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SCHOOL OF BUSINESS, ECONOMICS AND LAW

Me, my cycle and I

- a study of women's use of a digital contraceptive

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Abstract

The objective of this study was to understand and analyze the meaning the of a digital contraceptives in women's lives. This was achieved by answering the following research question:

How is the acquirement and use of a digital contraceptive empowering women?

The method applied was of qualitative nature and we conducted nine semi-structured interviews with current users of Natural Cycles, the world's first certified digital contraceptive. Through an inductive approach the concept of empowerment emerged. The collected data was analyzed through the theoretical framework of psychological empowerment, digital health and self-tracking, focusing on empowerment at an individual level. The women were found to be empowered by developing perceived control, self-knowledge, avoiding contraceptive institutions and acquiring social benefits. Amplifying the experience of empowerment was previous disempowering experiences in the contraception domain. For most it was an ongoing process of empowerment as they developed trust while using the app and adjusting to self-management. Self-tracking further empowered users by facilitating new ways of interpreting body and managing health.

Keywords

Contraception, digital contraceptive, psychological empowerment, digitalization, digital health, self-tracking

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1. Introduction

This chapter introduce the context of the digitalization of health and contraception, leading to our objective and research question.

1.1 Problem background

Consumers are argued to play an important role in the digital revolution predicted to transform the healthcare (Lupton, 2013a). Digitalization, the integration of digital technologies in everyday life, is an evolving transformation of society with multi-level impact on both individuals, the public sector and businesses (Hagberg, Sundstrom & Egels-Zandén, 2016). During the last years, digitalization have increasingly permeated the health arena, resulting in the industry of digital health and a blur of the patient and consumer role (Lupton, 2013a). Digital health is a phenomenon integrating new technologies in healthcare, medicine and public health.

Information systems, mobile digital devices, wearables, biosensors as well as digital media change the way individuals monitor their health, engage in self-care, receive consultation, access and seek out information and share their experiences (Lupton, 2013a). The growth of technology to aid health services delivery indicates a shift from a provider driven, traditional medical informatics to a consumer health informatics (MacLeod, Tang & Carpendale, 2013; Rai et. al, 2013).

Technologies are integrated with health management, such as mobile applications assisting individuals in monitoring their own bodies, self-tracking data and mediating their own health distanced from the healthcare (Lupton, 2017). Digital health is not limited to the public sector and more than 160 000 mobile health apps have reached the market (IMS, Institute for Healthcare Informatics, 2015).

One branch of digital health include mobile applications serving women in self-tracking their fertility cycles for contraceptive purposes. Contraception play an important role in most women's lives and The World Health Organization describe contraception as "essential to securing the well-being and autonomy of women" (WHO, 2016). Like many others, WHO describes contraception as a means of empowering women; enabling them to study, join the workforce and participate in public life. However, the impact of contraceptives on women's lives appears to be complex. Hormonal contraceptive use have been associated with depression diagnosis (Skovlund et. al. 2016) and the most commonly distributed contraceptive pill in Sweden was recently proved to relate to a significant decrease of general well-being, self-control and vitality (Zethraeus et al. 2017). A rising number of women have started to dispute the use of hormonal contraceptives and the interest for substance-free contraception through fertility tracking have increased (Freundl, Frank-Herrmann & Gnoth, 2010). Digital fertility trackers have been criticized for lacking support by clinical research (Frank-Herrmann et al. 2007), but the Swedish company Natural Cycles gained credibility in February 2017 having their method certified for contraceptive use (Natural Cycles, 2017a) after demonstrating reliability (Berglund Scherwitzl et al. 2016). Being the first application in the world certified as a contraceptive, this

can be considered a milestone for both digital health and contraception. Due to the novelty and recent certification of this phenomenon, little is known about its subjective meaning and impact on women's lives. As digitalization has been previously considered to empower consumers (Labrecque et al. 2013; Doherty and Ellis-Chadwick, 2010) and patients (Lupton, 2013a), we wish to understand how the digitalization of the contraception arena might empower women, transferring their contraceptive use to the digital domain.

1.2 Objective and research question

The objective of this study is to understand and analyze the meaning of a digital contraceptives in women's lives. This will be achieved by investigating users of Natural Cycles and focusing on individuals' experiences of acquisition and use. In order to fully grasp the process of this transition, we will in our study include the women's motivation of adopting Natural Cycles and experiences colouring their perceptions of use. Owing the novelty of the phenomenon and the questioned nature of contraceptives, Natural Cycles offers an unique opportunity to study empowering aspects of the digital health. The study could provide insights on institutional effects, as the company operates independent of the health care in addition to empowering experiences of use. We wish to address how women perceive their autonomy and self-care and doing so achieve our purpose of understanding impact on women of a digital contraceptive. Research on this phenomenon still remains essentially unexplored and with this study we aim to contribute to filling the research gap.

Research question:

How is the acquisition and use of a digital contraceptive empowering women?

1.3 Contraception 101

Contraception refers to a method intended to prevent pregnancy, a slightly wider term than contraceptive meaning any device or drug intended to prevent pregnancy (Cambridge Dictionary, 2017). A variety of hormonal and nonhormonal alternatives are available, of which a majority is targeted to women.

Hormonal contraceptives include contraceptive pills, vaginal ring and transdermal patch and contain estrogen and gestagen (1177 Vårdguiden, 2017). The pills are taken orally on a daily basis, the ring is inserted in the vagina monthly by the consumer and the patch is placed on the skin and changed weekly. Other gestagen-based alternatives are combined oral contraceptive, etonogestrel implant and hormonal coil. Both implants and coils are inserted and removed by a clinician; the implant is placed under the skin and changed every third year and the coil is inserted into the uterus and lasts for 3-5 years. Some hormonal contraceptives prevent a fertilized egg from implanting the uterus, while others prevent ovulation to occur. This affect the menstruation cycle, either by changing the length of the cycle, affecting blood volumes or prohibiting the period.

Nonhormonal alternatives available include the copper coil which creates a sperm aversive environment preventing sperms from reaching the egg. Similarly, barrier methods such as diaphragms and condoms prevent sperms from reaching the egg. The diaphragm is placed over the cervix by the user before sex, similarly to the condom. Sterilization is another hormone-free option which blocks the reproductive function, performed by a clinician. Natural family planning, a term including methods such as the temperature method and fertility monitors is based on adapting sexual practice to the days of the month which women are fertile which normally last four to five days (1177 Vårdguiden, 2017).

The effectiveness of contraceptives is indicated by the pearl index, showing how many of one hundred women that get pregnant during one year use of a certain contraception. Two types of pearl index exist; one assuming perfect use and the other acknowledge user errors such as using the contraception incorrectly. The contraceptive pill is an example of a method having low pearl index when used perfectly (0.3), but higher index when considering how it is used in reality (9) (MPA, 2014). Since contraceptives may lead to side effects, medical history should be considered when deciding method (1177 Vårdguiden, 2017).

In Sweden, 72% of all women between the age of 16 and 49 consume contraceptives and counseling is provided at most maternity and youth care centres (Kallner et al. 2015). To gain access to prescribed contraceptives, women must visit a gynecologist or midwife, with whom they typically discuss alternatives and then receive a prescription. Some contraceptives such as contraceptive pills, etonogestrel implant and coil are part of a national drug subsidize program and provided for free for all women younger than 21 (1177 Vårdguiden, 2017; eHälsomyndigheten, 2016). Additionally, some further subsidies are provided by local county councils, why price and selection vary locally (Kallner et al. 2015).

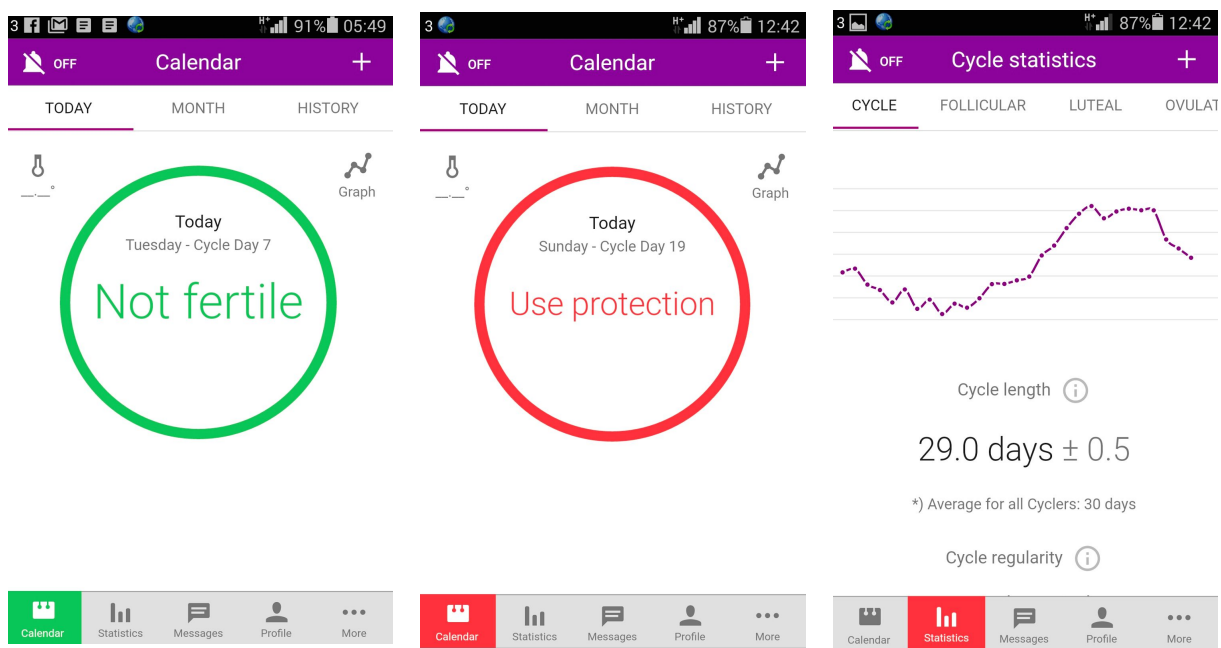
The Swedish Medical Products Agency, MPA, provides recommendations on contraceptive use and guidelines for councils working with contraception. The recommendations are substantially focused on women, which MPA explains depends on that no new contraception method for men has reached the market. According to the recommendations on contraceptive use, combined oral contraceptive should be the first choice for young women. Hormonal and copper coils could also be recommended if the woman has long-term intention of use. The last update of the recommendations was 2014 (MPA, 2014) and digital contraceptive is not mentioned in the list of contraception. However, natural family planning is listed as one method and rated with a pearl index of 24 (the pearl index of Natural Cycles is 7) (Berglund Scherwitzl et al. 2016).

1.4 Natural Cycles - the digital contraceptive

Natural Cycles is a digital contraceptive predicting fertility based on individual's body data, delivered to the consumer in form of an app and a thermometer. Natural Cycles is used by more than 200,000 women globally (May, 2017) of which two thirds use the app to prevent pregnancy (Natural Cycles 2017b; Natural Cycles, 2017c). The company describes their mission "to increase

contraceptive choice and empower women to take control of their fertility” (Natural Cycles, 2017d).

