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"Gaining Control" Women's Health on Period and Pregnancy Trackers

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"Gaining Control"
Women's Health on Period and Pregnancy Trackers

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by

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To Mommy, you are my inspiration and guardian angel. Love you beyond time.

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A note on language

Throughout this paper I go between using the terms "women" and "pregnant people" when referring to particular subjects. Although at times it may seem inconsistent and or oppositional, this is an attempt to interpolate the term "woman" with understandings of trans/nonbinary/genderfluid/disabled/sick figures. This is an insistence of the co-construction of "woman" or femininity with all of these figurations. In my usage of the word "woman," I think with Johannah Hedva when they write "I choose to use [woman] because it still represents the un-cared for, the secondary, the oppressed, the non–, the un-, the less-than."[1] The language of non-normativity in relation to pregnancy has yet to be established. This project is not concerned with establishing a new lexicon. Rather troubling the grammar, this project troubles the politics.

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[1] Johanna Hedva, "Sick Woman Theory," Topical Cream Magazine, April 1, 2022.

Introduction

> *Technology has changed how serious disabling conditions, injuries and chronic illnesses are*
> *survived and lived. As we clumsily and uneasily stumble forward into a piecemeal cyborgian*
> *society, there will be more like me, whose existence as a co-existence with numerous relationships,*
> *social programs and technologies supporting life can't be ignored.*
>
> Nick Dupree
> "Life Support", 2014

Nick Dupree was a disability rights activist who had a severe neuromuscular disease, and was dependent on a respirator to breathe. In Mobile, Alabama where Nick lived his adolescent life, the state's government paid for nurses to take care of him in his home. This in-home caregiving in Alabama, like in other states, would end once disabled children turned the age of twenty-one. After which, they would enter a nursing home or hospital. In 2003, Nick fought and won to increase the age limit of care receiving in Alabama to go beyond age twenty-one. This increase would ensure that severely disabled people would not have to be institutionalized to receive care.[2] After completing college at home, with the support of nurses and the financial assistance of the Alabama government, Nick moved to New York City. In New York, in the last ten months of his life, Nick moved between hospitals and nursing homes, the very places he tried to avoid his entire life. After a string of facility-acquired infections, Nick contracted sepsis, suffered from cardiac failure, and died on February 18, 2017.[3]

I begin this project by honoring Nick Dupree's life and death because it points to the violence of the medical industrial complex (MIC) in the United States. The narrative of Nick's life accounts a history of fragmented, inconsistent, and unspecified care in this country. Nick's

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[2] Joseph Shapiro, "Nick Dupree Fought To Live 'Like Anyone Else,'" NPR, February 22, 2017, sec. Policy-ish.

[3] Shapiro, "Nick Dupree Fought To Live 'Like Anyone Else.'"

life-long fear of being institutionalized for his disability reveals a fundamental distrust that many

people hold toward the MIC, and its repeated inability to provide genuine care. Nick's particular

condition and the specific terms of the care he depended on might be unconventional, but his

experience of neglect and his feelings of mistrust are not unheard of. Like many of us who fear

doctors, have been mistreated, and hurt by the MIC, Nick's story resonates deeply with us. Nick

and the millions of people who have died in the care of the MIC, or in their own homes in fear of

the MIC, present one of its essential problems. The MIC is an enormous system with tentacles

that reach beyond simply doctors, nurses, clinics, and hospitals. It is a system about profit, first

and foremost, rather than "health," wellbeing and care."[4] The MIC includes both private and

public health institutions. From this angle, fighting for the right to universal healthcare is not

enough, we must also fight for the right to refuse this healthcare.[5]

This project engages in a dialectic between medicine and technology in hopes to better

understand where the MIC is situated in an increasingly technocratic society. Centering the

bodies/minds of all those who exist in opposition to the anatomical atlas of Western medicine

evident in the MIC, this project sets out to answer the question: *how is the hyper-personalization*

of technology, produced by artificial intelligence, being used in medical practices?[6] I will

investigate this question by analyzing four feminine digital health platforms- Ovia Health, Sprout

Health, Clue, and Flo. This project's attention to health apps that address feminine conditions is

not an attempt to reify patriarchal constructions of femininity or gender. Rather, this is an

attempt to interrogate how groups of people's bodies have been atomized to conform to the

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[4] See Medical Industrial Complex Visual (2015) by Mia Mingus. This visual is Figure 5, located on page 68.

[5] Mingus, "Medical Industrial Complex Visual."

[6] In *The Birth of the Clinic*, Michel Foucault speaks of an "anatomical atlas" which refers to the constitution of the human body as a byproduct of the medico-scientific gaze. This atlas of human bodies as solid and visible in the late 20th century he argues was accepted as the only spatialization of disease without recognizing the possibility that other distributions are possible.

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engage in self-reflexive processes of self knowledge.[13] These technologies are thought to be empowering because they redirect what was previously the work of specialists into the hands of laypeople. Although fitness trackers are health technologies, their health implications are not essential in neoliberal Public Health. This non-essentialness is where fitness trackers diverge from health "proper" technologies.

The use of tracking technologies to improve access to and quality of healthcare is an emerging trend. Blood pressure monitors, ECG monitors, and continuous glucose monitors are all examples of health proper technologies which have been digitized. They are often promoted as "self-use" devices. These technologies are not necessarily new, however, their novelty lies in their shift in locality from the hospital to the home. These technologies represent the beginnings of a trend toward self monitoring. Simultaneously, they are examples of strictly medical technologies. In other words, they were once used in hospitals, and have been transformed through digitization for the purpose of accessible at-home use. This project is concerned with technologies that follow the opposite logic. This is to say, devices that were designed for non-medical use which have been *adopted* as medical technologies, primarily smartphones.

"FemTech" is the name given to mobile apps that address feminine health. Coined by Ida Tin in 2016, FemTech is defined as a way to "legitimize the female health tech market, thus driving forward innovation, attracting investment, and helping to normalize conversations about female health."[14] Ida Tin is the CEO and co-founder of Clue, one of the four apps which will be investigated in this project. Using four FemTech apps as its primary research subjects- Clue, Flo, Ovia, and Sprout- this project embarks on mapping where these apps are situated in the MIC. In

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[13] Oana-Ruxandra Constantin, "Regaining Control – the 'Quantified Self' Movement and the Creation of the Postmodern Human," 2019, 44.
[14] FemTech Live, "Femtech Founder: An Interview with Clue CEO, Ida Tin," October 7, 2021.

the style of a discourse analysis, I will interrogate how these apps market their services and shape user attitudes about health. This analysis will take place in four sections: (1) visuals, (2) language, (3) services, and (4) terms of use and privacy. This project argues that FemTech replicates rather than mitigate disparities in the U.S healthcare system.

Review of Literature

Many discourses shape the use of artificial intelligence (AI) in technology and medicine. The discussions surrounding AI in technology and medicine arise from a variety of fields including: history, technology, environmental studies, medical studies and many more. This project finds itself at the nexus of the literature between two fields- science and technology studies (STS), and sociology. These are the two primary fields of literature which will be reviewed.

AI is defined as the ability for computers or machines to complete tasks that would typically require human intelligence and discernment.[15] AI can be implemented in many different ways, but the focus of many tech companies in the contemporary data economy is on machine learning. Currently, AI is synonymous with machine learning- which defines only one method of programming intelligence. Machine learning is a method of data analysis in which algorithms improve efficiency through experience and the use of data.[16] These algorithms rely on massive amounts of data from a variety of sources, hence why the past two decades has seen a rise in "big data." Importantly, the work of these data mined algorithms is largely predictive.

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[15] BJ Copeland, "artificial intelligence." Encyclopedia Britannica.
[16] Tom M. Mitchell, Machine Learning, McGraw-Hill series in computer science (New York: McGraw-Hill, 1997).

Ergo, the current order of AI is as an assemblage of information (data) for the purpose of foreseeing or predicting the future.

To non-programmers, the way algorithms work can be a black box. In fact, programmers and corporations alike intentionally conceal the mechanics of their black box algorithms. This concealing is precisely what code allows. In a rudimentary sense, code creates a barrier of understanding between programmers and non-programmers. The barrier created by code is precisely where terms such as "user-friendly" are given meaning- by finding ways to make code accessible. Early social media platforms such as MySpace and Tumblr are good examples of when this programmer/non-programmer barrier is distorted. Both platforms invited laypeople into the code language of programmers. On MySpace, users could add HTML and CSS virtually anywhere to customize their page.[17] On Tumblr, users had to parse through lines of code to personalize their blog's theme. These are two micro examples focused on code, which begin to explain "black box algorithms".

Technology has since moved away from the realm of simple code into the realm of AI with massive algorithms. The increased complexity in technology itself has yielded congruent complexity in programming languages. This overall increased complexity heightens the barrier of understanding between programmers and non-programmers. The labor of demystifying black box algorithms is where much of the critical work in science and technology studies lies. Many thinkers in this field have shown how big data gets misused in algorithms. They argue that this misuse leads to the perpetuation of biases and inequities by machines.

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[17] Colby Fayock, "How MySpace Taught Me How to Code and Where You Should Look to Develop Your Passion," FreeCodeCamp.Org, last modified May 21, 2020.

