menstruates, ovulates, becomes pregnant; a body characterized by the lack of control and boundaries. A dangerous, irrational, impure and emotional body that posits women, because of their bodies, as inferior to men.

NC is not compensating for the insufficiency of the body’s ability to feel and sense, but it rather enables embodied understanding and wellness – and it places an even heavier emphasis on bodily intuition. It encourages “intro-sensing” (Mol & Law 2004). In this sense, it serves far from a techno-utopic dream in which the body becomes “something more”. The key to self-knowledge and self-understanding is not digital data or technology, but the body. Again, NC becomes an aid in listening to this body – which brings an empirical argument for how phenomenological and phenomenological perspectives can be used together in understanding how self-tracking practices and experiences do not need to be directed at escaping the corporeality of the body but rather it can be way of returning and intensifying it.

## **6.2 Zooming out**

### *Looking beyond: risk, labour and responsibility*

As found by Rooksby et al. (2014), people’s self-tracking stories consist of several stories; stories in which the category of user becomes far too narrow. However, the differing stories of the interviewees did also share a commonality, and an encompassing story has emerged through interviews. I will therefore take two steps back from the analysis, to discuss it in relation to this story.

Regardless of its promises, NC does not offer a way out, of breaking free. Women are still kept as the main responsible for the contraceptive use, and they are still the one’s whose bodies are subjected to risks. Adding to this, it is both the women, and their bodies, that invite as well as compensate for the risks in using NC. Thus, the responsibility is put on the women in a double sense as they are positioned as the experts. While they are empowered to act against the affordances of the app, using NC also opens up for self-blame as “with responsibility comes the accusation of irresponsibility” (Mol 2000). The women did not only act in ways against the app, but they could also act in ways which caused anxiety or discordance with their sense of self, for instance, by consciously taking a risk in form of having unprotected intercourse on a day marked as fertile by the app. Moreover, the responsibility (and blame) over consequences

when using NC falls, to a higher degree, on the individual user as the choice do not require the involvement of state institutions and medical professionals. This provides a contrast to the majority of traditional contraceptives, whose faults can be blamed on external state bodies – which was for instance expressed by the participating women in a study by Wigginton et al. (2015). While the choice between traditional contraceptives is still an individual choice, it is a choice between alternatives offered and promoted by state institutions and medical professionals. It can be compared with Jasmine and Maria, who had both tried to discuss NC with the medical professionals present during their contraceptive counselling. The latter had either patronized, and/or advised the interviewees against NC, which further contributed into making the use of NC into an individual choice taken despite objections. “Hacking the system” as Maria described it. In this way, using NC could even be seen as a rebellious act. At the same time, some of interviewees expressed a desire for a stronger support from state institutions in using NC.

Finally, while women are offered empowerment, ownership and agency through self-tracking, they are also bound by constant labour. It requires both time and effort related to measuring and inserting data into the app, negotiating and interpreting data, sensing and feeling their bodies, and keeping track of their body and fertility. The data, as stories of the body, are only valuable in so far women engage. Labour can also be thought of as the added responsibilities that women had when using NC, as the one keeping track and reminding the other partner when additional contraceptives were needed during sexual intercourse. NC does open up for increased partner involvement as user accounts, and digital data, can be shared by several people. However, this seemed to add, rather than relieve the women participating in this study of their labour. Instead, partner involvement and sharing practices became yet another one of the women’s responsibilities in using NC.

The level and extent of engagement on a day-to-day basis required in using NC was not seen as desirable by everyone. Not everyone has the time, resources or motivation to do so, and ultimately, this was the reason Maria, Maja, Lina and Jenny stopped using the app. None of them actually decided to quit the app at a specific occasion. Instead, they grew disengaged, eventually leading to the dissolvment and discontinuation of NC.

#### *Looking forward: cultures of embodiment through negotiating productive entanglements*

This study has started, and highlighted, the importance of taking the starting, and ending point, in the everyday life practices and experiences of the people who use self-tracking-devices. In this pursuit, socio-material perspectives and phenomenological approaches have been chosen

as the theoretical foundation. Although the former has been criticized for being a solely theoretical lens with questionable and limited practical value, this study has, exactly in its empirical focus, showed how socio-material perspectives are fruitful in illuminating the complex relationships and entanglements of human actors and technology, of bodies and data. Most of all, it has been useful in illuminating how neither app or data, or the human actor, is perfect or objective. Rather, the study has illustrated the frictions as these come together, and the constant uncertainty that underpin these relationships. Thereby, it has been demonstrated how the relationships between the app and the women are not one of domination but negotiation.