To use Natural Cycles, individuals register their daily basal temperature measured with their thermometer in the morning approximately at the same time (preferably at least five days a week), in addition to registering days of menstruation. In case of certain conditions measuring can not be done, such as when drinking the night before, sleeping less or more than usually, snoozing or leaving bed. Based on the individual's data, including date of period, temperature and cycle irregularities, a patented algorithm predicts fertility status (Natural Cycles, 2017d). Days likely of fertility are presented in red which inform couples of when to use protection or abstain from sex to avoid pregnancy. Green days on the other hand are fertility-free and users can engage in sex without protection. The number of red days declines as users add data continuously for a longer period of time (Berglund Scherwitzl et al. 2016). The app can also be used for fertility tracking and planning pregnancies, and according to company most suitable for women in committed long term relationships (Natural Cycles, 2017d).



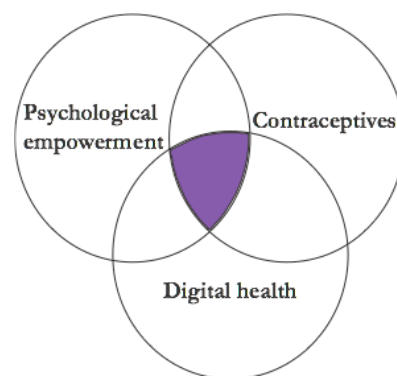
Application interface

Natural Cycles was launched in August 2014 (Natural Cycles, 2017d) and received a certification as a medical device intended to be used as contraception by the European inspection and certification organisation Tüv Süd in January 2017 (Natural Cycles, 2017b). In clinical research Natural Cycles has been measured to have a typical pearl index of 7.0, beating the contraceptive pills in preventing pregnancy which have an index of 9.0 (Berglund Scherwitzl et al. 2016, MPA 2014). In the case of Natural Cycles, most pregnancies were caused by not using protection during red days. Pregnancies caused by algorithm failure have been found to be 5 of 1000 (Berglund, Scherwitzl et al. 2016).

2. Previous research & theoretical framework

This chapter presents previous research and the theoretical framework used for analysing empirical findings.

Digital contraceptives is a novel concept, why previous research in this field remain sparse. We identify the phenomenon as a cross field of digital health and contraception, why our approach of understanding empowerment within this phenomenon will be take spring from these fields. We will investigate the phenomenon supported by empowerment theory, creating a framework as demonstrated in the figure below. Our analysis will build upon the experiences of the individual, adopting a psychological approach to empowerment.



Our area of research

2.1 Previous research

2.1.1 Contraceptives and empowerment

In academia, the relationship between contraceptive use and women's empowerment has been thoroughly researched, though mainly focusing on lower and middle-income countries and comparing users with non-users (Crissman, Adanu & Harlow, 2012; Do & Kurimoto, 2012; Hameed, 2014). Unanimous, these studies concluded contraceptive use to correlate with women's empowerment in general and were noticed to be interlinked with formal education, work and increasing wealth. However, contraceptive use does not affect all dimensions of women empowerment equally (Do & Kurimoto, 2012) and economical or socio-cultural benefits may not translate into empowerment on a psychological level, an aspect that has been found to correlate less with empowerment.

Despite more than 50 year of use, contraceptive effects on healthy women's well-being and sexuality have been sparsely researched in a wider context or with placebo-control (Sanders et al. 2001, Zethraeus et al. 2017). Although the research is claimed to still lack (Zethraeus et al. 2017), some studies have demonstrated hormonal contraceptives' negative impact on well-being. Zethraeus et al. (2017) discovered a significant decrease of general well-being, self-control,

libido and vitality by the most commonly distributed contraceptive pill in Sweden in a placebo-controlled study. Skovlund et. al. (2016) found correlations between use of antidepressants respectively clinical diagnosis of depression and a use of hormonal contraceptives when investigating more than 1 million women in Denmark. The association was notably strong in regards of younger women. Among women between 15-19 years the risk of depression was 80 % higher than among non-users, while the risk decreased to 20 % in the age of 25.

Additional to clinical research, psychologically wearing aspects of contraceptive use have been noted when investigating teenagers' perceptions and experiences of contraceptive use in a Swedish context. Ekstrand (2008) found that the women feared side effects from hormonal contraception, yet they experienced healthcare to not take them seriously and commonly failed to offer non-hormonal options. The women were also seen having the greater responsibility in pregnancy prevention. Ekstrand (2008) refers to the dilemma of having responsibility to prevent pregnancies, but limited freedom of contraceptive choice as "the illusion of power".

2.1.2 Digital health & empowerment

In health promotion an essential goal is to steer people to make healthy choices, and empowering patients to gain control has within healthcare become a core strategy (Koalen & Lindström, 2005). Digital health studies have found patients to feel more in control and confident when they believe they are gaining more knowledge about their bodies using self-monitoring devices (Lupton, 2013a). The possibility to gather information online and communicate with others in health related topics have further been found to create a sense of control (Korp, 2006). Recognition and support can also be gained through online communities.

The literature of empowerment and digitally involved patients have however been criticized for assuming a rational mind of individuals, failing to recognize the dependencies and ambivalence of being a patient of the healthcare (Lupton, 2013a). The use and meaning of health technologies have been identified as being varied and challenged, depending on the context and actors involved, oscillating between resistance and approval. The self-monitoring and self-care aspect of digital health have been discussed both in terms of empowerment and disempowerment and Lupton (2013a) argues that this is a transfer of the burden of responsibility from state to individual, whom willingly carry it to engage in their own health status. Distancing oneself from the healthcare allows for individuals to avoid restrictions and observance of institutions, yet the self-governing creates new demands for individuals to take responsibility to observe and act upon observations. This may be experienced as obligating, which is why engagement in digital health could be disempowering. If the knowledge drawn from their data reveals an unhealthy condition or contradict their own subjective idea of health it may also provoke anxiety and fear. Additionally, some appear to find digital health practices as inconvenient and uncomfortable (Lupton, 2013b). Yet, self-monitoring and self-care technologies are commonly viewed as a chance to achieve independence and control over one's body state.

2.2 Self-tracking

Self-tracking is considered to be a practice based on the interpretation of the body as a project requiring attention and care (Lupton, 2013a). It is considered a way to obtain previously unattainable knowledge which may be used to manage bodies with more efficiency (Smith & Vonthethoff, 2017). Collected data assists in developing capacities of the body to act, think and feel - to enhance the experience of living. Data is used to stay informed on the body and self, motivate and stimulate actions and construct social health narratives. The knowledge derived from data assist individuals looking to exert greater control over their lives (Smith & Vonthethoff, 2017), may it be improving the individual's situations, or exert control over a social context (Smith & Vonthethoff, 2017). Numerical data and statistic instil the perception of control over the unpredictability of the physical body.

Lupton (2013a) argues that health-related technologies influence how the body is interpreted and treated. She claims that an increased self-knowledge through self-tracking enable individuals to be more productive, healthier and more emotionally stable (Lupton, 2013b). Similarly, Smith & Vonthethoff (2017) explain how self-tracked data change how body processes are experienced and interpreted. Individuals understand, experience and inhabit their bodies in new ways by creating new relations between themselves and an objectified interpretation of their body. Conventional embodiment, health and illness concepts are re-defined. This is considered having both empowering and disempowering functions, since data may both enable or inhibit body and social relations. The statistical aspect of self-tracking enables the individual to produce hard, objective data, which is assumed to increase self-knowledge; the essential dimension in self-management (Lupton, 2013c).

According to Lupton (2013a), body data is believed to be a resort of objectiveness separated from distressing contingencies and uncertainties, therefore interpreted as a neutral and scientific receipt of body state. Assumed to be the best assessment, trusting data over physical experiences comes natural to individuals. Smith & Vonthethoff (2017) concur with this model, demonstrating how intuition is being replaced by data and directing health maintenance behaviour.

2.3 Empowerment

The empowerment term has been adopted in various fields in the academic sphere, such as health studies, information system studies and consumer research (Malone, 1999; Labrecque et al., 2013; Doherty & Ellis-Chadwick, 2010; Lupton, 2013a). People hold various and changing identities, why empowerment can be seen equally as a gender issue, a market issue and a health issue depending on the changing identities of individuals (Rowlands, 1997).

As the term has been used in numerous contexts it has been ascribed a variety of meanings and definitions. Rappaport (p. 122, 1987) however, defines empowerment as “a process, mechanism

by which individuals, organizations and communities gain mastery over their affairs". The empowerment construct has however been theorized both as a process and an outcome (Zimmerman, 1995). Empowering processes refers to how empowered outcomes are created, including created or given chances for individuals to influence their future and the decisions which impacts their lives. Zimmerman (2000) describes a process as empowering if it helps people develop skills so that they may independently solve problems and make decisions. It may be experiences teaching individuals how to achieve their goals, efforts to gain control and access to resources and gaining mastery over one's' life (Zimmerman, 1995). Empowered outcomes are one of the consequences of empowerment processes such as a sense of control and mastery, awareness of one's context and participatory behaviours (Zimmerman, 2000). Empowering processes may however lead to other outcomes than empowerment. Empowerment is a construct acting on an individual, an organizational and a community level, which all interact (Perkins & Zimmerman, 1995) and are both a cause and consequence of each other (Zimmerman, 2000).

2.3.1 Psychological empowerment

In this study we will focus on the individual level of analysis, adopting the construct of psychological empowerment originally stemming from community psychology research. The psychological empowerment construct relates to individuals gaining control over their lives, and contains processes and outcomes relating to perception of personal control, a proactive way of dealing with life and an awareness of the sociopolitical arena (Zimmerman, 1995). Zimmerman (1995) explains psychological empowerment as a concept holding intrapersonal, interactional and behavioural components. In this thesis we adopt this concept, considering empowerment not as a fixed and simplistic, but rather as dynamic taking various compositions.

The *intrapersonal* component refers to how individuals perceive themselves capable of influencing outcomes, such as reaching a goal or changing an unwanted situation (Zimmerman, 2000). This perception relates to competence, control, self-efficacy and motivation to control. Emergence in any of these aspects results in both personal well-being and psychological empowerment (Koelen & Lindström, 2005; Zimmerman, 1995). Competence describes how well individuals believe they will be able to perform a task (Li, 2016). Perceived control has been measured by e.g. locus of control (Zimmerman, 1995), being a person's generalised expectations about whether an outcome is controlled by the own behaviour (internal locus of control) or external forces (external locus of control) (Koelen & Lindström, 2005; Zimmerman, 2000). Perceived self-efficacy refer to people's belief about their capacity to achieve certain results in a specific domain (Zimmerman, 1995). These beliefs determine how the individual think, feel, behave and motivate oneself (Bandura, 1986). Individuals feel better about themselves when becoming psychologically empowered, and increased sense of self-acceptance, self-respect and self-esteem are results when a person re-define herself through the empowering process (Staples, 1990). People tend to make choices based on adaptive preferences, meaning they they steer their actions according to perceived opportunities, which is why interpersonal empowerment is

important for behavioural empowerment. Previous research has found feelings of social isolation, powerlessness, normlessness, helplessness and sense of lost control over one's' life to work disempowering in the intrapersonal domain (Zimmerman & Rappaport, 1988; Rappaport, 1984).