Cathy O'Neil's 2016 book *Weapons of Math Destruction* exposes the ways that algorithms used by various corporations and institutions are being designed with faulty mathematical models, which in turn further spew out incorrect and biased information. O'Neil argues that these algorithms informed by big data are opaque, vast, and damaging tools which are increasingly being used by a myriad of corporations and institutions to make crucial decisions about people's lives.[18] Meredith Broussard broadens O'Neil's argument and warns about the inefficiencies of AI at large. In her 2018 book *Artificial Unintelligence- How Computers Misunderstand the World,* Broussard empowers people to understand how computers work. Ruha Benjamin adds a race specific critique of AI algorithms in her 2019 book, *Race After Technology: Abolitionist Tools for the New jim Code.* She argues there are encoded inequities in the data that many algorithms rely upon, ultimately rendering algorithms themselves biased. She calls this cycle of perpetual inequity the "new jim code."

Thinkers in the sociology of medicine and technology study medical technologies. Dorothy Roberts and Rayna Rapp are two prominent thinkers who do not write about AI, but do focus on medical technologies more broadly. Rayna Rapp's work focuses on the intersection of technology and medicine, and its disabling effects. In *Killing the Black Body* Roberts provides a sociological account of the ways black mothers were perceived as perpetrators of social problems in the U.S., during the 1980s and 90s. She asserts that the reproductive lives of black women have been marked by their systematic and institutional denial of reproductive freedom. These medical practices, namely birth control, norplant, and assisted reproductive technologies, have systematically excluded black women from the reproductive populus. Some reproductive technologies, such as prenatal screening, have been used to discourage procreation by pregnant

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[18]Cathy O'Neil, Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy, First edition. (New York: Crown, 2016).

black people. Roberts uses sickle-cell screening as an example of this discouragement.[19] Her

project places the issue of black reproductive autonomy, or lack thereof, in a political context

which understands this issue as serving white supremacy.

In more recent publishings, Dorothy Roberts has shifted her perspective away from the

exclusion of black women in reproductive technologies, to their targeted inclusion. Roberts joins

a host of other sociologists, including Deborah Lupton, who argue that new medical and

reproductive technologies target low income women and people of color, to serve various

neoliberal agendas. Roberts argues that by targeting pregnant black people, new reproductive

technologies send the message that personal choice is the central element which determines a

"healthy" pregnancy.[20] To not engage with these technologies is to be negligent, she adds.[21] This

targeting and emphasis on personal choice serves the neoliberal agenda of privatizing healthcare,

Roberts claims. The role of personal choice in health is an important idea which Roberts suggests

that this project will continue to explore.

Similarly, Deborah Lupton argues that the rise of digital health promotion platforms has

perpetuated a cycle of individual responsibility to social determinants of health and back again.

Digital technologies are said to be the solution in this cycle. She states that neoliberal political

systems, such as that of the U.S., tend to advocate for individual changes in behavior as public

health policy, rather than taking a social epidemiology approach. By promoting individual

responsibility in healthcare, typically through the use of telehealth and digital medicine,

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[19] Dorothy E. Roberts, Killing the Black Body: Race, Reproduction, and the Meaning of Liberty, 1st ed. (New York: Pantheon Books, 1997), 253.

[20] Dorothy E. Roberts, "Race, Gender, and Genetic Technologies: A New Reproductive Dystopia?," *Signs: Journal of Women in Culture and Society* 34, no. 4 (June 2009): 783–804, https://www.journals.uchicago.edu/doi/10.1086/597132.

[21] Ibid.

neoliberal states downsize spending on public health and offer solutions that provide short-term savings for these governments.[22]

There is a sector of medical sociology concerned with the racialization of medicine which both Roberts and Lupton point to. Medical sociologists question the validity of race as a legitimate medical category.[23] Many of these works credit the human genome project for identifying race not as a genetic category but rather, as sociologists have suggested prior, a socially constructed one. These findings are what lead scholars to question why race continues to be readily used in medical language, technologies, and medicines as a legitimate category.[24] This paradigm of biopolitics coupled with an understanding of the social determinants of health are the premises of social epidemiology.

In addition to the STS and medical sociology texts reviewed, this project borrows heavily from the theoretical framework of disability justice. This framework provides crucial understandings for the co-constructions of the MIC with ableism, capitalism, white-supremacy, and cis-hetero patriachy. Alison Kafer's *Feminsit, Queer, Crip* challenges the rhetoric of naturalness and inevitability that underlie discussions about disability. These discussions frame disability as a monolithic fact of the body, beyond politics. She contests the idea that "good" futures obviously entail the eradication of disability. She highlights that such views are based in a history of ableism and disability oppression.[25] This argument supports the notion that decisions about the future of disability are in fact political, and should be recognized as such.

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[22] Deborah Lupton, "Digitized Health Promotion: Personal Responsibility for Health in the Web 2.0 Era," Sydney Health & Society Group, 2013, 5.

[23] Stefan Timmermans and Rebecca Kaufman, "Technologies and Health Inequities," Annual Review of Sociology 46, no. 1 (July 30, 2020): 583–602.

[24] Roberts, "Race, Gender, and Genetic Technologies."

[25] Alison Kafer, Feminist, Queer, Crip (Bloomington, Indiana: Indiana University Press, 2013), 3.

In "Capitalism and Disability" Marrta Russell and Ravi Malhotra think about the political nature of disability. In this article, they map the creation of the disabled class as a group classified in opposition to "abled-bodied" people under industrial capitalism. They point particularly to the advent of industrial capitalism, as opposed to feudalistic economies, with its requirement for productive physical labor for creating abled-bodied people as a productive class in opposition to those who were deemed unproductive and hence disabled. Russell and Malhotra are in conversation with countless other disability justice writers such as Susan Schwiek and Johanna Hedva, who problematize the nature of politics and its exclusion of disabled bodyminds.[26] [27]

Finally, Susan Marie Schweik offers a compelling argument for the aesthetics of modernity in *The Ugly Laws: Disability in Public.* This book describes the historical context for "unsightly beggar ordinances," commonly known as the Ugly Laws, which criminalized disability. She locates the laws at a crucial intersection of race, nation, sex, class, and gender.[28]

Exploring health technologies is only one small feat in uncovering the aesthetic project Schweik offers. This project picks up where Dorothy Roberts and Deborah Lupton leave off. It adds machine learning into the ongoing, intellectual project of recognizing patterns in healthcare. How are technology companies using the MIC to their advantage to profit off women's health?

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[26] Susan M Schweik, The Ugly Laws: Disability in Public (New York; Chesham: New York University Press ; Combined Academic [distributor, 2010).
[27] Hedva, "Sick Woman Theory."
[28] Schweik, The Ugly Laws.

Research Design

FemTech apps are the primary subject of this research. In doing so, this project expands

on a literature which recognizes software applications as socio-cultural artifacts.[29] [30]This

paradigm acknowledges apps as digital objects which are the product of discourses, tacit

assumptions, and decisions made, both by the humans who design them, and the social and

cultural contexts in which they are generated.[31] [32] Employing a cross-platform discourse analysis,

four FemTech platforms are investigated: Ovia Health, Sprout Pregnancy, Clue Period and Cycle

Tracker, and Flo Health. Ovia and Sprout are pregnancy trackers, while Flo and Clue are the

period trackers.

By looking at two examples for both pregnancy and period trackers, this project allows

for a broader investigation into the practices that are co-linked across these platforms, and how

this content circulates across them.[33] In addition to analyzing these apps, the project also draws

on the author's survey, titled "User Attitudes of FemTech Apps." Providing both quantitative

and qualitative data, the survey is used to introduce users into the discourse. By validating the

survey's results, this project recognizes the voices and opinions of users as central to the

discourse on FemTech. One of the major limitations of this survey is the demographic it was

distributed to. Although it was open to anyone, it was largely taken by college-aged people,

significantly decreasing the scope of the results for pregnancy trackers. There were 74 total

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[29] Deborah Lupton, "Apps as Artefacts: Towards a Critical Perspective on Mobile Health and Medical Apps," Societies 4, no. 4 (October 29, 2014): 607.

[30] Stefania Vicari and Daniel Kirby, "Digital Platforms as Socio-Cultural Artifacts: Developing Digital Methods for Cultural Research," Information, Communication & Society (January 30, 2022): 2.

[31] Sasha Costanza-Chock, Design Justice: Community-Led Practices to Build the Worlds We Need, 2020.

[32] Lupton, "Apps as Artefacts."

[33] Vicari and Kirby, "Digital Platforms as Socio-Cultural Artifacts."

responses. 65 used period trackers, 5 used pregnancy trackers, and 4 used neither. Percentages will be reported using these numbers as the total population.[34]

Settling on the four aforementioned apps as the primary research subjects happened rather late in the research process. They were selected because they are some of the most popular apps on the feminine health market. However, their salience in the discourses on medical technologies was not obvious from the start. The path to health technologies began with an observation about the racial and gendered biases enacted by AI algorithms.[35] [36] The writings of Dorothy Roberts, Rayna Rapp, and Allison Kafer further fueled this inquiry because they all pointed to specific assisted reproductive technologies (ART) that were exclusionary to black women, women of color, and disabled people. They spoke of IVF and gene selection technologies that were designed to create ideal offspring, while excluding disabled children, and those born from poor, black, crack-addicted mothers.[37] [38] [39]

Considering that most of this literature was published in the late 1990s and early 2000s, the current project set out to investigate how these technologies had evolved in the present day. Searching to no avail for the use of AI in these ARTs, what I found was even more shocking. I could not find much material on the use of AI in ARTs because this is not common practice yet. In today's economy, ART is only available to those who can afford the $12,000 average cost.[40]

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[34] For example, when it is reported that 80% of people reported X about pregnancy trackers, this is 80% of 5.