Throughout the study, it has been shown that the self-tracking practices that NC introduces in women's life, entails an intensified embodiment, and not disembodiment. It is the woman's relationship to her body, rather than the app, that emerges in the stories of the interviewees. It might seem contradictory, using technology to re-focus on the physical body. However, as we move through the world, we connect to other bodies, objects, non-human as well as human actors, and this form and shape our experiences of the world, and ourselves. We do not exist outside our relationships to others. To be a human, is to be connected and thereby the body is "always more than human" (Manning 2010).

Literature on self-tracking based in socio-material perspectives (Hong 2016; Mol 2002) often tend to assume that self-tracking devices and apps will bring with "new forms of embodiment" as they discuss how the body is made, and unmade, through different entanglements of non-human and human actors. Thereby, they also understand bodies as relational, and most importantly, multiple. Although socio-material perspectives are useful in thinking about the entanglements in human embodiment, and despite the socio-material basis of this study, it turns from this view of the body. Instead of multiple bodies, and new forms of embodiment, this study works from a phenomenological understanding of one singular, but interrelated and intercorporeal body: a body that is naturally regular and open to be affected. While NC introduces, and is part of, new entanglements, this study is not willing to reach as far as to claiming that NC enables new embodiments – which rather brings the mind to "exosenses" (Swan 2013); new senses enabled through technology, for instance through augmented reality-glasses. Instead, the kind of embodiment that interviewees described seemed to not have its basis in a "new" or "enhanced" body, but rather a re-connection, a return – maybe best captured in what Jasmine exclaimed at one point during her interview: "this is actually the whole reason

I wanted to quit the contraceptive pill and become free of hormones. Like, living with one's body and corporeality, it felt like, shit, this is so basic!”.

Self-tracking is a relatively new, but rapidly growing area of study. There are multiple opportunities in which future studies can continue the work barely started here. More research is needed in cases where open and contingent relationships, and ambiguous and flawed data are part of daily data experiences rather than an exception to the rule. Sensory and sensuous dimensions of self-tracking practices, and haptic qualities of digital data, are equally undertheorized areas. Finally, there is also a need for additional in-depth empirical studies of self-tracking in everyday life, for instance how self-tracking apps are fitted into life phases, circumstances, and existing routines.

## 7. References

Berg, M. (2017). Making sense with sensors. Self-tracking and the temporalities of wellbeing. In *Digital Health*, (3), pp. 1–11.

Blackman, L. (2008). *The body: the key concepts*. Oxford and New York: Berg.

Brinkmann, S. & Kvale, S. (2015). *InterViews. Learning the craft of qualitative research interviewing*. Thousand Oaks: Sage Publications.

Bullington, J. (2013). *The expression of the psychosomatic body from a phenomenological perspective*. New York: Springer.

Burr, V. (2015). *Social constructionism*. Third edition. London: Routledge.

Choe, E. K., Lee, N. B., Lee, B., Pratt, W., Kientz, J. A. (2014). Understanding quantified-selfers' practices in collecting and exploring personal data. In *Proceedings of the Thirty-Second Annual ACM Conference on Human Factors in Computing Systems*, Toronto, Canada April 26 – May 01, 2014, pp. 1143–1152.

Day, S., Lury, C., Wakeford, N. (2014). Number ecologies: numbers and numbering practices. In *Distinktion: Scandinavian Journal of Social Theory*, 15(2), pp. 123–154.

Deuze, M. (2012). *Media life*. Cambridge: Polity.

Didžiokaitė, G., Saukko, P., Greiffenhagen, C. (2017). The mundane experience of everyday calorie trackers. Beyond the metaphor of Quantified Self. Forthcoming in *New Media & Society*, 16(1). Available at <https://doi.org/10.1177/1461444817698478>

Fors, V. (2017). Sensory experiences of digital photo-sharing— “mundane frictions” and emerging learning strategies. In *Journal of Aesthetics & Culture*, 7(1), pp. 1-11.

Frykman, J. (2006). Ting som redskap. In *RIG - Kulturhistorisk tidskrift*, 89(2), pp. 66–77.

Geertz, C. (1973). *Interpretation of cultures*. New York: Basic Books.