The *interactional* component cover people's sensemaking of their social environment and how they use analytical skills to influence their context (Zimmerman, 2000). For individuals to engage in empowering processes, they must understand and learn about their options and the factors influencing their ability to practice control in their environment, including norms and values. It is about developing a critical awareness, not only about the environment but also about agents with authoritative power and factors influencing them, such as people, resources or events (Zimmerman, 2000). Zimmerman (1995) further elaborates on how development of skills that assist individual in becoming independent and exert control over their lives are also included, such as decision-making and leadership. Development may happen in a context where individuals have the chance to stay involved in decision making or in restricted settings where participation is impossible. The interactional element can be seen as a bridge between the interpersonal and the behavioural.

The *behavioural* component cover participatory behaviour - engaging in community organizations or activities in order to exert control. The behavioural component comprises individuals being highly affected by their social environment and interaction with others such as social networks, institutions and communities. Communities affect individuals by shaping and providing access to social, political and economic assets. These resources develop the individual's intrapersonal and interactional sources of empowerment. Hence, individual empowerment is interrelated with community empowerment (Schultz et al. 1995) and behavioural empowerment may stimulate other domains.

An empowered individual may hold one or multiple of these three components (Li, 2015; Speer, 2000). A person may have an intellectual understanding of power and methods required to change, but lack perception of efficacy to take action. Likewise, someone might feel empowered, but miss an understanding on how to act in order to create change. When empowered on all three levels, individuals believe to have the capability to influence their situation, understand the system of their context and act in ways to exert control (Zimmerman, 1995).

Zimmerman (1995) describes how psychological empowerment is manifested in various forms depending on the individual and context. Different people require different perceptions, skills and actions to feel empowered, and different contexts set unique conditions on what is needed to become empowered. While certain individuals might develop psychological empowerment through attempts to exert control, others feel empowered simply by the access to means of exercising control over their environment. Personal empowerment also vary across life domains such as work, family and health, and individuals may experience empowerment in one domain but lack it in another. It may also vary over time, why individuals can experience empowering

and disempowering processes, and become empowered or disempowered. Changing contexts of empowerment lead to changed perceptions of what empowerment is.

Psychological empowerment relates to power, which may suggest ultimate authority (Zimmerman, 1995). Within the concept of psychological empowerment, individuals can be psychologically empowered but still lack the authority to realize their goals. Thus, there is a distinction between feeling empowered and having authoritative power. The individual may perceive himself having a sense of strong intrapersonal, interactional and behavioral components but in reality lack the institutional context to act upon it.

2.4 Application of theoretical framework

To understand the experiences of our research subjects, we intend to apply the theories above. By applying a psychological empowerment framework, we will highlight the experiences of the individual. As we wished to investigate impact of a digital contraceptive on a psychological level, this framework was found suitable. Zimmerman's work (1995, 2000) acknowledges not only intrinsic factors but also the context as perceived by the individual in addition to action. Originating in community and sociopolitical topics, it may be extra relevant compared to management perspectives on psychological empowerment as contraception in many ways is a political topic. As empowerment theory focuses on both outcomes and how goals are achieved, the theory is applicable to the qualitative approach of the study. Using the concept of psychological empowerment we aim to identify empowering processes and outcomes of women's transition to and use of Natural Cycles on an individual level. Here, we will contribute with examples of how psychological empowerment may present itself within digital health, as well as identify the impact of acquirement and use.

In addition, notions stemming from perspective on digital health and self-tracking will be used as a framework to consider consequences of self-tracking, assuming that users mutually give their digital means meaning when integrated in everyday life in addition to being granted meaning. This focus on individuals and their relationship to the self will provide complementary insights on how technology interrelates with empowerment on an individual level. This will produce explanations of how a digital means may empower consumers through use.

A marketization of public services and increased patient engagement has resulted in a greater emphasis of patients as consumers (Mold, 2010; Lupton, 2013a). In this study, we define a patient as "*a person receiving or registered to receive medical treatment*" and a consumer simply as "*a person consuming*". Hence, women using conventional contraceptives are within this thesis considered as patients to accentuate their tie to the healthcare. These definitions also indicate that by changing to Natural Cycles the women lets go of their patient status in the contraceptive domain and becomes solely consumers. Besides from being consumers in the marketplace, we believe they consume contraceptives within their space of being a woman, which is why we will refer to our study subjects as women more often than consumers.

3. Methodology

This chapter presents and motivates choices of methodology made during the research process.

3.1 Qualitative research

Considering the aim of this study to understand women's perceptions of their transfer and use of a digital contraceptive, we agreed on qualitative research to be the most appropriate. Qualitative research is interpretive, meaning it aims to understand the world through the participants' interpretations and the researcher aims to reach understanding, explanation and make connections (Bryman & Bell, 2013). The researcher also develops a closer relationship and understanding of the research subjects, something we believed to be necessary to investigate our research question, as it requires a nuanced understanding and operates in a private domain of the research subject's lives.

Furthermore, as we were about to study a new and sparsely explored phenomenon we sought a flexible research process. A qualitative approach is commonly more flexible than a quantitative, as interviews, transcription and analysis of the material often occur interspersed. This process enables a greater adaptation of the research design to the field (Ahrne & Svensson, 2011) and by being receptive to what the subjects emphasize the research direction may be adjusted.

3.2 Inductive reasoning

Following our desire to achieve a flexible research process, we decided on an inductive approach to stay open to what we would encounter as the study progressed. Therefore, this study was commenced without particular hypotheses, which assisted us in avoiding preconceptions (Bryman & Bell 2013). We intentionally began with a wide research area to be receptacle for whatever subjective meaning that might emerge from data. However, the interview questions were partly inspired by the Theory of planned behaviour as it aims to explain various psychological factors of behaviour. While collecting and processing data we reflected on what our interviewees emphasized, which enabled us to narrow our research area as the study proceeded and settle with theoretical framework and research question .

3.3 Data collection

3.3.1 Interviews

Interviews have the potential to register language, norms and emotions of interviewees (Ahrne & Svensson, 2011). The possibility to collect detailed data led to settling with an interview-based study, as we found it appropriate considering the complexity of the topic explored (Bryman & Bell 2013). We considered a semi-structured format preferable, as its flexible nature would enable

us to create a more relaxed atmosphere, suiting the private nature of the themes to be investigated. The interviewer may also ask follow-up question or rephrase them according to the participant (Bryman & Bell 2013), which allows for deeper investigation. The interviewees may also respond with own words, which opened up for a potential word analysis.

All interviews but one took place at private group rooms at the University of Gothenburg. According to Crang and Cook (2007), conducting interviews in neutral locations have two main benefits. Firstly, neutral ground enable both interviewer and interviewee to relax more in each other's company. Secondly, locations other than workplace and home may stimulate references to different aspects of identity and attitude. As one interview by suggestion of the interviewee took place in Stockholm in a private room at her workplace, it may have influenced data. While acknowledging it as a methodological flaw, we decided on accepting the interview conditions due to a lack of participants.

To test our interviews questions we conducted a pilot interview which we later decided to include in our study. The decision to do so was motivated by the fact that we had followed the same principles as for the following interviews; neutral location, neutral interviewer and semi-structured interview format. The questions used in the other interviews were also the same, the only difference being we were able to ask the questions in a more relaxed manner and change the order according to the direction of the conversation as we became more experienced.

The length of each interview was approximately one hour, as it has been found to be long enough to establish rapport and cover several issues, while short enough be pleasant for interviewees (Crang & Cook, 2007). Due to a limit of time and access to participants the interviews could not be held on the same time of the day. To be able to analyse how the interviewees talked about their experiences we decided to record the conversations (Crang & Cook, 2007) using two smartphones. After one of the interviews one interviewee shared more information when the recorder was turned off. To collect this information, we immediately made complementing notes to include the material in our findings which our interviewee agreed with. When interviewing participants none of us had relation to, we both participated; one of use functioning as the interviewer asking most questions while the other took the role of an observer, sometimes complementing with supplementary questions.

3.3.2 Sampling

We conducted a homogeneous purposive sampling in order to find participants within the timeframe of the study and to strategically select the sample rather than randomly. Due to the purposive sampling, no generalizations can be made (Bryman & Bell, 2013). However, as generalizations were not the purpose of this study and we knew that we would collect subjective experiences, this was not considered an issue.

The final participant selection criterias included gender and an active use of Natural Cycles. We originally sought to study a group as homogeneous as possible in order to diminish different influencing external factors. Therefore, the aspiration was to interview women with approximately the same academic background, age, socioeconomic status and living in the same neighborhood. We also aimed to interview women following the average user of Natural Cycles, being 25-29 years old, in a relationship and with a university degree (Natural Cycles, 2017a). However, we soon discovered some of these criteria to be an unattainable utopia, as we troubled to find enough participants. Therefore we altered the selection criteria to solely cover gender and current use.

To find interviewees we reached out to our social networks, both in real life and on Facebook. We joined Natural Cycles' private Facebook group where we advertised for interviewees in the group feed. As we were struggling to find enough participants in Gothenburg, we also reached out to some who had made public posts on the public Natural Cycles group on Facebook. Before inviting the women to interviews we sent out an online form to collect details about their age, purpose of use, time of use, occupation and level of academic studies. Through the form we could confirm that our interviewees fitted our selection criterias and then schedule an interview. According to Ahrne & Svensson (2011), 10-15 interviews is required in most studies to achieve a representative result. Our ambition was to interview between 8-10 women considering the time frame of the study, but we decided to keep the number fluid if we would reach data saturation. After our seventh interview, we debated whether to keep going as the answers were somehow repetitive, but concluded to do so as it is hard to estimate where the saturation level truly is (Ahrne & Svensson, 2011). In total we interviewed nine women and concluded to be satisfied with the data saturation level. As we struggled to find Natural Cycles users within our geographical area and timeframe, we accepted three interviewees who were acquainted with one of us. These interviews were conducted by the one of us who was not familiar with the interviewee. Eight of the women were inhabitants of Gothenburg, and one was living in Stockholm. Eight of the users were at the time of the interviews using Natural Cycles as a contraceptive. One of the women was currently using Natural Cycles to monitor her pregnancy, but we decided to include her in our sample as she had previously used the app as a contraceptive.

Interviewee	Age	Time of use
Sara	30	24 months
Lisa	28	18 months
Anna	26	18 months
Frida	24	7 months
Petra	23	5 months
Carolina	32	4 months
Louise	28	2-3 months
Sandra	27	1 month
Kajsa	23	3 weeks

Interviewees

3.4 Data management

3.4.1 Transcription

Each interview was transcribed within 48 hours after its occurrence. The transcriptions were made using the web application oTranscribe, which was considered a viable as the transcription is stored locally in the browser's cache rather than uploaded. The interviews were transcribed word by word capturing most colloquial expressions. The interviews were held in Swedish and transcribed in original language. When quoting the women in this thesis we have translated their quotes to English as accurately as possible to avoid misrepresenting interpretations.