[35] "Twitter Finds Racial Bias in Image-Cropping AI," BBC News, May 20, 2021, sec. Technology.

[36] Ryan Mac, "Facebook Apologizes After A.I. Puts 'Primates' Label on Video of Black Men," The New York Times, September 3, 2021, sec. Technology.

[37] IVF stands for In vitro fertilization. It is a method of fertilization in which mature eggs are retrieved from ovaries and implanted into sperm in vitro- outside the body, in a lab- for fertilization. Once fertilized, the eggs are implanted back into the uterus.

[38] Kafer, *Feminist, Queer, Crip*.

[39] Roberts, *Killing the Black Body*.

[40] Sara Crawford et al., "Costs of Achieving Live Birth from Assisted Reproductive Technology: A Comparison of Sequential Single and Double Embryo Transfer Approaches," (February 2016): 444–450.

These findings positioned Marxian economic relations at the center of my analysis on digital health technologies.

Since the Transatlantic Slave Trade, American history has held racists attitudes and politics toward black women's reproductive capacities. Reproductive technologies have followed a similar racist logic. Traversing the path between reproductive necessity, to control and restriction, and back to necessity is the historical map of black women's reproduction.[41] Today, reproductive technologies are stratified across class lines, which is a proxy for race in this country. To understand the cost of IVF and other ASRs, and to center them as the sole examples of discriminatory reproductive technologies would be to exclude poor women from the discourse on reproductive health.

This project is an attempt to legitimize the reproductive technologies that are designed to mitigate health disparities across racial and class lines- digital health technologies. It is through smartphones, as conduits of digital health, that neoliberal economies have afforded poor and working-class women services for their health, specifically reproductive health. FemTech apps are part of the MIC. Although they are not issued by federal agencies or even private/public health institutions, they still act as medical technologies.

Considering the novelty of digital methods design, this project uses multimodal techniques of analysis. A multimodal approach acknowledges that both visual cultures and text-based queries are pivotal for understanding digital platforms.[42] The project surveys four distinct elements for each platform: (1) the visuals, (2) language, (3) services provided, and finally (4) the terms of use and privacy policies. By analyzing all four, the project considers how these elements reveal the multi-dimensional approaches to marketing employed by each platform.

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[41] Roberts, *Killing the Black Body.*
[42] Pearce et al., "Visual cross platform analysis."

For each platform, I browsed through every page of their website. I coded recurring content into descriptive lists such as "empowerment language" and "image depictions of diverse families." I then cross analyzed my findings from each platform by comparing what elements were continuous and made note of what was discontinuous. Considering what was similar across the platforms contributed to collective phenomena. Considering where they differed pointed to the different goals and purposes of each platform. Highlighting these differences is important to digital platform research because it refutes the idea that all platforms have equal affordances and meet the same user needs.[43]

Although in a very limited manner, I also engaged with the mobile app versions of these platforms. Since they all required the creation of a personal account, the research was limited to aspects of the apps that could be observed without an account. These actions were reduced to viewing terms of use, privacy policies, basic layout, and preliminary sign-up information. Because of the limited amount of information available from this perspective, most of the analysis in the project comes from the marketing on their websites.

These methods of digital research presented complications to the "participant observation" style of ethnographic research typically awarded to sociological research. Ethnographic fieldwork explores topics from the point of view of the subjects. Discourse analyses are a different method of research in which language itself is the subject.[44] In addition to the content of the apps as subjects, this project views the apps themselves as both subjects and sites of fieldwork. This site/subject conflation complicates the relationship between researcher and subject as distinct actors for digital research. One of the benefits of participant observation is the immersion it allows researchers. What distinguishes researcher from interlocutor in this style

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[43] Vicari and Kirby, "Digital Platforms."
[44] Ulrike Ehgartner, "Methods for Change: Sociological Discourse Analysis," Aspect, 2021.

of research is the temporality of participation. The internet problematizes this temporality by marking, either through tacking or cookies, everyone who connects to it. In this way, research on the internet reconfigures who is a participant and who is an observer.

The blurring of the binary distinction between researcher and research subject was one of the limitations in my methods. As previously mentioned, as a researcher I was not willing to consent to the terms of use of the apps. This prevented me from creating personal accounts. Not having accounts neglected significant material that could only be observed within the apps themselves. At the same time, this limitation points to a significant privacy concern at stake with using one's personal cellphone as a site for fieldwork. Even with precautions toward my personal cell phone, navigating the websites on a desktop still breached researcher privacy. As I tried to observe these websites, they too made it abundantly clear they were observing me via my cookies.[45] It was no shock when I started randomly receiving ads for Ovia Health and new birth controls in the middle of my personal accounts- which are connected to the IP address and email attached to my research computer. By conducting research, I inadvertently became subject to the exact forms of surveillance the objects of this research- genuine users of FemTech- are subject to.

Reuben Miller writes about the gift of proximity as an aptitude awarded to those researchers who in their own lived experience have witnessed, embodied, been proximal to the subject of their research.[46] This celebration of proximity particularly uplifts the work of scholars

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[45] Cookies are data from a website that is stored within a web browser. They provide servers with unique identifiers from a web browser, such as usernames and passwords.

[46] In *Halfway Home: Race, Punishment, and the Afterlife of Mass Incarceration* Reuben Johnanthan Miller chronicles his experience as he builds relationships with people who have been incarcerated or have close relationships with the system, to highlight the ways in which proximity to the criminal justice system tends to have negative impacts. In the Appendix Miller accounts his own connections with mass incarceration through being the son and brother of incarcerated men. He calls this the gift of proximity in its ability to allow him to speak about the subject matter from a position of experience.

who themselves inhabit marginalized identities, by allowing their proximity to show up in their work. The gift of proximity was generously offered to me over the course of my research. As I currently write this, I lay in my own sick bed. Too weak to leave my bed, I must continue to work. At this moment, I am imparied by my own chronic "feminine" condition which refuses to name itself, and has proven defiant in the face of treatment. At times like these, I cannot help but think about the entanglements of my own condition with the second-class citizenship afforded to the feminine conditions this research addresses.

The urgency to call attention to the way feminine health is a lucrative field for venture capitalists to exploit, comes from a yearn to centralize my own struggles alongside those of my sisters and siblings. It comes from a place of having used the types of technologies which are the subject of this research. It comes from being a part of the ill-healthed,"at-risk", insuranceless, low-income groups that neoliberal approaches to public health have neglected. This project is not an attempt to conceal the objects of research, but it is to take ownership of my own position in the MIC.

App Overview

Sprout Health is the name for a suite of health apps designed for managing pregnancy, child development, women's health and chronic conditions. The suite includes four apps- Sprout Pregnancy, Sprout Baby, Sprout Care, and Sprout Fertility & Period Tracker. Founded in 2010 by two white men, Alex Romayev and co-founder Robert Kern, the platform is based in Bridgewater, New Jersey. On their LinkedIn profiles, both men express their enthusiasm for technology and design before any mentions of feminine health.[47] [48]

Much larger than Sprout, Ovia Health is another suite of health apps catered to feminine and family health. Formerly called Ovuline, Ovia is the self proclaimed largest and most trusted family health app. It is a Boston based company founded in 2012 by Paris Wallace, Alex Baron, and Gina Nebesar, two Harvard University men and a Harvard woman. Paris Wallace, the current CEO of Ovia is a biracial black man who is a self titled "DEI crusader" and "serial entrepreneur."[49] Alex Baron is the technological brain of the operation. In 2012 he and his wife were awaiting a baby when he created an algorithm that predicted her ovulation. This algorithm was the beginning of Ovia Health.[50] Gina Nebessar is the product officer at Ovia. She attended Harvard Business School at the same time as Wallace. Curiously enough, Paris Wallace is not listed as the CEO on their site. Instead, Pamela Abbott, a visibly Asian woman, is shown as the president.

Clue is a menstrual cycle tracker based in Berlin and was founded in 2013 by Ida Tin. Clue has become one of the leading period trackers on the market, with over 8 million users

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[47] Alex Romayev's LinkedIn profile, accessed April 2022, https://www.linkedin.com/in/alex-romayev
[48] Robert Kern's LinkedIn profile, accessed April 2022,
[49] Paris Wallace's LinkedIn profile, accessed April 2022, https://www.linkedin.com/in/pariswallace
[50] Cameron Bruns, "Who's That Gal: Gina Nebesar of Ovia Health," Just Us Gals.

globally. Prior to becoming the CEO of Clue, Tin, like the others, was an entrepreneur. She has gained significant acclaim for her coining of the term "FemTech," and her empowerment rhetoric behind Clue. As a woman founder, Ida Tin is a rare exception in an industry predominantly led by men.

Finally, Flo is another menstrual cycle tracker which supports people at each stage of their cycle. It predicts cycles, tracks menstruation, ovulation, pregnancy, early motherhood, and menopause. Like Clue, it is one of the most used period trackers. The app was founded in 2015 by two Danish men, Dmitry Gurski and Yuri Gurski. Like Wallace, Dmitry is also a self proclaimed "serial entrepreneur."[51] He is Stanford Business school educated. Yuri is both an IT specialist and an entrepreneur.