Grosz, E. A. (1994). *Volatile bodies. Toward a corporeal feminism*. Bloomington: Indiana University Press.



- Haraway, D. J. (1988). Situated knowledges: the science question in feminism and the privilege of partial perspective. In *Feminist studies*, 14(3), pp. 575–599.
- Haraway, D. J. (2003). *The companion species manifesto: dogs, people and significant otherness*. Chicago: Prickly Paradigm Press.
- Haraway, D. J. (2008). *When species meet*. Minneapolis: University of Minnesota Press.
- Harding, S. G. (2008). *Sciences from below. Feminisms, postcolonialisms, and modernities*. London: Duke University Press.
- Hayles, N. K. (1999). *How We Became Posthuman*. Chicago: University of Chicago Press.
- Hekman, S. (1977). Truth and method: feminist standpoint theory revisited. In *Signs*, 22(2), pp. 341–365.
- Highmore, B. (2001). *Everyday life and cultural theory. An introduction*. New York: Routledge.
- Hong, S. (2016). Data's intimacy: machinic sensibility and the quantified self. In *Communication +1*, 5(1), pp. 1-36.
- Jackson, P. T. (2010). *The conduct of inquiry in international relations. Philosophy of science and its implications for the study of world politics*. New York: Routledge.
- Kvale, S. (1996). *InterViews. An introduction to qualitative research interviewing*. London: Sage Publications.
- Käll, L. F. (Ed.). (2016). *Bodies, Boundaries and Vulnerabilities*. Basel: Springer International Publishing.
- Li, I., Anind, D. K., Forlizzi, J. (Eds.). (2011). Understanding My Data, Myself: Supporting Self-Reflection with Ubicomp Technologies. In *Proceedings of The Thirteenth International Conference on Ubiquitous Computing*, Beijing, China September 17-21, 2011, pp. 405-45.
- Li, Ian; Dey, Anind; Forlizzi, Jodi (2010): A Stage-Based Model of Personal Informatics Systems. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, Atlanta, USA April 10-15, 2010, pp. 557-566.
- Lomborg, S. & Frandsen, K. (2015). Self-tracking as communication. In *Information, Communication & Society*, 19(7), pp. 1015–1027.
- Lowe, P. (2005). Embodied expertise: women's perceptions of the contraception consultation. In *Health*, 9(3), pp. 361–378.
- Lupton, D. (2014a). Apps as Artefacts: Towards a Critical Perspective on Mobile Health and Medical Apps. In *Societies*, 4(4), pp. 606–622.
- Lupton, D. (2014b). Critical Perspectives on Digital Health Technologies. In *Sociology Compass*, 8(12), pp. 1344–1359.
- Lupton, D. (2014c). Self-tracking cultures: towards a Sociology of Personal Informatics. In *OZCHI*, Sydney, Australia, Dec 2-5, 2014, pp. 1-8.

- Lupton, D. (2016a). Digital companion species and eating data. Implications for theorising digital data–human assemblages. In *Big Data & Society*, 3(1), pp. 1-5.
- Lupton, D. (2016b). 'Mastering your fertility' - the digitised reproductive citizen. Forthcoming in McCosker, A., Vivienne, S. and Johns, A. (eds.) *Negotiating Digital Citizenship: Control, Contest and Culture*. London: Rowman and Littlefield, pp. 81—93. Preprint version available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2679402](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2679402)
- Lupton, D. (2016c). *The quantified self. A sociology of self-tracking*. Cambridge UK: Polity.
- Lupton, D. (2017). Feeling data: touch and data sense. Accepted post-print version. Forthcoming in *New Media & Society*. Available online at <https://simplysociology.files.wordpress.com/2017/03/lupton-2017-feeling-data-touch-and-data-sense.pdf>.
- Lupton, D., Pink, S., Sumartojo, S., LaBond, C. H. (2016). The affective intensities of datafied space. In *Emotion, Space and Society*, 21 (1), pp. 33–40.
- Manning, E. (2010). Always more than one. The collectivity of a life. In *Body & Society*, 16(1), pp. 117–127.
- Meißner, S. (2016). Effects of quantified self beyond self-Optimization. In Stefan Selke (Ed.) *Digital self-tracking and Lifelogging - between disruptive technology and cultural transformation*. Wiesbaden: Springer VS, pp. 235–248.
- Merleau-Ponty, M. (1962). *Phenomenology of perception*. New York: Humanities Press.
- Merleau-Ponty, M. (1965). *The structure of behaviour*. London: Methuen.
- Mol, A. (2000). What diagnostic devices do: the case of blood sugar measurement. In *Theoretical medicine and bioethics*, 21(1), pp. 9–22.
- Mol, A. (2002). *The body multiple: ontology in medical practice*. Durham: Duke University Press.
- Mol, A. & Law, J. (2004). Embodied action, enacted bodies. The example of hypoglycaemia. In *Body & Society*, 10(2-3), pp. 43–62.
- Möllering, G. (2001). The nature of trust: from Georg Simmel to a theory of expectation, interpretation and suspension. In *Sociology*, 35(2), pp. 403–420.
- Nafus, D. (2016a). Stuck data, dead data and disloyal data: the stops and starts in making numbers into social practices. In *Distinktion: Scandinavian Journal of Social Theory*, 15(2), pp. 208-222.
- Nafus, D. (2016b): The domestication of data: why embracing digital data means embracing bigger questions. In *Ethnographic Praxis in Industry Conference Proceedings*, Minneapolis, USA, August 26-September 1, 2016, pp. 384-399
- Nafus, D. & Sherman, J. (2014). This one does not go up to 11: The quantified self movement as an alternative big data practice. In *International Journal of Communication*, 8(1), pp. 1785-1794.
- Oakley, A. (1981). *Subject women*. Oxford: Robertson.