3.4.2 Coding

To analyze the collected data we decided to code the material by identifying themes, examining how they correlate to each other and thereafter decide what themes to analyze through the theoretical framework (Crang & Cook 2007). Before the coding process we read the interview transcripts multiple times to get a sense of the content and note major themes. To organize the coding we used NVivo, a qualitative data analysis software. By building classes with subcategories in NVivo we were able to shift the level of analysis from individual descriptions to global themes when considering how different statements interrelated (Crang & Cook 2007). When linking relevant segments with comparable cases themes began to emerge. We also conducted word count analysis and produced word trees using NVivo to further explore what the most significant themes were. Through the process we reordered, reconstructed and reconsidered the data several times before deciding on the themes presented in this thesis. This

flexible method of coding enabled the analysis to be nuanced and detailed, suiting our desire to grasp meanings of the women's contraceptive consumption.

To compare and acknowledge differences in our interpretations, both of us coded each interview separately. After individual assessment and classification of the first interview, we merged our codes in NVivo to compare, discuss and reorder some of the codes. To increase the internal reliability of the results and make sure we made the same interpretations (Bryman & Bell, 2013), we defined a set of codes and guidelines of how to use them for the following interviews. However, when either of us discovered a new theme, it was briefed with the other and added to the coding manual.

We coded each interview shortly after transcription, meaning the analysis of the material was an ongoing process. Since the results emerged from this analysis process, we decided to present the empirical data interwoven with analysis through the lens of psychological empowerment theory.

3.5 Ethics

Considering the private nature of our topic we took extra care to reflect on potential ethical issues. Before the interviews we considered the ethical guidelines presented by Bryman and Bell (2013), taking extra care to consider the four ethical requirements recommended. The first guideline concerns prerequisite information. Before the interviews commenced we informed the women orally about the nature of the study and presented them with an information sheet covering purpose, background and methods of the study, in addition to data management.

The second ethical requirement concerns consent, which we considered by informing the women that their participation were voluntary and the option to quit at any time and all interviewees signed a document of informed consent. The third ethical aspect we considered was confidentiality and anonymity. We informed the participants that we will handle the material confidentiality and unidentify all personal data. To ensure the women's anonymity, we have replaced their real names with pseudonyms. Following the last ethical guideline, we will only use collected data for the research purpose which all participants agreed upon.

3.6 Limitations

Considering the nature of the study, being based on individuals' subjective perception of the world, generalizations are difficult to make (Ahrne & Svensson, 2011). Therefore, we do not claim to make any generalizations based on our results. We acknowledge that the information gathered only can reflect the experiences of the participants and their perception of the world, expressed during one particular meeting. There may be aspects the interviewees remembered falsely. The questions asked may also have been misinterpreted, which is why we made an effort to follow up with explanations if the interviewees seemed confused and noted when answers related to other topics. A flaw of interviews is to validate whether the statements are true, if

interviewees truly think and behave as claimed (Ahrne & Svensson, 2011). Apart from trying to interpret what the women said, we aimed to be receptive of what was not expressed. During the interview process we also became better at follow-up questions, asking interviewees to elaborate and exemplify statements. Hence, we sometimes discovered that participants in practice not always followed behaviours as claimed, something we later took into account when processing the data.

Qualitative research has also been criticized of having a subjective nature, influenced by biases of the researcher (Bryman & Bell, 2013). We acknowledge a risk of interpreting meaning different from the subject's intention, influencing coding and analysis (Ahrne & Svensson, 2011). With this in mind we strived to stay as neutral as possible during the whole process. We did not always agree with opinions and statements of our interviewees, nevertheless everything was taken into consideration in order to reach an understanding for the phenomenon.

When beginning this research project none of us used Natural Cycles and were only briefly familiar with the app. However, during this journey both of us decided to start using Natural Cycles. Our personal involvement may be considered a limitation and a contamination of an objective mind. However, we have strived to present the data as objective as possible, even though being aware objectivity is unachievable (Bryman & Bell, 2013). We also started using Natural Cycles after the coding process was finished, why the interpretation of the interviews may have been less biased by our private use.

3.7 Credibility

This study was conducted independent of Natural Cycles. We contacted the company to collect details on the average user, which they provided and gave consent to publicize in this thesis. Maja met briefly with one of the two founders at the company office in the later part of the study. Although striving to maintain an objective mind, this could have resulted in a bias.

Being aware of mentioned limitations, we have aimed to conduct this study according to good practice. As we applied a qualitative method and an inductive approach, validity and reliability must be valued differently compared to when conducting quantitative research. However, by interviewing a range of individuals with varying relation to Natural Cycles, and coding the material independently we sought to increase validity. However, we do not aim to generalize our findings. Additionally, by providing a detailed description of the data collection and processing and being transparent about choices made throughout the process, we have sought to achieve credibility.

4. A digital contraceptive

This chapter presents empirical findings interwoven with analysis. The findings are divided into the main themes which emerged during the coding process; *Body control*, *Self-knowledge*, *Contraceptive institutions* and *The social contraceptive*. All four themes relate to outcomes of shifting to and using Natural Cycles. Contraceptive institutions and The social contraceptive demonstrate how the change of context was perceived, whereas Self-knowledge and Body control treat changes on an individual level. After presenting and analysing the four themes separately, we analyse their relation.

Themes	Subthemes
Body control	<ul style="list-style-type: none"> · A natural body · Trusting a contraceptive · Self-management
Contraceptive institutions	<ul style="list-style-type: none"> · Lacking selection · Healthcare influence
Self-knowledge	<ul style="list-style-type: none"> · The female body · The real me · My health status
The social contraceptive	<ul style="list-style-type: none"> · New community · Shared responsibility

Overview of themes and sub-themes

4.1 Body control

The first theme relates to how for some women perceptions of lacking control over their bodies and situation when using conventional contraceptives motivated the shift to Natural Cycles. This theme also covers how the shift to a digital contraceptive with increased self-management and absence of substances was experienced. Three subthemes were identified within Body control: *A natural body*, *Trusting a contraceptive* and *Self-management*. A natural body and Self-management both relate to the Trusting a contraceptive theme, as the appreciation of these two were grounded in a mistrust of contraceptives. A natural body and Self-management also mutually illustrate a feeling of being restrained by conventional contraceptives.

4.1.1 A natural body

Several of the women described feeling a lack of control over their bodies when using substance-based contraceptives, being recipients of side-effects and reactions they could not control. The severity of side effects experienced varied, but all interviewees but one had experienced some influence on their health. Physical side effects covered reactions such as migraine, vomiting up pills and vaginal infection, which affected both physical and psychological well-being. Sandra who suffered from infection, talked about how she during her teenage years felt ashamed and found herself disgusting, not wanting to discuss the matter with her family and quit dating. Psychological reactions among the women also included decreased sex drive, a spectrum of feelings related to depression and a fluctuating temper.

Kajsa: I have a lot of mood swings normally, which means I get really happy and really sad. But then [with contraceptive pills] I would never get really happy... And I felt like that's not really a fun life to live.

The women more prominently disempowered by physical reactions and suffering from side effects iterated their self-evaluation, like Kajsa considering herself unable to live a fun life and Sandra starting to find herself disgusting. The impact on how they perceived themselves and their ability to live their lives fully can be described as a disempowerment, having their perception of themselves degraded (Zimmerman, 1995). Frida similarly suffered from side effects, experiencing a severe depression due to consumption of progestogen-only pills.

Frida: I've been really depressed... I had a transdermal patch as a teenager, but they forgot to ask me if I suffer from migraine so when I went to get a new prescription they told me "Take it off immediately, you might get a stroke!". I was 16 when they told me, so I took it off and got progestogen-only pills instead and they made me severely depressed. It was really bad... I don't remember those 6 months of my life.... It's a blackout.

The experience of Frida, having a six month blackout also falls in line with what Rappaport (1984) describes as disempowerment; the sense of lost control over one's life. The women dealing with physical pain and psychological side effects described how these pains permeated their life and expressed a sense of powerlessness over one's health. The feeling of lacking control among the women struggling with side effects, confirms how they were in a disempowering situation (Zimmerman, 1995).

Shifting to Natural Cycles brought the women a greater sense of influence over their bodies. Not having to insert a device in their bodies was talked in terms of freedom and control. Petra described how she developed a capability to help her exert control over her fertility in a new way; learning how to adjust sexual behaviour to her fertility cycle and praised not having to use anything invasive. Participants who had struggled with harsh side effects from hormonal contraceptives particularly emphasized their newly found control. The knowledge that no substance was going into their system and that they would not be affected by physical reactions made them feel in free and in control of their bodies and health.

Anna: It feels like I'm taking back the control over myself. That's it. What does it mean to me? It also means that I'm living a little bit cleaner, one thing less I'm putting into my body to process... and I guess that feels good.

Anna's expression indicates how she perceives her new contraceptive use as an act of empowerment, even though she only had experienced minor side effects. Being natural was by many referred to as having an intrinsic value, and becoming so was creating a sense of empowerment through control (Zimmerman, 1995).

4.1.2 Trusting a contraceptive

Another aspect which women frequently returned to when mentioning body control was trust. Several interviewees expressed concerns about the contraceptives they had previously encountered, with worries concerning their medical nature. These included doubts about whether they actually worked, long term side effects and confusion regarding what substances they actually contained. Some interviewees distrusted even well-established alternatives such as the contraceptive pill, and two explicitly described that they had distrusted all contraceptives. These worries confirm previous research (Ekstrand, 2008) on hormonal contraceptives.

Sara: When you take a pill every day.... You don't really get a confirmation that it works. Of course you don't get pregnant month after month, but the only receipt you'll get that it works is that...

Sara's expression indicates that a confirmation of effectiveness is crucial to earn her trust. She can control the act of taking her pill, but she lacks feedback confirming that her action leads to desired outcomes. Although she has the cognitive understanding that her contraceptive pills should work, she still feels out of control and mistrust them, examples of disempowerment (Zimmerman, 1995; Zimmerman, 2000)

Although mistrust had encouraged the women to try Natural Cycles, a new source of worry presented itself using a digital contraceptive. All women but one expressed that they at some point had experienced doubt - some found it hard to trust the technology and that the algorithm actually worked, while others were struggling with the fact that it was not an invasive process. Some hesitated to fully trust the app and engage in unprotected sex during green days. They used additional methods such as condom and diaphragm as strategies to feel safer. This demonstrate the ambivalent relationship consumers have with health technologies (Lupton, 2013a), resisting its effectiveness yet adopting the idea that it might work. Some women had initial doubts which they had overcome as they were using the app, noticing its accurate predictions. Frida described how the confirmation the app would provide her about the events in her cycle made her trust the data, even if she did not feel related symptoms. The long-term user Sara had developed a relationship to the app where she struggled with contradicting its recommendations.

Sara: I can feel it, I know that it's one and a half week until my ovulation. So it's completely safe (to have unprotected sex), but the app doesn't say so. In those situations, I don't really feel comfortable with taking that decision myself. You'd get so fed up if you actually got pregnant.

Sara, who did not want to take actions that contradicted the app's recommendations demonstrates how her data is perceived as a superior judge of her body state. Even though she acknowledge her own sensations, her behaviour is directed by the data, confirming previous assumptions regarding how self-tracked data is assigned superiority (Lupton, 2013a; Smith & Vonthethoff, 2017). While developing a sense of perceived control and trust, she reconsidered her authority and own competence. Competence, as in how well she believes she can perform a task (Li, 2016) and being an example of intrapersonal empowerment (Zimmerman, 1995), was re-evaluated. The case of Sara is an example of how an effort to gain more control, being an empowering process (Zimmerman, 1995) not necessarily leads to an exclusively empowering outcome; but here an inner struggle whether to trust the intuition from within or the data.