These personal details about each founder are necessary to better understand the types of people behind FemTech. These details highlight that FemTech uses entrepreneurial acumen to exploit women's health. With the exception of Ida Tin, the founders are almost exclusively men. With the exception of Paris Wallace, they are exclusively white. The administrative boards of these four companies convey that cis, straight, white men get to make decision about women's health. Over the course of the next several sections, a comparative discourse analysis of these four platforms will be presented.

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[51] Dmitry Gurski's LinkedIn profile, accessed April 2022, https://uk.linkedin.com/in/dmitrygurski.

Visuals

  A discourse analysis in the traditional sense of rhetorical analysis can lose sight of a crucial element in digital media. Visuals are often more overt than language-based messaging. For this reason, this section engages strictly with the visual elements of the four platforms. It critically analyzes features of website architecture, such as layout and images, as messaging. It interrogates who the platforms visually include, as mechanisms of branding. In this section, I argue that the visuals of these platforms have a two pronged mission: (1) appealing to for-profit health partners/educative initiatives, and (2) conducting diversity, equity, and inclusion crusades.

  A website's architecture describes the hierarchical structure of the site and maps its internal linkages.[52] The design of the Ovia Health and Sprout Health websites demonstrate a poignant appeal to for-profit health partners. Both websites emphasize for-profit partnerships over individual users. At Ovia, there are two tabs designated to "health plans" and "employers," while only one tab is designated to "individuals." This 2:1 ratio points to a structural imbalance in the website's design, wherein more space is allotted to health partners than to individuals.

  Sprout highlights their partners through color contrast. The titles for all tabs except one are colored a monotonous gray, while one title stands out in a vibrant blue. "Our apps," "app support," "about," "media," and "contact" are all gray, while "Sprout for Enterprise" is blue. The color contrast draws attention to the tab. Coincidentally, the enterprise tab is where hospitals, insurers, and advertisers can locate information on contracting with Sprout. These two methods of focalization in the architectures of these websites demonstrate a commitment to for-profit health partnerships. This commitment to for-profit is demonstrated in the fact that 77.8% of

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[52] Clifford Chi, "What is website architecture?," Hubspot, May 2021.

survey respondents reported not using pregnancy trackers because they did not even know about them.[53]

Unlike periods, which are predominantly viewed as hygienic matter outside the medical profession, pregnancy is a condition which specifically underwent medicalization beginning in the 19th century.[54] The invention of the obstetrical forcep in 1848 marked a rise in physicians and surgeons as primary childbirth deliverers. Medicine was emerging as a male dominated profession at this time.[55] By introducing forceps as surgical tools, male surgeons were exclusively able to perform delivery in obstructed pregnancies, providing the possibility of saving both pregnant person and child. Forceps intervened in the instrument-less practice of midwifery.[56] By the mid 1940s after World War II, it was common practice for births to take place in Hospitals.

Birth workers such as midwives and doulas are still used, but are far less common today. In 2019, the CDC reported that only 9.8% of births in the U.S. were performed by certified midwives.[57] The Black Mamas Matter Alliance has worked to advance black maternal health, rights, and justice. They also uplift the work of locally based, black women-led, maternal health initiatives and organizations. The Alliance partners with many community based birth workers such as doulas and midwives. They have subsequently revived a conversation about, and increased the use of, birth workers in many Black American communities across the country.

In 2020, amidst the global Covid-19 pandemic, home births in the U.S. increased by 1.26% from 2019. Black and Hispanic women had particularly higher rates of home births that

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[53] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.
[54] Deborah Lupton, Medicine as Culture: Illness, Disease, and the Body, 3rd ed. (Los Angeles: SAGE, 2012), 11.
[55] Ibid.
[56] Ibid.
[57] Joyce Martin et al., "Births: Final Data for 2019." *National Vital Statistics Reports,* 2022.

year (36% and 30% increase, respectively), in comparison to white women (20% increase).[58]

This increase is the highest since the 1990s.[59] In 2020, there were 861 reported maternal deaths,

at a rate of 23.8 deaths per 100,000 births. The death rate was disproportionately high for Black

mothers, who represented 55.3% of deaths. For comparison, Hispanic mothers died at 18.2%,

and white mothers at 19.1%. These statistics highlight recent challenges in maternal care, vis-a-

via the country's exceedingly high black maternal mortality rate.

I suggest that the website design of pregnancy trackers Ovia and Sprout, which prioritize

for-profit health partnerships, speak directly to the presented challenges in maternal care. Unlike

period trackers who are tasked with combating menstrual taboos, pregnancy trackers are tackling

the current crisis of maternal mortality and morbidity. This issue centralizes racism in healthcare,

medical/non-medical birth work, costs, and services. By promoting for-profit health partners,

pregnancy trackers offer a for-profit health solution to the maternal mortality crisis.

Conversely, the architecture of the period tracker websites follow a consumer oriented

design. Flo's website is organized by resources that users may find useful, including: health

library, medical expertise, about us, privacy portal, help center, careers, and Flo for business.

Although it includes a business page, this page is not highlighted by color contrast like at Sprout.

Similarly, Clue categorizes their website strictly by user tools, including: encyclopedia, careers,

and Clue birth control. The birth control tab is, however, highlighted by an orange box. This

emphasis points to the legitimation of an internal project, rather than an appeal to external for-

profit health partners. The consumer oriented designs of the period trackers differ from the health

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[58] Elizabeth C.W. Gregory et al., "Changes in home births by race and hispanic origin and state of residence of mother: United States, 2018-2019 and 2019-2020, National Vital Statistics Reports, 2022.
[59] Martin et al., "Births."

partner oriented designs of the pregnancy trackers. This difference is the second method to the

first prong of visuals- educational initiatives.

The purpose of period trackers as primarily educational is based on historical tensions

between biology/medicine and society/culture in shaping women's anatomy, bodily experiences,

and conditions. In *Medicine as Culture*, Deborah Lupton writes:

> "For centuries women have been defined as the Other in medical discourse, the
> 'sick' or incomplete version of men: as weaker, unstable, the source of infection,
> impure, the carriers of venereal disease or the source of psychological damage to
> their children."[60]

Continuing this sentiment, Dorothy Roberts brings race into the conversation by adding,

specifically, that black women are the locus of this othering.[61] Johanna Hedva takes this

metaphor of the woman as the 'sick' other and reconfigures it to identify with all 'othered'

identifies: disabled, queer, trans, poor, and ill-healthed, to say all of these identities are co-

constructed.[62]

Menstrual taboos associated with these bodies reify constructions of women as 'other.'

Using Mary Douglas' conclusion of uncleanliness as that which is "out of order," Lupton asserts

that these symbolic cultural rules about dirt and pollution may regard menstrual blood as

breaching the boundaries of a normal body, which contains blood except for when injured.[63] [64]

The symbolic associations of blood with bodily disorder, paired with an understanding of the

menstruating woman as a vesicle of uncontrollable blood flow, render menstruating bodies as

[60] Lupton, Medicine as Culture, 2.
[61] Roberts, Killing the Black Body.
[62] Hedva, Sick Woman Theory.
[63] Mary Douglas, Purity and Danger, Routledge, 2003, 41.
[64] Lupton, Medicine, 8.

anxiety-provoking. These common cultural understandings of menstruating bodies are reinforced through clinical renderings of the human body, which are often abled-bodied, cis, white, and male.[65]

In contrast to these taboos, post-modern feminist renderings of menstrauation, based in Foucaudian thought, tend to reinforce positive attitudes of the self and the body. Here, menstruation is understood as achieving sexual maturity, lack of pregnancy, normality, bodily order, and good health.[66] For example, Donna Haraway's Cyborg is a humanoid chimera, which views sex, gender, ethnicity, and arguably disability as indeterminate and fluid.[67] [68] Although not directly about menstruation, Haraway possesses a sentiment common of post-modern feminists who deny the valorization of the uniqueness of women's embodied experiences (i.e. menstruation, pregnancy, menopause) as products of femininity constructed by patriachy.

By promoting educational initiatives which enforce post-modern feminist principles, period trackers like Flo and Clue counter patriarchal understandings of women's bodies. Because cultural attitudes, supported by biology and medicine, posit women and menstruation as deviations from the norm, period trackers are afforded the role of education. 87.8% of people reported using period trackers.[69] 82.3% of them said their period apps were useful.[70] By choosing to engage with these apps, the educational approach of period trackers aids in creating personal responsibility. The two approaches embodied by pregnancy and period trackers apply to the first

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[65] Lupton, Medicine, 3.

[66] Lupton, Medicine, 8.

[67] Donna J. Haraway, "A Cyborg Manifesto: Science, technology, and Socialist-Feminism in the Late Twentieth Century," in *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 149-181.

[68] Although commonly read as exclusionary to disability, I suggest Haraway leaves room to read disability into cyborgism. However, this is not to equate disability with cyborgism, but simply to insert disability into the metaphor.

[69] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.

[70] Ibid.

prong of FemTech platform's mission. This mission is to appeal either to for-profit health partners or to educational initiatives.