- Oxlund, B. (2012). Living by numbers. The dynamic interplay of asymptomatic conditions and low cost measurement technologies in the cases of two women in the Danish provinces. In *Suomen Antropologi: Journal of the Finnish Anthropological Society*, 37(3), pp. 42-54.
- Pantzar, M. & Ruckenstein, M. (2014). The heart of everyday analytics. Emotional, material and practical extensions in self-tracking market. In *Consumption Markets & Culture*, 18(1), pp. 92–109.
- Pink, S. (2009). *Doing Sensory Ethnography*. London: SAGE.
- Rapley, T. (2004). Interviews. In Clive Seale, Giampietro Gobo, Jaber F Gubrium, David Silverman (Eds.) *Qualitative research practice*. London: SAGE, pp. 16–35.
- Rivano Eckerdal, J. (2011). To jointly negotiate a personal decision: a qualitative study on information literacy practices in midwifery counselling about contraceptives at youth centres in Southern Sweden In *Information Research*, 16(1).
- Rooksby, J., Rost, M., Morrison, A., Chalmers, M. (2014). Personal tracking as lived informatics. In *Proceedings of the Thirty-Second Annual ACM Conference on Human Factors in Computing Systems*, Toronto, Canada April 26 – May 01, 2014, pp. 1163–1172.
- Ruckenstein, M. (2014). Visualized and interacted Life. Personal analytics and engagements with data doubles. In *Societies*, 4(1), pp. 68–84.
- Rudestam, K. E. & Newton, R. R. (2014). *Surviving your dissertation: a comprehensive guide to content and process*. Fourth edition. Thousand Oaks, CA: Sage Publications.
- Schmechel, C. (2016). Calorie counting or calorie tracking. In Stefan Selke (Ed.) *Digital self-tracking and Lifelogging - between disruptive technology and cultural transformation*. Wiesbaden: Springer VS, pp. 267–281.
- Seale, C. (2012). *Researching society and culture*. Third edition. London: SAGE.
- Smith, G. J. D. & Vonthehoff, B. (2016). Health by numbers? Exploring the practice and experience of datafied health. In *Health Sociology Review*, 26(1), pp. 6–21.
- Swan, M. (2013). The quantified self: fundamental disruption in big data science and biological discovery. In *Big data*, 1(2), pp. 85–99.
- Thomas, G. M. & Lupton, D. (2016). Threats and thrills. Pregnancy apps, risk and consumption. In *Health, Risk & Society*, 17(7-8), pp. 495–509.
- Thrift, N. (2011). Lifeworld Inc—and what to do about it. In *Environment and Planning D: Society and Space*, 29(1), pp. 5–26.
- Wajcman, J. (1991). *Feminism confronts technology*. Cambridge: Polity.
- Weiss, G. (1999). *Body images. Embodiment as intercorporeality*. New York, London: Routledge.
- Wiedemann, L. (2016). Self-Monitoring. In Stefan Selke (Ed.) *Digital self-tracking and Lifelogging - between disruptive technology and cultural transformation*. Wiesbaden: Springer VS, pp. 207–212.