4.1.3 Self-management

Using conventional contraceptives, some women felt bound to follow certain behaviours in order to secure fertility control and avoid side effects. Although the requirement of measuring ones' temperature and the restriction of having to measure approximately the same time five days a week, Natural Cycles was still talked about in terms of freedom when compared to other alternatives. Being able to choose when to measure or not was emphasized as a major benefit of the app, and the flexibility of use was experienced as liberating.

Anna: It's not like with the pills, when there's a must that I have to take a pill every day and could never forget about it. Because if I forget about it, I'll be punished.

Kajsa: In some way it feels like a greater freedom to miss out on measuring a value. (...) The pill is a no-no to miss.

Anna and Kajsa describe their use of Natural Cycles as more permissive and thereby easier to manage, whereas their previous contraceptives threatened them with "punishments" and they felt bound to follow certain behaviours. When Kajsa claims she now has greater freedom she can be considered more comfortable and confident with her self-efficacy, as she know the conditions now to be looser. Another aspect the women labelled as freedom, was the possibility to instantly stop using their contraceptive with a tap on their smartphone. Most participants contrasted their current flexibility of use to previous contraceptives where they had less opportunities to sculpt their use according to needs. They appreciated the possibility to be able to handle it as they wished, without suffering from side effects.

Sandra: You really do have the power. If you really want to get pregnant it's a tap away and then you're in control.

Sandra's experience of being more involved in the fertility control process increased her self-efficacy and sense of control of their fertility. She exemplifies Bandura's (1986) argument that beliefs of one's self-efficacy determine how the individual feel and think, as well as the self-tracking research demonstrating how individuals feel more confident and in control when self-monitoring their bodies (Lupton, 2013a).

However, being in control of one's body and fertility also means having a greater responsibility, which some considered to be a burden, agreeing to how Lupton (2013a) describes the responsibility of self-tracking. Some of the women had initially experienced stress due to the fact that they had to keep track of measuring, but eventually resonated with the knowledge that the only harm less measuring provokes is fewer green days.

Kajsa: After all, it's about measuring your temperature on a regular basis. So I think that's what mainly took some time, it didn't really feel like I was gonna make it work. I know I'm pretty puzzle-headed as well, I will forget.

Lisa: No one else is checking it, it's me that has to check if it's green or not. If you're on the pill you trust the pills, you trust the condoms, you trust someone else who brought something they claim to be 100% safe. Now it's me that has to add the data to the app and it has to work in the right way, that's what does the trick. When it gets down to it, I have to trust myself.

The shift from a substance-based solution to an algorithm-based one is an increase of internal forces influencing control. Therefore, although gaining the ability to follow and act upon the state of their body, some women still felt a lack of control as they had to trust their own capabilities. This confirm Lupton's (2013a) arguments of how self-tracking can be an ambiguous experience - empowering yet disempowering. Some participants expressed worries regarding correct use, as the rules for when to measure or not when drinking, feeling sick or not getting enough sleep are blurry. The women demonstrated a spectrum of locus of control - some being more confident in how they would treat this responsibility and feeling more in control than others. Most interviewees were more or less comfortable with the responsibility. Some mentioned that they trusted themselves, but might not would have trusted a younger version of themselves with less self-control. The women who had used Natural Cycles for a longer time had developed the skills they needed to keep track of measuring and handling the app guidelines and felt more secure, gaining a greater confidence the more they used the app. Therefore, the use was for most women a process of overcoming these worries and the shift to Natural Cycles in itself cannot be described as solely an empowering outcome. Rather, the consumption can be seen as an empowering process during which the women developed a perception of control, or intrapersonal empowerment as labelled by Zimmerman (1995). The fact that many had developed trust and a sense of control throughout their use confirms the assumption of Zimmerman (1995); direct efforts to exert control also helps to develop a sense of control.

In sum, the theme of Body Control demonstrates how the lack of control over their bodies and situation when consuming conventional contraceptives motivated the women to try Natural

Cycles and contributed to their feelings of empowerment when using Natural Cycles. All three subthemes points out sources of previous disempowerment; for some the concept of medical contraceptives in itself was a source of mistrust and lacking control, for others it was the actual influence on their body functioning. Some felt limited due to restrictions to follow certain behaviours. They all sacrificed a perceived control over health and well-being to master their fertility. Yet, some did not appear to feel in control over their fertility despite the effort.

Naturally, the increased sense of control over their bodies the women gained through their use of Natural Cycles can be confirmed as intrapersonal empowerment, following the definition of Zimmerman (1995). This empowerment seemed to trickle down to multiple domains, as the women expressed feelings of control relating to both their health, bodies and lives. This confirms previous research of how self-tracking assists consumers in improving their life situation and is used to gain a sense of control (Lupton, 2013a). Further, the fact that the self-tracking and use of Natural Cycles was a process of developing trust and a sense of control demonstrates how digital health is an ambiguous process of empowerment and not rational in use, as Lupton, (2013a) suggests.

4.2 Contraceptive institutions

The second theme that emerged from the interviews relates to contraceptive institutions, being visible and invisible structures of contraceptive selection and distribution such as social norms, state regulations and healthcare practices. Two sub-themes were identified; *Lacking selection* and *Healthcare influence*, both including critique towards institutions limiting agency.

4.2.1 Lacking selection

The selection of contraceptives made some of the women feel like they were “between a rock and a hard thing”, mainly referring to the lack of hormone-free options. Some had tried non-hormonal alternatives available but found them inconvenient. Frida had successfully tried condoms and diaphragm, yet she experienced the use of them as a hassle. Some questioned the extent of measure they had to take to control their fertility. Slow drug development processes, state regulations and patriarchal structures was mentioned as reasons for the poor selection.

Sandra: I think it's a shame that there's so much hormones today and that it's basically the only alternative.

Interviewer: What do you think about that, the fact that there's not that many options?

Sandra: I think it's really sad. I've tried to insert a copper coil, that's the only option you have really.

That or using a condom, you don't have that many other choices and copper coil doesn't work at all for me. I've tried, I've had three different nurses and two doctors trying to insert it and it doesn't work, my uterine won't open so if I'm gonna insert a copper coil I have to get anaesthetic. It's outpatient surgery and I have a medical referral, but I feel like, how far should you take it?

Sandra repeatedly took action intending to secure fertility control, but failing to do so she lost her motivation to reach her goal and quit taking action. She illustrates how inconveniences of contraceptives negatively influence motivation self-efficacy and competence, hence disempowering its user (Zimmerman, 1995). Her critique reveals an awareness of her institutional context, demonstrating a state of interactional empowerment (Zimmerman, 1995) while the powerlessness of being in the hands of the system disempowered her intrapersonally. Sandra exemplifies how the women were to a great extent depending on structures of contraceptives, and how the demands these institutions placed upon her created discomfort. She was required to go through surgery, an effort she was not fully comfortable with and had to balance her desire to achieve fertility control with her sense of integrity. The women's stories relate to what Ekstrand (p. 42, 2008) refers to as "The illusion of power" - being given the responsibility to prevent pregnancies but have a limited freedom of contraceptive choice. What at first sight could be perceived as empowering, the ability to control fertility, is for these women rather disempowering in its practice. This explains how Natural Cycles was perceived as a key of regaining control over one's' situation, enhancing the experience of empowerment.

4.2.2 Healthcare influence

A resistance towards the healthcare was also included in the appreciation of Natural Cycles. The interviews revealed that the healthcare played a major part in many of the women's experiences with contraceptives. Some women expressed how they felt dependent on the healthcare, as the selection was limited and their relation complicated. Contraceptive consultation was described as restraining.

Anna: When you're sitting there, with the midwife and you're going to discuss the best option, it's actually the midwife and what she thinks is best for me that will determine what I'm going to get.

Petra: As an individual going to a gynaecologist or midwife you're in the hands of the information given by the midwife. If you don't get information about all your options, you won't know what your options are.

The women paints a picture of feeling dependent on their midwife and lacking participation in decision-making, demonstrating disempowerment trademarks as powerlessness, as defined by Zimmerman (1995) and Zimmerman & Rappaport (1987). Several women had turned to the healthcare to discuss alternatives to hormonal contraceptives. They experienced a variation in practitioner competence, and resonated that some professionals seemed to be more up to be more knowledgeable and up to date with alternatives than others. Most women described how the healthcare could not provide options that satisfied their needs. They mentioned feelings of being dejected and powerless as their dependency limited their choices.

Sara: I went to the gynaecologist when I was 18-19 and said I didn't want hormones because I don't feel good when taking them. And then she said, "Then there's no options." And I'm thinking "What?". "There's no other options." So I said I wanted to get sterilized, "No, you can't do that before

*you're 35.' And I'm like, 'But then you have to help me with something else!' 'No, there's nothing.'
Such an useless reply!*

The situation of Sara being denied sterilization, illustrates how perceived ability to reach her goals is affected by formal structures and environmental forces, which she understands and criticises. Several women had changed their personal beliefs and started to question the contraceptive practices of the healthcare when they did not receive the support they needed. Their critique related to a motivation to find options that met their needs and a sense of being let down by the system. This evaluation of their context demonstrates a link between interactional and intrapersonal empowerment - an understanding and negative evaluation of the norms and rules in their context decreased their sense of control.

While some had developed a critical awareness as defined by Zimmerman (1995) and struggled for years to find alternative contraceptive options, others had by routine continued with their original choice of method. Yet, some women talked about their contraception debut as if the choice was not their own. Some considered their choice to be influenced by monetary interests. Sandra described herself as a victim of these circumstances;

Sandra: If you look at the region Västra Götaland where I'm from, everyone got the same contraceptive. It was the cheapest one on the market. I had a lot of complications and I know others who got other sorts of problems too. I feel like it ruined a big part of my youth.

The experience of Sandra, having her “youth ruined” demonstrates helplessness and a feeling of losing control over her life, which according to Rappaport (1984) are components of disempowerment. Following the theory of Zimmerman (1995), this could be a case of intrapersonal disempowerment, as it relates to how the women perceived themselves. Reflecting over her situation, she expresses disappointment of how the system works. Another set of critique that was expressed during the interviews concerned recommendations some interviewees had received as teenagers to use contraceptive pills to treat menstrual pain. They were now disputed whether women are prescribed contraception pills at an appropriate and if hormones really treat menstrual pain. Lisa was one of the women who had started with contraceptive pills due to menstrual pain and was now critical to how they were handled by the midwife.

Lisa: It's absolutely insane; what did they think? (...) To treat pain with hormonal contraception; in my mind that's crazy. Should you stuff teenage girls with hormones so they won't have menstrual pain? No, that's insane. There's other things that can help in those cases; there are better options than the pills. So no, I don't think it should be the first hand choice.

When questioning a normalization of hormonal contraceptive and thereby their social environment, the women changed their personal beliefs. According to Zimmerman (1995), this cognitive understanding enables empowering decision-making and the ability to envision alternatives. Lisa exemplifies this as her insight and dissatisfaction being a bridge to take action to adopt another option, despite her doubts about Natural Cycles. The critique of how

contraceptives are handled demonstrates a discontent, yet awareness of forces influencing such as economy, norms and education. This aligns with the idea of Zimmerman (1995) regarding interactional empowerment, interpreted as an understanding of their sociopolitical context and an awareness of the factors influencing their ability to practice control.