The second element to the visuals of these sites is images. Images point to the second prong of FemTech platform's mission- what I call the diversity, equity, and inclusion crusades. Ovia and Flo use similar tactics in their DEI efforts. Images of diverse, happy people are pervasive on both sites. The people depicted in these images may be coded as people of color, either through skin, hair, or bodily features.[71] The images also tend to suggest queerness, single parenthood, and interraciality- all viewed as non-conforming or deviant in the face of white supremacy and heteronormativity. Importantly, diversity on both websites happens everywhere, not just designated LGBTQ+ or DEI sections. The pervasive image of diversity on these websites can be interpreted as serving two purposes: (1) to rightfully visualize non-normative people into medical archives, and (2) to potentially attract these audiences to use their apps. The first purpose is a well intended effort at mitigating racial, ethnic, gender, and sex-based disparities in healthcare and medicine. The second purpose serves the capitalist agenda of these apps. Nonetheless, Ovia and Flo demonstrate the most vigorous campaign of the DEI crusades.

Clue takes a more reserved approach to the DEI crusade by animating most of their images of non-white bodies. What is intriguing about these animations is their contrast to many of the live-action photos, which are almost exclusively white and heteronormative. The contrast between the animations and the live action photos can be interpreted as Clue's dream of diversity, while not materially implementing it.

Figure 1. Screenshot from Clue website showing live action images of white bodies, while animating images of non-white bodies. (Clue, 2022).

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[71] W. E. B. Du Bois and Eric J. Sundquist, The Oxford W.E.B. Du Bois Reader (New York: Oxford University Press, 1996), 41.

Of the four platforms, Sprout is the least participatory in the DEI crusades. In general, there are not many images of adults or families depicted on their site, only of babies and fetuses. The few images of families are white and heterosexual. The Sprout apps tend to stick to animated icons such as those of babies, diapers, stethoscopes, and calendars. These racially impartial icons give the effect of Sprout as a universal platform. This impartiality to diversity-which can certainly be read as a negligent reinforcement of heteronormativity and white

supremacy- speaks to Sprout as a platform which does not proclaim to champion racial disparities in the way the other platforms do. By only depicting non-racialized babies, Sprout presents a nuance to the DEI tactics of FemTech platforms. They do not all enforce DEI in the same way, and the methods they choose may be indicative of their bottom lines.

One curious visual component of the pregnancy trackers are their reconstructions of fetal images typically rendered by sonograms. Ovia and Sprout have features which allow users to view images of their babies as they grow in the womb. These images, closer in resemblance to human babies than sonogram images, humanize the unborn fetus. In *The public life of the fetal sonogram: technology, consumption, and the politics of reproduction*, Janelle S. Taylor makes a compelling argument for the way ultrasound imagery is used outside its medical context by: parents to distribute images of their child- to be, anti-abortion advocates to insist on the liveliness of a fetus, and by advertisers to induce anxiety or hope about the unborn fetus. These non-clinical uses of ultrasound imagery often have contradictory purposes in comparison to their medical intention- which is primarily a diagnostic technology that identifies complications and disabilities with fetuses.[72] The mismatch between the use of ultrasounds in a clinical context and lay uses of these images speak to a debate on medical/non-medical paradigms of pregnancy.

The reconstruction of ultrasound imagery by pregnancy trackers offers both sides of the medical/non-medical debate on pregnancy. As digital technologies, Ovia and Sprout do not have the capacities of hospitals in creating real sonographic images. However, since these apps act in lieu of hospitals, they assume the role of simulating sonographic images. I suggest that these fetal animations serve the same purpose and provoke similar sentiments as ultrasounds. They simultaneously medicalize and unmedicalize these images. More so than ultrasounds, these

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[72] Janelle S. Taylor, The Public Life of the Fetal Sonogram: Technology, Consumption, and the Politics of Reproduction, Studies in medical anthropology (New Brunswick, N.J: Rutgers University Press, 2008), 4.

animations give facial features and characteristics to the fetuses, rendering them fully formed

babies. On Sprout, users can even share the image of the fetus, the baby's kicks, and contraction

information, directly to Facebook. In doing so, the app extends the pregnancy experience beyond

the pregnant subject, making it a more (digitally) social event.[73]

Figure 2. Screenshot of Ovia app (left) and Sprout website (right) depicting fetal animations with descriptions. In contrast to sonograms, which tend to be black and white and without recognizable features, these animations color, give detailed faces, and even names to the fetus.
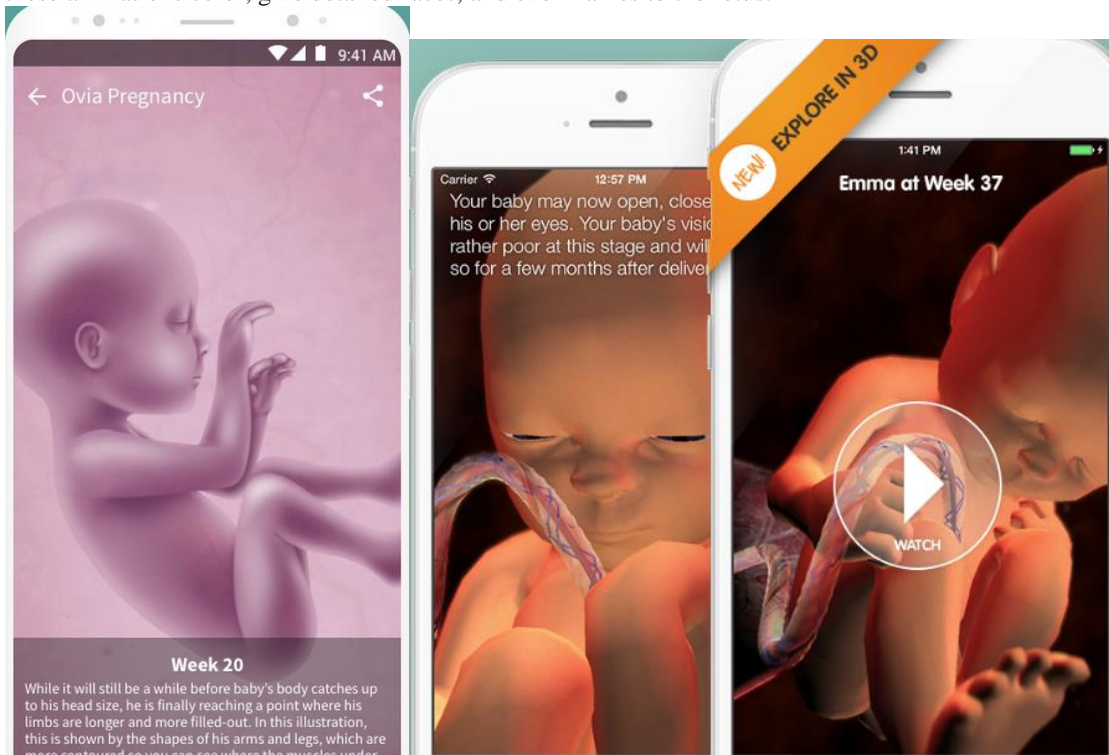
The social media sharing encouraged by Sprout conveys a distorted vision of what

community looks like in medical spaces. Prior to the COVID-19 pandemic, and certainly

heightened by it, hospitals have been notorious for their patient visitation limits. Black and

brown patients are reported as having less frequent and shorter visitations, in comparison to

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[73] Sophia Johnson, "'Maternal Devices', Social Media and the Self-Management of Pregnancy, Mothering and Child Health," *Societies* 4, no. 2 (June 13, 2014): 340.

white patients.[74] During the pandemic, limitations on the number of visitors, even in labor and

delivery departments, were reduced to one visitor. This new restriction meant that, for example,

black birthing people, who are more likely to receive doula support during childbirth in

comparison to white women, were now forced to choose between having doula support or

support from a partner or loved ones.[75] In New York, ShiShi Rose and other doulas fought for

hospitals to allow them into the birthing room when black birthing people went into labor.[76]

They argued that especially in a pandemic where black people are dying at disproportionate

rates, black birthing people need to be supported at the crucial moment of giving life.[77] These are

the sorts of nuances that the healthcare system is expected to facilitate. This is why I suggest,

with Mia Mingus, that the right to receive care also entails the right to refuse it, until we receive

it exactly how we need it.

The image of hospitals as restrictive institutions which tend to enforce safety in draconian

(often anti-black) manners, is strikingly different from the image of Sprout, with its celebration

of community. Sprout is not the only platform that fosters a digital community. Ovia also

encourages users to post photos on Instagram using the hashtag #OviaBaby. Use of hashtags on

social media certainly foster communities for users of all these platforms, including Clue, and

Flo. These apps create a sense of community which is not typical in real-life medical spaces,

such as hospitals. I present the sociality of period and pregnancy trackers as a practice that, if

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[74] Zeynal Karaca and Herbert Wong, "Racial Disparity in Duration of Patient Visits to the Emergency Department: Teaching Versus Non-Teaching Hospitals," Western Journal of Emergency Medicine 14, no. 5 (September 17, 2013): 529–541.
[75] Alexandra Norton et al., "Impact of Hospital Visitor Restrictions on Racial Disparities in Obstetrics," Health Equity 4, no. 1 (December 1, 2020): 505–508.
[76] ShiShi Rose, "Doulas Are Essential," Medium, November 1, 2020.
[77] Ibid.

properly implemented, could be beneficial in the real world. I suggest that more hospitals should embody this spirit of community in their policies on doulas and visitor limitations.