Wigginton, B., Harris, M. L., Loxton, D., Herbert, D., Lucke, J. (2015). The feminisation of contraceptive use. Australian women's accounts of accessing contraception. In *Feminism & Psychology*, 25(2), pp. 178–198.

Wilkinson, J., Roberts, C., Mort, M. (2015). Ovulation monitoring and reproductive heterosex: living the conceptive imperative? In *Culture, health & sexuality*, 17(4), pp. 454–469.

Williams, K. (2013). The weight of things lost: self-knowledge and personal informatics. In *Proceedings of the Thirty-First Annual ACM Conference on Human Factors in Computing Systems*, Paris, France April 27 – May 02, 2013.

## Empirical sources

Aronsson, O (2015). *Natural Cycles tvingas meddela: Appen är inget preventivmedel.*  
<http://www.breakit.se/artikel/2209/natural-cycles-tvingas-meddela-appen-ar-inget-preventivmedel> [2017-02-10]

Carlsson, S (2016). *Klart: Gravid-appen Natural Cycles tar in 50 miljoner.*  
<http://digital.di.se/artikel/klart-gravid-appen-natural-cycles-tar-in-50-miljoner> [2017-02-10]

Gering, J (2015). *The health app that hopes to empower women.*  
<http://www.bbc.com/news/business-34835823> [2017-05-01]

Glow (2017). <https://glowing.com/> [2017-05-01]

Google Play (2017). *De mest populära apparna i underkategorin hälsa och fitness.*  
[https://play.google.com/store/apps/category/HEALTH\\_AND\\_FITNESS/collection/topselling\\_free](https://play.google.com/store/apps/category/HEALTH_AND_FITNESS/collection/topselling_free) [2017-05-01]

Natural Cycles (2016). *Dina mätvärden. Vår analys.* <https://www.naturalcycles.com/sv/> [2016-11-10]

Natural Cycles (2017a). <https://www.naturalcycles.com/en> [2017-04-01]

Natural Cycles (2017b). *The science.* <https://www.naturalcycles.com/en/science> [2017-04-01]

Natural Cycles (2017c). *The app.* <https://www.naturalcycles.com/en/contraception/theapp> [2017-05-01]

Natural Cycles (2017d). *How it works.*  
<https://www.naturalcycles.com/en/contraception/howitworks> [2017-05-01]

Natural Cycles (2017e). *Your menstrual cycle.*  
<https://www.naturalcycles.com/en/science/menstrual-cycle> [2017-05-01]

Natural Cycles (2017f). *Instructions for use.*  
<http://ask.naturalcycles.com/customer/en/portal/articles/2240836-instructions-for-use> [2017-05-01]

Sveriges Riksdag (2017). *Lag (2003:460) om etikprövning av forskning som avser människor*. [https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-2003460-om-etikprovning-av-forskning-som\\_sfs-2003-460](https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-2003460-om-etikprovning-av-forskning-som_sfs-2003-460) [2017-05-01]

Szirmai, B (2016). *How big data empowers women*. <http://factoryberlin.com/magazine/how-big-data-empowers-women/> [2017-05-01]

TT Nyhetsbyrån (2015). *P-piller granskas i stor studie*. <http://www.dn.se/nyheter/sverige/p-piller-granskas-i-stor-studie/> [2017-01-06]

Vetenskapsrådet (2002). *Forskningsetiska principer: inom humanistisk-samhällsvetenskaplig forskning*. Elanders Gotab. [www.codex.vr.se/texts/HSFR.pdf](http://www.codex.vr.se/texts/HSFR.pdf) [2017-05-01]

Quantified Self (2015). *About the Quantified Self*. <http://quantifiedself.com/about/> [2017-01-06]

### **Interviews**

”Jenny”. (2016). Interview with I. Chen. 6<sup>th</sup> of November [Skype].

“Maja”. (2017). Interview with I. Chen. 10<sup>th</sup> of March.

“Maria”. (2017). Interview with I. Chen. 10<sup>th</sup> of March.

“Karin”. (2017). Interview with I. Chen. 14<sup>th</sup> of March [Skype].

“Jasmine”. (2017). Interview with I. Chen. 15<sup>th</sup> of March.