None of the women had discovered Natural Cycles through the healthcare. Instead it was the recommendation of friends and marketing communication that had reached them. Lisa was one of few interviewees who consulted a healthcare professional before trying Natural Cycles.

Lisa. She certainly didn't know what Natural Cycles was, so I had to explain it to her. And then I thought that as a doctor she should know that the temperature curve varies during the cycle. I thought she should know that, but no she didn't! She didn't tell me she knew at least. She patronized all of it and said it shouldn't be used.

She portrays an encounter belittling her own competence and eroding her trust to healthcare representatives. This is an illustration of an institutional context disempowering individuals, by degrading their competence.

All women were positive to not having to reach out to healthcare institutions to get access to Natural Cycles and found it convenient to order online. All had conducted extensive research online before commencing their Natural Cycles use, and reasoning they had conducted enough research on their own to be aware of benefits and risks it assisted them in creating a sense of control; something some had thought to lack previously when being handed the same contraception as everyone else, and later having them withdrawn due to health risks. Anna also described not having to do the health check-up visits related to her previous contraception as a freedom. After negative experiences with the healthcare, Frida found it beneficial to be able to avoid consulting a professional.

Frida. Very often when I've consulted a gynaecologist, I've had to defend why I don't want to use hormones. It doesn't help to say that they've made me depressed, they always say something like "Well, it will work with another drug composition, try again." And I just feel that no, I'm not taking that risk again. So it's great that I can chose exactly what I want and order it without having to contact anyone.

By transferring from being a patient to a consumer, the context of the women changed. No longer dependent on healthcare regulations and practices for contraceptive access and use, they were free to act on their own. Increased awareness of benefits and flaws of their contraceptive increased their sense of control, a process of interpersonal empowerment Zimmerman (1995). However, even though the majority appreciated the liberty of the free access, some disadvantages were mentioned. Some resonated that a younger version of themselves would have lacked the maturity to inform themselves and handle the self-management of Natural Cycles. Sara also felt ambiguous about the freedom and thought that without a doctor's advice or prescription of contraceptives it was her own responsibility if it failed.

Sara: You trust a doctor; if a doctor tells you that you won't get pregnant by "this", then you trust them. But if they on the other hand say "I can't promise anything" and I go home and order it on the Internet like some... animal... You feel like someone who didn't get their drugs prescribed and instead ordered sleeping pills online. It feels like you're cheating. (...) When you don't get it prescribed it feels like you're choosing a less secure alternative. And it feels like you only have yourself to blame if it doesn't work out.

The women judged themselves as capable of acting independently of the healthcare and many considered it a plus. These are efforts of gaining mastery and control over resources (contraceptives), hence processes of empowerment according to Zimmerman (1995). However, this empowering process also increased their responsibility and brought concerns about the own competence and of being on your own, as expressed by Sara. Sara expresses how her responsibility makes her dreads that she might fail in her sole pursuit of controlling her fertility, which relates to perceiving a lacking competence in the domain. According to Zimmerman (1995), this would disempower her intrapersonally. However, Sara also expressed feelings of trust and gaining control through the app, feeling in control and able to handle the app sufficiently, which according to the concepts of Zimmerman relates to empowerment. Zimmerman (1995) describes how individuals may develop a sense of empowerment at one time and disempowerment at another. As the case of Sara reveals, it seems as it might be possible to experience both processes at the same time. This reveals how gaining control over resources through independence not solely leads to empowerment; a duality that has earlier been discussed in academia. Lupton (2013a) claims that when engaging in their own health status, the burden of responsibility transfers from the state to individuals. Making decisions and acting on a distance from the healthcare, the individual is free from institutional surveillance and restrictions but the pressure on self-governing may be experienced as obligating and unsafe (Lupton, 2013a). Frida's and Sara's different evaluations of their autonomy demonstrate the ambiguity and individual variation of the empowerment process.

To summarize this theme, Zimmerman's (1995) view on empowerment highlights how a cognitive understanding of one's' context enables empowering decision-making and the ability to envision alternatives. In the case of the interviewed women, they demonstrated an understanding of their options, as well as an idea of what they were looking for. They navigated their contraceptive choice outside the healthcare arena by adopting a digital market based option, which could be seen as an example of how the interactional component is a bridge to the behavioural component, as Zimmerman (1995) suggests. Therefore, the shift to Natural Cycles can be considered a process of interactional empowerment, as the women based on their understanding of their context developed the skills necessary to become independent of their previous context and become their own best advocates.

4.3 Self-knowledge

The third theme which emerged from the interviews relates to self-knowledge and contraceptive use. All interviewed women had an interest in learning more about themselves and felt in various ways disconnected from their bodies when using conventional contraceptives. Through their use of Natural Cycles they developed an understanding of themselves. The subthemes *The female body*, *The real me* and *My health status* are all elements of disconnection turned into insights. The female body and The real me theme both relates to My health status as the women were able to understand their health better by learning about their body and mind.

4.3.1 The female body

Several women felt that they lacked knowledge about their bodies and cycles when using hormonal contraceptives. Some described having a desire to reach a “natural” state and adopted Natural Cycles with the intention to learn more about themselves. This was achieved by their use as the data and information provided by the app explained their fertility cycles and how the female body functions. Carolina described figuring out how her body and monthly cycles worked as one of the greatest benefits of using the app. The intertwined learning process and data collection was for most women a joyful process and some described analyzing their graphs with great passion.

Louise: It's like gamification in some ways, it's a hobby because it's kind of awesome.

Considering her self-tracking as a hobby and being excited about the practice, aligns with Lupton's (2013a) description of self-tracking as a practice based on the idea of the body as a project. The shift of considering contraceptive use as a must dictated by others, to a playful element indicates the development of the idea of the body as a fun project and a health management playground. According to Smith and Vonthehoff (2017), the ability to understand and manage the body enhance the experience of living. In the case of the interviewees, the process of understanding of themselves brought enjoyment.

For some women, the relationship to their body had been challenged by the new insights. Sara, who previously had a negative relationship with her body was able to develop a greater self-acceptance.

Sara: I have become better friends with my body (...) By using this app and a menstrual cup, everything has become less disgusting. I can't really explain it in a rational way; it's more of a feeling that it's now less disgusting with the body, menstruation and fertility cycles in general.

Sara describes how she has changed her view of concepts of the female body, now finding it less aversive. She interprets herself and female health in a new way. Making her messy female functioning defined, presented and explained through numbers and facts, the app helps her to

accept its whereabouts. This exemplifies how objectified interpretations through data empowers individuals, as Smith & Vonthehoff (2017) suggests. New body interpretations even went beyond self-acceptance for some, who talked about their data and graphs with great satisfaction. Anna was one of the women who had developed a sense of pride over her body, and joked about how she would like to brag about its qualities.

Anna: It is a little bit like vanity points; my cycle actually only varies plus minus one day. You become a little bit proud over yourself that you function so well.

Having herself defined in data, now metrified and comparable to others and clearly showing her status, upgraded her self-evaluation. Anna also presents an example of how data is used to create new social health narratives, as Smith & Vonthehoff (2017) suggests. Her health was a source of pride in relation to other bodies, something she could demonstrate and a story she could share.

The increased self-acceptance and self-esteem these women had gained are concepts playing important roles in an individual's capability of empowerment (Staples, 1990; Zimmerman & Rappaport, 1988; Zimmerman, 1995). This indicates how the redefinition of oneself in the case of Natural Cycles was empowering, and confirm Smith & Vonthehoff (2017) arguing that self-tracked data change how the body is experienced.

4.3.2 The real me

Some women expressed that they did not feel like they were being their real selves with hormonal contraceptives and used Natural Cycles as a means to reunite with their substance-free self. Louise described how she had been using her contraceptive pills for 12 years and lost her sense of who she was without them. For her, changing to Natural Cycles was a question not only about developing an understanding about her body, but also figuring out what she was like without her pills. Lisa shared a similar experience of forgetting what her nature was like without her pills:

Lisa: It had to do with the mood sometimes... that I felt that this is not me. But I had been on the pills for so long that I didn't remember who I was without them...

Lisa express how she has forgotten her true nature, a loss of control over her real self, demonstrating how the distance to one's true nature is disempowering (Rappaport, 1984; Zimmerman & Rappaport, 1988). By leaving substance-based contraceptives behind, some women found their character change and learned about their nature free from the influence of substances. For Lisa, it was mainly her mood that changed.

Lisa: When I stopped using contraceptive pills I noticed that some things changed. I had felt some sort of irritation before, a hair-trigger temper you might say.... I noticed a significant difference when I stopped, I don't walk around and get annoyed by everything like I did before.

Some women expected the change, but for others the difference came as a shock. Carolina explained how she consumed contraceptive pills since the age of 16 and never experienced any side effects. She decided to try Natural Cycles as her friends had done so and experienced mood differences. Carolina did not expect this to hold for her as she had lived happily with her pills, so when she stopped taking them and her mood became remarkably more stable and her energy levels increased she was shocked. This revelation made her question her history with the pills.

Carolina: The fact that no one told me earlier? Primarily my mum... Why did no one tell me "Carolina, you don't have to eat this"? Or make the connection between my mood and this (...) To think back knowing that my mood could have been so much more stable... Now I've lost those years.

For Carolina, the shift to Natural Cycles was barely an act of empowerment, as she considered herself to be content with her pills and did not expect to change. Experiencing a version of herself with more energy influenced her evaluation of her own self-efficacy and competence in a positive direction. Her statement of losing years of her youth however reveals a sense of powerlessness, why the reconsideration of her past self may be disempowering (Zimmerman, 1995). Hence, Carolina demonstrates how empowering and disempowering processes can happen mutually, but regarding different time and space.

4.3.3 My health status

Some women expressed concerns about giving up their menstruation when using certain contraceptives, as they considered a regular period to be an indicator of a healthy body. They felt that without this monthly confirmation they lacked an ability to understand and monitor their own health and included this in their reasons for trying Natural Cycles. Some considered their disturbed fertility as extra concerning as they had future dreams of starting a family. It takes time for the body to reset after using hormonal contraceptives and some women mentioned that they were unsure if they were fertile after years of hormonal contraceptives. Therefore, they used the app as a means to find out. Uncertainty about one's health and capability to have a child reveals a flawed sense of control, characterizing a disempowering state according to Zimmerman (1995). Petra, who aimed to secure her fertility for future pregnancies had yet not been able to track her ovulation, but still sensed that she increased the capacity to achieve her goal by her new self-knowledge.

Petra: I think that knowledge is power... Now I've got foresight and prepared myself which gives me opportunities. If I don't get my period I can go to a midwife and see what the problem is without feeling desperate about being pregnant now (...) Now I know how my body function and it can help me in the future.

Petra exemplifies how an increased self-knowledge leads to a greater sense of control over her life, being empowered in intrapersonal manner in line with Zimmerman's definition (1995). She also implies how her self-efficacy has improved, being the capability to achieve results in specific

domains (Bandura, 1986). Although her self-tracking has provided her with information about her health status that could cause anxiety and stress (Lupton, 2013a), her sense of control assists her in a positively evaluating her situation. Petra feeling confident, confirms the idea of Lupton (2013a) that self-knowledge through self-tracking create emotional stability.