At the same time, the sense of community created by the digital nature of these platforms raises an interesting question for how these platforms do not actually mitigate disparities in the U.S. healthcare system, but instead reinforce them. The potentially positive effects of the digital communities in light of their DEI crusades can convey the message that those who are systematically discrimminated, mistreated, and traumatized by the MIC- namely black and brown women, gay people, trans people, and all other non-conforming people- must resort to digital health because of systematic discrimmination in real-world medical intutuions. From this perspective, health apps provide amateur digital remedies, while reinforcing real-word inequities.

Language

Part of assessing FemTech platforms is interrogating the language used by the companies; how they describe themselves, what words they choose to use. This rhetorical analysis will help better understand how these apps configure user attitudes about themselves and their health. I argue that the language used by FemTech apps is empowering in a manner that promotes personal responsibility. This model, which views empowerment and responsibility in tandem, will be shown to serve the emerging expansive projects of FemTech.

Between Clue, Flo, Ovia and Sprout, they use some variation of empowering language. They all either pander to the individualistic affordances of digital technologies, or to the increased autonomy over bodily health that technology allows. At Clue, this model of empowerment is most apparent in their slogan to "understand how your body works."[78] Of all

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[78] Clue, 2022.

four platforms, Clue is the biggest perpetrator of empowerment lingo. The site includes an entire

encyclopedia of terms related to anatomy and conditions associated with menstruating. By

educating themselves with the selected terms, users have the power of knowledge over what is

made available about their bodies. The existence of this encyclopedia as a central component to

the website has an er of empowerment to it. Like the visuals, the educational initiatives of period

trackers (i.e. Clue's encyclopedia) empower users through educational language. Clue is also

very adamant about including possessive pronouns in their rhetoric. They do not just educate

about 'cycles,' but rather about "your cycle." The use of possessive pronouns is a minute detail

which demonstrates Clue's efforts at trying to give their platform a more personalized feel.

Figure 3. Screenshot from the Clue website Encyclopedia menu. These terms are meant to cover what Clue considers the breadth of words and conditions associated with periods and pregnancy. The text of the image reads: Menstrual cycle: your vagina, puberty, skin & hair, diet & exercise, bleeding, emotions, miscarriage, anatomy, reviews, products, periods, menopause and perimenopause. Birth control: hormones & your cycle, hormonal birth control, abortion, non-hormonal birth-control. Fertility: pregnancy, birth & postpartum. Issues & Conditions: cramps & pain, PMS & PMDD, endometriosis, covid-19, PCOS. Sex: pleasure, STIs, dating & partnership. Life & Culture: LGBTQIA+, gender equality, race, society. About Clue: events, how to use Clue, meet Clue. End description. The vast extent of this list coupled with the use of possessive pronouns highlights Clue's intention to empower users through education.

Flo and the pregnancy trackers also have similar uses of empowerment language. A

Vogue magazine review of Flo said it "[empowers] women through shared information."[79] The

way they categorize the "your cycle" page on their site into "health," "sex," "lifestyle,"

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[79] Flo, 2022.

"menopause," and "puberty" as subheaders, communicates their intention to make users feel

educated and empowered at every stage of their lives. Similar to Clue, they also use the

possessive pronoun "your" to directly call users into the conversation. 30% of users reported

their period tracker induced positive feelings, while 47.6% denied that they induced negative

feelings.[80]

Beyond the educative benefits professed by the period trackers, pregnancy trackers add a

dimension of necessity and responsibility in partaking in the digital documentation they promote.

At Sprout, they encourage the use of their apps because it helps users "stay organized" and

"track feedings, pumping, sleep and diapers with charts to identify patterns and trends."[81] The

simple language used to describe Sprout's features can be crucial for encouraging parents to use

the app. 50% of users said they found their pregnancy tracker useful.[82] Simultaneously, the

simple language can be seen as implicitly demonizing those who do not use Sprout. In 2012,

Sprout was named an Apple "essential app for parents," and made Time Magazine's list of top

fifty apps the same year.[83] [84] Because Sprout is marketed as providing the necessary tools to a

successful pregnancy, it could be argued that those who choose not to participate are deemed

irresponsible or negligent to some extent. 50% of users said their pregnancy tracker induced

positive thoughts about themselves and their fetus.[85] This analysis builds from Dorothy Robert's

observation of personal choice as the implied central element to a healthy pregnancy.

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[80] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.

[81] Sprout, 2022.

[82] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.

[83] Ibid

[84] Matt Peckham, "Pregnancy (Sprout) Made It onto TIME's '50 Best IPhone Apps' List," *Time*, February 6, 2012.

[85] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.

Ovia adds the fact that "millions of women rely on Ovia Health for reproductive health support," incentivising their effort to allow users to "gain control of [their] parenting journey."[86] In doing so, Ovia technologically empowers users who, for many reasons, might need to 'rely' on Ovia for support. This language of reliance, coupled with its visual appeal to marginalized communities, raises questions about the socio-political realities Ovia reinforces. One user said they used pregnancy trackers "to learn about stages of pregnancy once pregnant."[87]80% of people reported using pregnancy trackers to cause pregnancy.[88] Acknowledging that many people have to rely on FemTech platforms to receive reproductive education and support, poses a problem of ethics in the profiteering of Ovia and other platforms on educational and care disparities in the MIC. Capitalizing off the underserved (and already capitalistic) MIC is not a technological revolution. It is a predatory, classist, act of violence.

In 1969, rising healthcare costs were a "massive crisis," according to President Richard Nixon.[89] The creation of Medicare in 1966 led to an arms race mentality by medical institutions, who irresponsibly made investments in machines, operating rooms, and specialty units. Another problem the system faced was the over-specialization of physicians, which led to a maldistribution of care both across the country and across specialities.[90] By the late 1980s, pharmaceutical companies larded the healthcare system with expensive, addictive drugs, which gave rise to the opioid epidemic.[91] In 2018 President Donald Trump delivered a speech in New Hampshire about fighting the opioid crisis. He incorrectly blamed China, Mexico, and sanctuary cities for the proliferation of these drugs. His chosen enemies completely ignored nineteenth

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[86] Ovia, 2022.
[87] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.
[88] Ibid.
[89] Jonathan Engel, Unaffordable:American Healthcare from Johnson to Trump, 2018, 10.
[90] Engel, Unaffordable.
[91] Ibid.

century Euro-American regimes of racial narco-capitalism, which eventually aided in

transforming Afghanistan into a narco-state, and primary supplier of opium.[92] [93] Today,

healthcare accounts for 19.7 percent of America's gross domestic product, double that of other

countries such as Denmark, Japan, and France which all typically make the list of top healthcare

systems.[94]

By providing "free" digital solutions, FemTech companies attempt to mitigate high

expenditures on healthcare in this country. Of the 87.8% of people who reported using period

trackers, 73.4% found tracking apps more convenient than other forms of recording.[95] Through

their empowerment language, they offer a desire and solution for taking care of one's own

health. This empowerment takes the job of physicians, educators, and other professionals, and

distributes that labor and *responsibility* to individuals themselves, ultimately reducing costs.

FemTech's twin politics of neoliberalism and technochauvinism reinforce the idea that

the marginalized communities they target must be subjected to digital health for healthcare costs

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[92] See Max Mishler, Race and the First Opium Crisis, Boston Review, 2019. Opium trading was one of the ways early American and British imperial capitalists sought to balance the fortune of China in global trade. By 1820 opium was the greatest Western import into China. Abolitionists drew explicit connections between the suffering of enslaved Africans and Chinese opium addicts, both of whom were vulnerable racialized populations subjected to the depredations of Anglo-American capitalism.

[93] Donna Murch, How Race Made The Opioid Crisis, Boston Review, 2019.

[94] Christy Ford Chapin, Ensuring America's Health:The Public Creation of the Corporate Health Care System, Cambridge University Press, 2015.

[95] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.

to decrease for the rest of the country.[96] From this perspective, the digitization of healthcare through the use of advanced, hyper-personalized technologies should be understood first and foremost as an economic endeavor which capitalizes off, and replicates disparities in the U.S.' medical industrial complex. These cost reduction strategies may be seen as exemplary from an economic standpoint. Afterall, minimizing costs is esteemed in any capitalist society predicated on scarcity and zero-sum economics.[97] However, in the specific context of the MIC, this commitment to cost reduction hides a history of malpractices by hospitals, pharmaceutical companies, doctors, and many other actors in the MIC.

Recent origins of personal health monitoring is well documented in the history of centrist Democratic actions dating back to the early 1990s. The election of President Bill Clinton in 1992 marked a period of shifting attitudes and policies toward the use of technology by the Democratic party. As the Democratic nominee for the 1992 election, Clinton visited some of the leading high-tech corporate leaders of Silicon Valley in San Jose. They included John Young, chief executive of Hewlett-Packard Co. (HP), and Apple Inc. chairman, John Sculley.[98] Young and Sculley both endorsed Clinton's commitment to cooperation between government and industry. "Most people are trained to think about a separation of the public and private sectors, but I just don't think that's what's going to work in the competitive world today," Young said.[99] Prior to the Clinton administration's advocacy for technological advancement, Young and Sculley were both lifelong Republicans.[100]

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[96] In *Artificial Unintelligence,* Meredith Broussard uses the term technochauvinism to describe the belief that technology is always the solution.