“Sara”. (2017). Interview with I. Chen. 15<sup>th</sup> of March.

“Gloria”. (2017). Interview with I. Chen. 16<sup>th</sup> of March.

“Sandra”. (2017). Interview with I. Chen. 16<sup>th</sup> of March.

“Kristina”. (2017). Interview with I. Chen. 18<sup>th</sup> of March [Skype].

“Anna”. (2017). Interview with I. Chen. 21<sup>st</sup> of March.

“Lovis”. (2017). Interview with I. Chen. 23<sup>rd</sup> of March.

“Lina”. (2017). Interview with I. Chen. 23<sup>rd</sup> of March.

## Appendix A: interview guide

### Themes:

- The decision to use NC: background, motivation, expectations
- Social aspects
- Everyday life, data and usage
- Body, health and relationships

### Questions:

- Can you tell me about how you came to the decision to use NC? Start from the very beginning.
  - o What were your expectations before you started to use NC?
  - o What influenced your final decision?
- Have you discussed NC with other people, or on social media? In what way?
- Can you describe how the app works? Imagine that I have never heard of NC before.
  - o Which functions of the app do you use?
  - o Would you feel comfortable with showing me one month in the app and tell me a little about the data and feedback you received during that month?
- Can you take me with you on a typical morning in which you used NC? Start from the very beginning: the alarm clock goes off and then...
- Did any of your daily routines change when you started using NC, and if so, how?
- What did you find difficult in using NC?
- How did you view green and red days, did you see them as “green” and “red”?
- Were there any occasions when you found the data or feedback from NC to be incorrect?
  - o What did you do then?
- On the website of NC, other users have written that they through NC have “learned to feel their bodies” – what are your thoughts on this?
  - o Have you learned anything new about your body since you started using NC?
- How did NC work in your current life as single or in relationship?
  - o Was your partner involved in any greater degree than before?
- Do you see any risks with using NC, if so, what?
  - o How did you handle those?

## Appendix B: data coding example

	Gloria	Sandra	Anna	Jasmine
Engaging with the possibility of/possibly flawed or ambiguous data	I always get some day every month where I think that I have slept the correct number of hours but then the app might still give a reading that is a bit too high. This can be due to sleeping badly, or going out to party the night before, or maybe even going to the bathroom in the middle of the night [...]	[...] in one case, I think that the temperature had dropped a little too early, so it looked almost like I was going to have another ovulation. So then I did some research on if it's possible to have double ovulations, and it is, but I don't think that actually happened in my case.	I guess it is if I have been out until like 3 a.m, and then wake up 8 a.m. Then I haven't been sleeping the way I usually do. Or if I have been drinking the night before, then I won't measure my temperature either.	[...] there were a few green days when we first started, even if there were not a lot. But I didn't want to have sex then [...] it was still like, "is this really safe?"
Self-knowledge, self-reflection and self-understanding	[...] this thing with discharge and sore breasts, it has always just been a fact, you did not think of why or what it meant and so on. [...] things just happened [...] but now things have a specific reason.	I feel everything in my body very, super clearly and then it's really fun with the app because it confirms [...] when it confirms that yes, that was the day of your ovulation, then I know that what I was feeling, was right.	[...] a feeling that you could feel your body more clearly, like when your menstruation was on its way [...]	[...] the ovulation returned, the menstruation returned, and when I got stomach cramps when I had ovulation as well. I haven't experienced that before, [...] it felt like you got to know your body more, "oh, did that happen?"
Control and ownership	[...] you got the routine now, where you check your general state [...] it is not something I actively think of but now when I talk about it, I also think that it can help me to identify when something isn't well, like my sleep for instance, I think about it more, like if I feel that I am well-rested, and those kinds of factors.	[...] if it happens something big in one's well-being, then you might discover it there and then it might be, or at least for me, it might be easier to take it seriously if I can see that something is happening with my body.	If I am going to say how it [NC] affects me, then it's that I don't have to eat contraceptive pills. That way, I feel better because I don't have to care about me putting weird stuff, or I mean, hormones, into my body. Then I feel better because then I know that my body works precisely as it is supposed to. [...]	[...] when I ate the contraceptive pill, I always cried before I would get my period [...] and it was like shit, is it only because of them? But when I used NC, sure, I had to keep track if I was fertile or not but at the same time, I could disconnect from the feelings and think more like, it's okay to be sad or angry [...].