An increased self-knowledge of cycles furthermore helped the women to make sense of their own health. The fertility cycle can affect both the physical and psychological well-being of women, but these issues had not always been understood in relation to their cycles. Kajsa expressed how she had experienced symptoms of the ovulation process, but never before understood what it really was. Anna had begun to reflect on why she felt certain ways throughout the month and related it to her app. This presents another example of how the data was used to interpret and understand health and body state as Smith & Vonthethoff (2017) argues. The relation between their data and cycles was also expressed in terms of control, as they felt that they now could monitor anomalies in their bodies. This exemplifies Lupton's (2013a) argument that self-monitoring is viewed as a chance to achieve control over one's body state.

An increased self-knowledge of both their own cycles and temperament further helped some of the women with handling physical and psychological health issues they struggled with. Frida talked about how the prediction of her cycle helped her to prepare for the period of severe pain she went through each month. Her up-to-date self-knowledge about her body state provided her with opportunities to handle her pain that earlier had overpowered her. By using the app, she knew when to bring her prescribed painkillers and could feel safer. Sara on the other hand, had suffered from severe anxiety for many years. By self-tracking, she could confirm a correlation between her anxiety and fertility cycle. The data helped her make sense of her emotions and ability to control the situation better.

Sara: If I feel so anxious that I can hardly handle myself, because I still have severe anxiety, I can log into my phone and see that I'll have ovulation tomorrow. My hormonal levels are probably way off... I find comfort in knowing that even if I feel like shit it's probably completely because of physical reasons. I usually get severe anxiety attacks three days before menstruation or one day before ovulation. Even if it's really hard and I feel horrible and I want to cry, it's very relieving to let go of some of that anxiety by knowing that it's because of my hormonal levels.

Sara and Frida exemplifies how increased self-knowledge helped the women handle their lives, and increasing sense of control. By learning about the sources of anxiety, respectively ability to predict, they could both develop strategies to handle their struggles - influencing the internal locus of control (Zimmerman, 2000). They are also examples of how individuals use data and self-tracking to gain a sense of control (Smith & Vonthethoff, 2017) and re-interpret themselves through their data (Lupton, 2013a) - the pain and anxiety became different and more manageable when it was predicted and explained.

Some women felt that the increased self-knowledge could strengthen their position vis-à-vis health professionals even in other matters, considering how they could back up symptoms with data when debating health issues. Frida had already used her data to her advantage when requesting a polycystic ovary syndrome assessment, a disorder that can cause irregular or no menstrual periods.

Frida: I used the data to prove that I have PCOS. I've tried to get a medical assessment for such a long time, but I haven't been taken seriously. But now I could show, "Look, I don't have ovulation every month", and I got a diagnosis. [...]. But they were a little hesitant. I said, "I know I had ovulation two days ago," and they said "Yeah, right." But then they did the assessment and realized a bit surprised that "Yes, yes you did."

Frida experienced feelings of empowerment in her patient role, feeling in control and finally able to influence her situation due to decreased information asymmetries. She had identified an opportunity to influence the decision-making process, why her use of Natural Cycles also was a process of interactional empowerment. By collecting data about herself she was also a co-producer in the assessment process, which aligns with previous research on health self-tracking (Lupton, 2013a). Another woman mentioned that she due to her data would not have to visit a clinician to investigate her fertility, and considered it to be a benefit of using the app. She had realized how the data resource could assist her in becoming independent and her “own best advocate” in relation to the health care. She was able to navigate her context and its system by turning to a market actor and when acquiring and managing a new resource, she used it in her own favour. Acquiring and using the app in such ways characterizes a process of intrapersonal empowerment, landing her in a intrapersonally empowered outcome being aware of her new advantages (Zimmerman, 1995). It additionally illustrates how self-care technologies assist in achieving independence as Lupton (p. 266, 2013b) suggests, and how the “burden of responsibility” may not be of importance in the cases of leaving a highly disempowering situation through self-tracking.

To summarize, the self-knowledge gained from experiencing their minds and bodies free of substances, learning about the female cycle functioning and gaining data about their health affected the perception the women had of themselves. Mainly, they had gained a sense of control over their bodies and well-being. Gaining a new sense of themselves and being able to manage their own health linked to new evaluations of own competence, control and self-efficacy. These outcomes applies to Zimmerman’s (1995) concept of intrapersonal empowerment. The process of learning about themselves through self-tracking and using the app was therefore a process of empowerment, leading to an empowered outcome. The women could confirm the arguments of Lupton (2013a), being individuals feeling more confident and in control when they are gaining more knowledge about their bodies through self-tracking. Their re-interpretation of themselves and health concepts further confirms Lupton’s (2013a) and Smith & Vonthehoff (2017) views on self-tracking as a tool enabling individuals to experience themselves differently and create new relations to this new translation of their body.

4.4 The social contraceptive

The last theme which emerged from the interviews relates to how the women encountered a new social dimension of contraceptives through Natural Cycles. This theme is divided into the two sub-themes *Shared responsibility* and *New community*, having the dimension of sharing the experience of use with others in common.

4.4.1 Shared responsibility

All of the women agreed on that it was up to whoever who did not desire a pregnancy to take responsibility to practice safe sex. However, they all described the responsibility to commonly be placed on the woman and most women expressed their disappointment and disagreement with this fact.

Kajsa: I get more and more pissed off that it (contraceptive) is always a female issue. It's only ours.

Being expected to take responsibility is a demonstration of how the women perceived social norms and regulated their behaviour according to it to take care of their fertility. They expressed anger towards the society and contraceptive industry, which they described as failing in providing men an ability to share responsibility. Zimmerman (1995) claim that critical awareness by understanding norms and values, examples of interactional empowerment. Being aware of their context, the women were therefore empowered in that sense, although their evaluation of this context made them feel disempowered. This serves as an example of how psychological empowerment is related not only on its components, but also the relation between them - e.g. how the consequences of an interactional empowerment may lead to an intrapersonal disempowerment.

This disempowering context shed a light of potential empowerment on the possibility of Natural Cycles to share the app with a partner and split the control over the fertility process. The women appreciated the possibility to distribute some of the responsibility to their partner by keeping track of safe days and stocking up on condoms.

Petra: It's a bit of the feeling that it's not only me taking the responsibility now. It's often the woman's responsibility since most contraceptive is targeted to women. It's the women that must use it, manage it and keep track. But here it's actually one more person that's keeping track, even if it's probably the women anyways who'll keep track since we're the ones getting pregnant.

Petra appreciated the gender equality aspect of sharing, although she considered the responsibility norms to remain. Frida described the most important thing when choosing a contraceptive method as being in control, and being able to share the control with her partner. Both interviewees dating and women being in a relationship praised the sharing function. Some also mentioned how their partners were equally content with the opportunity. This exemplifies

how data can assist in creating social relationships in an empowering manner (Smith & Vonthethoff, 2017). The app brought a new ability to in a new manner practice fertility control together with their sexual partner. This new option is an emerge of control in an interactional aspect by acquiring the opportunity to share. Since this was something the women had discovered during their use, it was an unintended empowering outcome - a sense of control by sharing it (Zimmerman, 2000).

4.4.2 New community

Multiple women mentioned the community of users surrounding Natural Cycles as a positive phenomenon. They appreciated the open and seemingly novel discussion about cycles, women health and natural contraception and described women connecting over their contraception in a way they had not done before. Some women actively engaged in online forums by answering other users questions. Being able to hear about other people's progress and confirmation it worked was also comforting.

Carolina: They're [Natural Cycles] creating a discussion about the whole thing, something no one else would do. You'll eat your pills on your own, and someone else theirs.

Anna: I think that every time I add a measured value and use the app, I'm doing myself and everyone else using it a favour.

Anna felt that she was contributing to the whole user base by using the app. According to Zimmerman (1995), behavioural empowerment includes involvement in communities and participatory behaviour. As Anna felt she was doing all users of Natural Cycles a favour when she contributed with her data, she sensed she participated simply by using the app. This can therefore be seen as a process of behavioural empowerment. Some women described with joy how they had learned from other users in online forums but also themselves had contributed to these new communities, in line with previous research on benefits of communities (Korp, 2006). This also exemplify Schultz's et al. (1995) description of how communities affect individuals by giving access to social resources and information. By sharing advice and thoughts they contributed to each others empowerment in intrapersonal and interactional domains, such as motivation to control, critical awareness and skill development. Furthermore, Schultz and his colleagues (1995) argues that empowerment at the individual level is interrelated with community empowerment. As some engaged in online forums by sharing and answering others questions, they were both empowered by their actions but also empowering and strengthening the community. The communities surrounding Natural Cycles functioned as a playground for participation and communal knowledge development, why the women active in the community can be seen as taking part of a behavioural empowerment process. In sum, the social aspects of using Natural Cycles enabled interactional and behavioural empowerment.

4.5 Theme interactions

Interactions between the identified themes became visible when mapping out the data. Body control, self-knowledge and contraceptive institutions were all factors that contributed to the women's shift to Natural Cycles. The four interviewees which had been severely disturbed by side effects emphasized all three themes, while those with less wearing experiences and the one woman with no side effects mainly stressed body control and self-knowledge.

Several women talked about taking back body control, referring to how contraceptive institutions, the context producing practices and norms of alternatives and distribution, impeded them from sustaining a relation to their body and health. Counselors, social pressure and norms were identified as forces discretely dictating how to control their bodies and distancing them from body and health self-knowledge. Zimmerman's (1995) proposition describing how an individual can feel empowered without having real authority may explain why some women never questioned their context, trusting provided options and the contraception norm but then found themselves feeling deceived. Becoming increasingly aware of the consequences of their contraceptive consumption and for some questioning institutions, a motivation grew to take back the control over the own body. The adoption of Natural Cycles was therefore for some considered as a means to achieve self-sufficiency and mastery over the own body.

When commencing their digital contraceptive journey the women distanced themselves from healthcare and institutional governance. But in tandem the burden of responsibility transferred from the healthcare to themselves, as stated by Lupton (2013a). Differences of how the new self-government was experienced was noted between novel and veteran users. In a greater extent beginners doubted their self-efficacy as well as demonstrated more mistrust of the technology. The novices further emphasized Natural Cycles as a resistance and escape of substance-controlled bodies, whereas the women with a longer history of use had developed a relationship of emotive nature with their app. They similarly considered their independence valuable, but additionally described a relationship with their app built on guidance and support which the new users had not reached. The development of such relationship was characterized by gaining a feeling of control and developing self-knowledge, confirming previous research of self-tracking outcomes (Lupton, 2013b).

It was also clear how body control and self-knowledge were interacting components of empowerment. Self-management and control over substance created opportunities for body, mind and health self-knowledge. Developing trust was related to experiences of the app's accurate predications and gained self-knowledge. As self-knowledge and a sense of control was essential for trust development, one can also understand how contraceptive institutions undermined the women's sense of trust. For some it was still inhibiting their practice, an invisible norm of they were aware of and blocking full confidence in the app. Therefore one can conclude that for empowerment to happen through digitalization, norms must be battled or changed.