[97] In game theory, zero sum is a situation involving two sides wherein the advantage of one side complements the equivalent loss of the other. When total benefits and losses are totaled, the net change is zero.

[98] Daniel Southerl, "For Clinton's High-Tech Plan, Corporate Cheers," Washington Post, September 17, 1992.

[99] Ibid.

[100] Ibid.

This new Democratic interest in technology, particularly their promise to support technological endeavors at federal expense, prompted Silicon Valley's overwhelming support for Democrats from 1992 and thereafter. By 1993, the Clinton administration was focused on centralizing the Democratic party by cutting federal funding for social welfare programs.[101] In office, they worked to fuse the technological sector with the economic sector through several initiatives. These initiatives included: the National Science & Technology Council, (gave Silicon Valley representation in Washington), the National Information Infrastructure (AKA the internet), which was a package of bills which sought to deregulate the internet for the purpose of nationalizing it, and finally, the semiconductor and dual use technology initiatives, which through ARPA would fund private corporations in their manufacturing of semiconductors.[102] This initiative allowed military technology, such as flat-screens, to be adopted for consumer use.[103] The adaptation of flat-screens would mobilize consumer technologies, making them smaller and hence more portable.

The reciprocal support between Democrats and Silicon Valley that began in 1992 points to a politicization of the cultural traditions of the Valley. Prior to Clinton's election, the Republican party was deeply invested in decentralizing technology and supporting early foundations of the internet.[104] In fact, Young and Sculley were themselves Republicans. However, it was the culturally liberal ethos purported by Democrats, coupled with their disposition to use federal funding to support tech companies, which ultimately obtained and retained the support of these companies for the Party. In short, Democratic cultural liberalism

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[101] Fred Turner, From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism (Chicago: University of Chicago Press, 2006), 215.
[102] Advanced Research Project Agency, not to be confused with the American Rescue Plan Act of 2021 with the same abbreviation.
[103] Making Silicon Valley Histories lecture, 2022.
[104] Turner, From Counterculture.

coupled with the fiscal conservatism proposed by the Clinton administration was favored in

Silicon Valley.

These notions of cultural liberalism and fiscal conservatism are what continue to drive

technological innovation today, as demonstrated in the case of FemTech. The four companies

promote liberal notions of "gaining control" of one's health.[105] However, the mode in which

they employ this autonomy primarily serves an economic purpose, upended to showcase an

attention to health. Particularly in the case of Ovia, its locality in a Boston tech hub demonstrates

a commitment to the tech hub mentality of what used to be Route 128. This is a mentality based

on independent firms, rooted in self-reliance.[106]

Bridging the gap between Democratic attitudes toward technology, and how these

attitudes were applied to medical technologies, which fostered the growth of personal health

management, is the task of the following section. It was mentioned prior that part of the Clinton

administration's centralist agenda manifested as cutting federal funding for social welfare

programs. This policy of diminishing the welfare state was posited as lowering dependency and

increasing productivity. In the 1996 State of Union Address, President Bill Clinton stated that

"the crime rate, the welfare and food stamp rolls, the poverty rate and the teen pregnancy rate

[were] all down."[107] This list of accomplishments was a celebration of the fact that for Clinton,

"the era of big government [was] over."[108] Although 'big government' was over, America was

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[105] Ovia, 2022.

[106] Saxenian, 2006, 12. In *Regional Advantage: Culture and Competition in Silicon Valley and Route 128,* AnnaLee Saxenian highlights the divergent industrial organizations of Silicon Valley and Route 128 that allowed the Valley to continue to grow as a technological hub in the 1970s while Route 128 lost its competitive edge. Saxenian points to culture, geography, and funding as components of their divergence, but ultimately focuses on their differing modes of integration. Silicon Valley being non-hierarchical, flexible, and interdependent, while Route 128 promoted a culture of stability and self-reliance.

[107] White House, "President William Jefferson Clinton State of the Union Address,"January 23, 1996.

[108] Ibid.

still committed to working together, he added.[109] This sentiment about the prospect of economic flourishing presented by a smaller government fits in line with Clinton's remarks upon accepting the presidential nomination at the Democratic National Convention in New York in 1992. He is cited as stating that America needs a new approach to government that offers "more empowerment and less entitlement."[110]

The assertion that the government should offer more empowerment and less entitlement are the grounds on which the systemic individualization of health was built upon. When Clinton hoeld the country's decreased crime rate, welfare state, poverty, and teen pregnancy as successes, he placed himself within an economically conservative canon which believes that to have rights entails responsibility. This (economic) responsibility is vested in a mission to turn the unemployed into workers who contribute to the economy.[111] The legislation of the Americans with Disabilities Act (ADA) which was signed into law in 1990 under the George H.W. Bush administration highlights similar sentiments toward employing the unemployed. In *Capitalism and Disability*, Marta Russell and Ravi Malhotra delineate how the ADA was partially enacted to decrease federal expenditures on welfare programs to incentivise disabled people to return to work. However, these policies did little to actually get people into work, instead, they only penalized people for not working.[112]

The two recounted histories about Democratic policies toward technology in 1992, and Republican attitudes toward labor and disability in 1990 in/enform the current figure of FemTech. Specifically, the sentiments of individual responsibility and technological advancement expressed by Republicans and Democrats have been co-opted by FemTech and

[109] White House, "President William."
[110] Archive, 1993.
[111] Russell, Marta, and Ravi Malhotra. "Capitalism and Disability." *Socialst Register,* 2002, 220.
[112] Ibid.

presented as empowerment. In the same way that Bill Clinton wanted a government model that allowed for more empowerment, less entitlement, FemTech's mission to empower women by allowing them to take their health into their own hands follows a similar logic. When Ida Tin, founder of Clue, claims it is important for women to be in touch with and learn about their bodies by digitally tracking periods and pregnancy through apps, we must ask ourselves whom this practice truly benefits?[113]

This glorification of individual action has been taken up in the Quantified Self movement. The QS movement is a community of technology enthusiasts who track their daily activities with apps in hopes of finding patterns to better understand themselves.[114] QS members understand themselves as postmodern humans, in their challenging of health authorities. The contradiction with the QS movement lies in the fact that the very devices they revere for unshackling them from authority, are the same tools that authority figures are using increasingly for control and surveillance. FemTech apps are examples of this contradiction. These apps tell women that they can and should manage the unpredictable occurrences of their anatomy to feel more in control and knowledgeable about their bodies. They convey the message that If women can tame this facet of their biology, they will finally be at liberty to labor productively, rather than reproductively. This reproductive labor turned productive labor highlights the implicit, unpaid, (re)productive labor women, menstruating people, and pregnant people are *expected* to perform for their own wellbeing and for the possibility of procreation.[115] While only 18.8% of

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[113] FemTech Live, "Femtech Founder: An Interview with Clue CEO, Ida Tin," October 7, 2021.

[114] Constantin, "Regaining Control."

[115] Rachael Louise Healy, "Zuckerberg, get out of my uterus! An examination of fertility apps, data-sharing and remaking the female body as a digitalized reproductive subject," *Journal of Gender Studies,* 2021.

users reported feeling like their period or pregnancy tracker was a lot of work, responses that

expressed they were not a lot of work were far more varied in terms of degree of agreement.[116]

Many disability justice thinkers have made the claim that capitalism exists in direct

tension to and opposition with disability. It is the capitalist definition of labor as determinant on

the physical capacities of workers that creates a class called the disabled.[117] Under a capitalist

paradigm of work, the only way that many disabled people are allowed to participate in the

economy is through their subjugation to this disabled class. This shows that disability is at the

heart of labor. This is an opportune moment to present the fact that under particular

circumstances, pregnancy is considered a disability under the ADA.[118] Considering this, the

perspective of disability as being in contention with capitalism raises questions of how FemTech

platforms serve capitalism?

Returning to the rhetorical analysis of these apps will further tease out possibilities to this

question. Across all four platforms, the language used tends to over-emphasize credibility. They

all promote their research based, data-driven solutions for women's health. The homepage of Flo

states that it is the "#1 female OB-GYN-recommended app for period and cycle tracking."[119] At

Clue, they claim that all their "predictions are based on the most up-to-date science."[120]

Following a Physician's review, Sprout is said to be "physician recommended."[121] Finally, at

Ovia they also claim to be evidence based and science backed by "ten plus years of data."[122]

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[116] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.

[117] Russell and Malhotra, Capitalism and Disability.

[118] See ADA Amendments Act of 2008.

[119] Flo, 2022.

[120] Clue, 2022.

[121] Sprout, 2022.

[122] Ovia, 2022.

In a data coding experiment conducted on the language used on Ovia's website, I found that of thirty-nine distinct categories of words and phrases used, language about data credibility was repeated most often. There were eighteen different iterations of data credibility language throughout the site. Data credibility language was followed by language about the "complete family care continuum."[123] The need to over-emphasize credibility by these platforms is an attempt to over-shadow the reality that most Americans do not trust tech companies with their personal health data.[124] By continuously awarding their medical expertise for their credibility, the platforms obscure the fact that user data is actually at the heart of their operations. As much as physician recommendations may speak to the integrity of these platforms, user data is what actually drives the algorithms, and hence the reliability.[125] If it were not for the millions of data that are fed into these algorithms, the platforms would cease to exist. This contradiction minimizes the role of the individual responsibility of users, which these companies boisterously advocate for at every other occasion.