Body control and trust development was also interrelated with self-knowledge and the interpretations made of the bodies and minds. The women who had used Natural Cycles the longest had begun to re-evaluate themselves. It was both in terms of re-defining their bodies and health status as something increasingly positive, as well as assigning the data mandate over body status truth, similar to the theories of Lupton (2013a) and Smith & Vonthethoff (2017).

Body control and self-knowledge were also sources of increased sense of power in relation to contraceptive institutions. These assets could support advocating own interests, by being able to act independently and provide proof of health status. For some, it strengthened their position vis-à-vis medical professionals even in other matters than pregnancy prevention. The support function of contraceptive institutions, such as the healthcare was also challenged by the new online communities surrounding Natural Cycles. Seeking and providing counseling could be done peer-to-peer, instead of seeking out a medical professional.

5. Conclusion

Natural Cycles demonstrates an example of how women are empowered by a digital contraceptive better suiting their needs and providing benefits self-tracking. The women were found to be empowered by gaining perceived control, avoiding contraceptive institutions, developing self-knowledge and social benefits by acquiring and using the app. Amplifying the experience of empowerment was previous disempowering experiences in the contraception domain. Liberation from substances, the healthcare and gaining the flexibility of self-tracking nature was found empowering. These factors were however also sources of disempowerment due to trust issues and responsibility-related stress. The shift to Natural Cycles itself was not sufficient for all to create empowerment, as for some using the app was an empowering process by developing trust over time. Using the app was also an empowering process of developing self-efficacy, perception of control and competence through self-tracking. The self-tracking further empowered long-term users by facilitating positive body relationships and re-considerations of body concepts. It was further found to in some cases support an empowering perception of their bodies through data and a disempowering assignment of body status authority to data. Gathering data was additionally found to be an empowering process as it produced a means of health management and testimony in healthcare encounters.

6. Discussion

This chapter presents our own reflections which emerged during the study.

Diving into the world of digital health and contraception without knowing what to expect have been an inspiring journey. Discovering a digital contraceptive to have the potential of having such fundamental impact on individuals lives, was far more than we expected when commencing our study. During our analysis process, we identified the capacity of digital contraceptives to empower women, in addition to highlight and adjust for disempowering flaws of healthcare and research institutions. The purpose of the study was to understand the impact of a digital contraceptive on women's lives. We have identified processes and outcomes of empowerment within acquiring and using a digital contraceptive, being a duet of handling contraceptive institutions and offering new benefits of self-tracking. Furthermore, we have illustrated how women perceive their autonomy and self-care in relation to empowerment.

The empowerment processes found in this study reflect the subjective experiences of nine women. Considering the importance of contraception in women's lives and the political nature of the topic, some aspects of these processes might be unique for this case, potentially the doubts and emphasis on trust, in addition to the sense of being governed in contraceptive practices by external factors. Although generalizations cannot be made, the results still provides insights on potential effects on individuals of an increasingly digital and self-tracking society, in addition to the adding to the understanding of the impact of contraceptive consumption on psychological empowerment.

Considering the growth of digital health and wearables, we suspect Natural Cycles to be a glimpse of how health will increasingly be addressed. This implies the development of a new patient-professional relationship, and sets higher demands on both patients in terms of autonomy and professionals in terms of increased involvement of patients in management and assessment. Self-management was by a few women considered stressful, which promotes the idea of Lupton (2013a) to consider the emotive aspect of self-managing health. These learnings might be useful for the future digitalization of health - making sure to consider needs of support. Further, a developed self-management scenario could potentially be riskful if self-monitoring of health correlates with avoiding professional's consultation believing to have enough expertise to discover anomalies. Some individuals may be less suited to take the responsibility of handling their health, raising the question about who is fit to be empowered, age limits or the importance of technology to assist assessment. It also raises the question of whether the concept of empowerment in health is desirable for everyone. Some might prefer being less empowered, distributing the control and responsibility to someone else. On the other end of the topic, concerns could be raised when considering the possibility of prescribing data authority on body state evaluation and the settlement of own agency, embracing self-management without further analysis.

The private matter of reproduction and sexuality also raise questions about privacy and potential commercialisation of the collected health data. Realizing the capitalist value developers of mobile health apps have begun to sell the real-time data to third parties such as marketers and advertisers (Lupton, 2017). There might be a risk of discrimination if actors e.g insurance companies gain access to private health data, using it in evaluation and governing the individual.

Self-tracking was an important source of new perceptions of self-efficacy and control, enabling women to master and understand their bodies. The lack of insights on female anatomy, struggles of handling their cycles and even aversive body interpretations made us reflect upon the roots of these findings. Knowledge about the fertility cycle is highly important for women's sexual and reproductive health, and according to the national guidelines for councils working with contraceptive (MPA, 2014), information about fertility and the menstrual cycle should be provided adapted to the woman's age and prior knowledge. Considering the results in our study, we believe digital contraceptive may play an important role in supporting the development of such knowledge and substituting whereas public efforts may fail. As the self-tracking was further found to be able to produce positive considerations of the body and its concepts, digitalization of health may be further be a tool of enhancing individual's well-being and challenging norms. Future research may further explore how self-tracking may affect user's self-image and the view of the body.

We found the idea of contraception as a means of empowering women (WHO, 2016) to be challenged, as our study revealed how contraceptive consumption can be equally disempowering, due to a reduced well-being, dependency on the health care and a disconnection to body and mind. The fact that even the women who mistrusted the effectiveness of Natural Cycles adopted the service indicate how dissatisfying other options truly were. The emphasis on control, behavioural freedom and self-knowledge throughout the interviews implies the importance of psychological empowerment in the contraceptive domain and how these elements have been lacking. Not trusting their provided contraceptives also demonstrates a flaw in the system, asking them to accept the uneasiness. As many had been discontent for years, the lack of options meeting their needs is questionable. Likewise, their communal disappointment over contraceptives being a women's issue and the lack of male options indicates how this topic needs to be addressed from a gender perspective. It became clear during literature research how research and organizations lay major focus on female contraception (Berglund Scherwitzl, et al. 2016; Crissman, Adanu & Harlow, 2012; Do & Kurimoto, 2012; Hameed, 2014; MPA, 2014; WHO, 2016).

Shifting to Natural Cycles women were able to avoid formal contraception structures such as the healthcare, and feeling empowered doing so. However, norms of behaviour set by health policy makers (Koelen and Lindström, 2005) in addition to assumptions of women to be the only users may contribute to preserving norms holding women responsible for pregnancy prevention. The new autonomy of the self-managing individual is a shift of the monitoring of choices and

behaviour, yet what is considered desirable and healthy choices is implicitly determined in advance (Koelen and Lindström, 2005). Zimmerman (2000) describes a process as empowering if it supports individuals in developing skills so that they may independently make decisions. Within the digitalization of health individuals develop skills as they learn to gain and interpret their own data, but their choice making is still controlled by institutional forces determining what to be considerate healthy. Even though the women perceived themselves being empowered by the digital contraceptive, they can in a wider context still be considered disempowered in terms of the expectations to control their fertility. An interesting field to explore could therefore be the sharing aspect of Natural Cycles which may be developed as the app user base is growing - how may a digital contraceptive empower men?

Another topic of future research to consider is the Natural Cycles community. It appears to have adopted the role of counseling previously played by the health care or a friend - women advise each other and receive input from company representatives. This supporting and social function may have impact on women's empowerment and well-being. The community further provides a setting for future collective empowerment Consumers have previously been able to group, demand market sanctions and influence products through digital means (Labrecque et al., 2013; Doherty & Ellis-Chadwick, 2010), and the community of Cyclers as they are named by the company may be a platform for women to in the future co-create their own contraceptive. Worth investigating could also be whether the social aspect of connecting and sharing contraceptive experiences would influence the contraception discourse, perhaps shifting its status from a private matter to a more public topic.

Consumers are argued to play an important role in the digital revolution predicted to transform the healthcare (Lupton, 2013a). Investigating this revolution we can conclude that consumers play an important role not only in transforming the healthcare, but also in transforming their own lives.

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**GÖTEBORGS UNIVERSITET
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Information regarding your participation in a digital contraceptive study

This is a study conducted by Maja Nordfeldt and Olivia Widén within their bachelor thesis at the School of Business, Law & Economics at the University of Gothenburg.

Purpose:

The purpose of the study is to investigate the use and experience of a digital contraceptive in order to expand the knowledge within the area and create a basis for better contraceptives.

Background::

Digitalization has enabled mobile applications which through fertility tracking functions as contraceptives. Previous research has investigated conventional contraceptives thoroughly, but this phenomenon is left to explore.

Method:

The study applies a qualitative research method with in-depth interview. We plan to interview about 10 women using Natural Cycles as a contraceptive. The interviews will not be longer than one hour. Your participation is voluntary and anonymous and you may end your participation whenever you wish without any further explanation. The recordings will not be played to any external part and only the two of us and our supervisor will have access to the data. All data will be presented anonymously in the thesis. The study will be presented in a bachelor thesis at the School of Business, Law & Economics at the University of Gothenburg which you will have access to.

If you have any questions regarding the study or your interview, please contact any of the following by phone or email.

Thank you for your participation!

Student:

Maja Nordfeldt

XXXXXXXX

XXXXXXXX

Student:

Olivia Widén

XXXXXXXX

XXXXXXXX

Supervisor:

Peter Zackariasson

XXXXXXXX

School of Business, Law & Economics

University of Gothenburg



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Informed consent and confirmation of the following:

- I have been informed about the purpose of the study
- I have been informed about how collected data will be managed
- I have been informed that participation is voluntary
- I have been informed that I may end my participation in the study whenever I wish

Based on the presented conditions I consent to participate in this study

Signature: _____

Name: _____

Date: _____

Interview Guide

1. *Could you start by telling me, what is Natural Cycles?*
2. *How did you find out about Natural Cycles?*
3. *What were your reasons for starting to use Natural Cycles?*
4. *Did you consult anyone before starting to use Natural Cycles?*
5. *What's the best thing about Natural Cycles?*
6. *What's the worst thing about Natural Cycles?*
7. *What does Natural Cycles mean to you?*
8. *How have using Natural Cycles influenced your life?*
9. *How would you describe the Natural Cycles brand?*
10. *How do you consider your own agency regarding contraceptives?*
11. *What do you think about contraceptives and society?*
12. *What do you think about that you can get a contraceptive without visiting a midwife?*
13. *Who do you think is responsible for contraceptive use?*
14. *Who do you discuss contraceptives with?*
15. *What does your friends, partner and family think about Natural Cycles?*
16. *What do you think about using an algorithm-based contraceptive rather than a substance based one?*
17. *What do you think about drugs in general?*
18. *What do you think about requirements of self-management to make a contraceptive work?*
19. *What do think about the data about yourself?*
20. *How do you relate the data in the app to your own well-being?*
21. *What do you think about the data storage about you?*
22. *Do you adopt new technology? Can you provide any examples?*
23. *Do you use any other self-tracking apps, like a workout-app? How often?*
24. *What is your idea about the perfect contraceptive?*
25. *Is it something we haven't talked about you would like to share?*
26. *Do you know anyone using Natural Cycles who we could get in touch with?*