Another language trend consistent across all four platforms is the use of language that expand the missions of the platforms. Second to language about data credibility, Ovia's website is riddled with language about supporting the "complete family care continuum." At Ovia, this refers to their mission to expand their services not just to pregnant people, but to provide care to all members of a family during pregnancy. This language of a care continuum is fairly vague, and I argue that the vagueness is intentional. Another phrase Ovia uses frequently is that they "meet families where they are," another vague claim to inclusivity.[126] I suggest that the

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[123] Ovia, 2022.

[124] Drew Harwell, "Is your pregnancy app sharing your intimate data with your boss?," *The Washington Post,* April 10, 2019.

[125] O'Neil, Weapons, 3.

[126] Ovia, 2022.

vagueness of these phrases serves the purpose of expanding the possibilities of what is expected of Ovia. This expansive language allows Ovia to become the single caregiver for an entire family.

Similarly, the other three apps have variations of this kind of expansive language. Sprout claims to provide "comprehensive information about you and your developing baby."[127] Use of the word 'comprehensive' suggests that Sprout can address everything related to pregnancy, hence why they consider themselves "the only pregnancy app you'll ever need."[128] This language also makes Sprout a tracker for the parent and the baby. Flo's slogan is to "track your health beyond periods."[129] Similarly, Clue's is "track your period and ovulation with Clue to understand how your body works."[130]

These slogans exemplify how many FemTech apps are broadening their scope to offer more services beyond period and pregnancy tracking. In the case of Sprout, the use of expansive language could be more so for competitive reasons as opposed to trying to provide more services. Sprout's position as one of the oldest pregnancy trackers, senior to Ovia, their claim about being the "only pregnancy app you'll ever need" may be competitive as opposed to trying to expand. Nonetheless, they and the other platforms use language that may serve to expand their services. The following section on "Service Partnerships" will provide a closer analysis on how the companies turn this expansive language into services.

The rhetoric of the period trackers are also characteristic of a different trend. In making statements about overall health beyond periods, these apps establish a broader territory of health

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127 Sprout, 2022.
128 Ibid.
129 Flo, 2022
130 Clue, 2022.

they can exploit. In their expanded models, periods are no longer just a condition of the uterus, but wholly determine the overall health of those who menstruate. By this logic, to understand one's period is to understand their entire body and health. This perspective reduces menstruating people to the capacities of their reproductive organs. This particularly gendered attention to the dynamic changes that occur within the tissular space of the body's mass are the premises on which Foucault noted changing clinical spatializations in the nineteenth century.[131] For nineteenth century physicians, these dynamic changes in the body were the "original site"or "spatial and temporal starting point"of pathology.[132] [133] The essentialist understanding of health promoted by period trackers, which focalizes menstruation as the central point (and deviation) of health, are not dissimilar from nineteenth century ideas on the geography of the body. This perspective centralizes gender in health, and further tethers heteronormative conceptions of gender and sexuality to menstruation.

Additionally, period tracker's offering of ovulation and fertility preferences also reinformces heteronormative conceptions of gender and sexuality. 76.9% of people report that their peiod tracker informs about ovulation and fertility.[134] Although these apps allow users to select whether they are trying to avoid pregnancy or not, conception is always the norm that has to be opted out of. 83.8% of users said their tracker did not discourage them from conceiving.[135] This standardization of conceiving reinforces stereotypes about the reproductive obligations faced by people with periods. It configures menstruation and conception as inseparable.[136]

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[131] Philo, Chris, "'The Birth of the Clinic': An Unknown Work of Medical Geography." *Area* 32, no. 1 2000, 15.
[132] Michel Foucault, The Birth of the Clinic; an Archaeology of Medical Perception, Pantheon Books, 1973, 140.
[133] Ibid.
[134] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.
[135] Ibid.
[136] Healy, "Zuckerberg, out my uterus."

Rhetoric which highlights credibility and promotes platform expansion can be seen as plausible business models. There is nothing intrinsically unethical about advocating for the integrity of a product. However, it is unethical when this integrity is promoted under false pretenses. Femtech platforms, especially period trackers, buttress the very anti-patriarchal establishments they attempt to combat in their expansive language. By exaggerating their credibility, they diminish the role that user data plays in their subsistence. In this light, expanding FemTech platforms is both an employment and exploitation of individual responsibilities to health.

In *Powers of Freedom,* Nikolas Rose offers an application of Foucaudian governmentality to the advanced liberalism of Anglophone states. Rose insists that power relations can no longer be understood as who enforces it, but rather by how it operates.[137] This project proposes that FemTech possess distinct governmentalities which provoke particular attitudes about cis-normative, female anatomies, and replicate disparities in the MIC. This is not saying that FemTech is part of government, but that it employs certain mentatlities of governance (i.e. cis normativity, personal responsibility) over its users.

The individualized model of health promoted by FemTech gives rise to the phenomenon of the "expert patient." The expert patient explains how the advent of healthcare apps that encourage self-tracking, have allowed users to become experts on their conditions. These expert patients know exactly the right questions to ask doctors and are able to self advocate in medical environments.[138] This expectation of self-advocacy is incredibly classist because it is premised on the belief that people should already know the correct information, and ask the right questions to receive care. FemTech's educational initiatives epitomize the expert patient, furthering gaps in

[137] Nikolas S.Rose, Powers of Freedom: Reframing Political Thought. Cambridge University Press, 1999.
[138] Johnson, "Maternal Devices," 331.

the MIC, which is predicated on self-advocacy. This model of healthcare essentially excludes those who are unequipped, either materially or logistically, from receiving care. The four apps' vehement expressions of empowerment through language raises important questions about inclusivity. When empowerment is understood in conjunction with personal responsibility, new power dynamics emerge. This is a power relation which idolizes responsibility as an act of freedom. Understanding that freedom is a key invention and resource of governance, the question of who is allowed freedom in the first place becomes more important than how people utilize their freedom.[139]

Service Partnerships

Clue, Flo, Ovia and Sprout all offer different services marketed to individuals and for-profit partners. Because the previous section analyzed their marketing tactics to individuals, this section will closely examine their marketing of services toward for-profit partners. Many elements of the service sector can be understood through Marxian terms. Chief to this perspective are the modes through which the service sector directly produces surplus value. In this section, I argue that FemTech platforms offer a myriad of services as a means to broaden the horizon of what digital health is capable of. It will be shown that these companies profit off of appropriating and rebranding established knowledge about periods and pregnancy.

Similar to their visuals, the variety in services each platform provides speaks to the divergent goals of FemTech platforms. A classically Marxist interpretation classifies activities in

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[139] Rose, Powers.

their relationships to the production, realization, appropriation, and distribution of surplus-value. Indeed, the economic process in capitalism with which Marx is centrally concerned is the production and appropriation of surplus-value.[140] For this reason, this section will interrogate the ways in which FemTech companies create surplus value.

In the Language section, it was shown that services offered by FemTech apps market empowerment to individuals. To for-profit partners, services are marketed to expand platform capabilities. These services tend to have the potential to mitigate health disparities. However, the for-profit nature of FemTech apps brings into question at what cost these benefits come. Of the four platforms, Clue is the only one that does not (openly) partner with insurers, or employers. Instead, Clue's partnerships are for enhancing user experience. For example, in August of 2021, L'Oréal, a renowned French cosmetics company, announced a partnership with Clue to advance scientific knowledge on the relationship between skin and menstrual cycles.[141] This partnership has allowed Clue to offer a new skin tracking feature. Another example of a user oriented service is their development of a "digital birth control." This model of birth control essentially repackages the cycle tracking technologies already in use at Clue, and rebrands them as a new contraceptive. For U.S. users, this "contraceptive" has been cleared by the FDA and will soon arrive to consumer markets.[142] Research partnerships promoted for improving user experience are common amongst FemTech platforms. 71.9% of users reported enjoying using their period tracker.[143]

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[140] Fiona Tregenna, "What Does the 'Services Sector' Mean in Marxian Terms?," Review of Political Economy 23, no. 2 (April 1, 2011): 285.

[141] Liz Flora, "L'Oréal Group Partners with Period-Tracking App Clue," Glossy, August 5, 2021.

[142] Clue, 2022.

[143] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.

Clue's partnership with L'Oréal and their new digital birth control exemplify both a broadening of their horizons, and the creation of surplus value by appropriating knowledge. The L'Oréal partnership reaches a new domain of skincare, where FemTech companies were previously not authorized. This expansion of Clue compliments the expansive language (and mission) many of these platforms possess. This partnership privatizes the research being conducted on the relationship between skin and menstruation, potentially narrowing the remedies.[144] Although the research may be well-intended, the privatization significantly decreases the scope.

On the other hand, their creation of what they call "digital birth control" is merely an appropriation of pre-hormonal contraceptive techniques.[145] Birth control has been a common practice in indigenous and ancient civilizations prior to doctors. Technological societies have spread the common myth that modern medicine created birth control. However, prior to the 1950s, modern medicine did practically nothing to advance birth control.[146] Clue's digital birth control can be summed up as; using a calendar to track fertility. This method does not offer anything new, only appropriates and rebrands old knowledge. Of people who reported not using tracking apps, 100% of them reported using a calendar to track periods, and 80% used birth control in addition, for tracking.[147] Clue's contraception could be a viable option for those who have health complications which result in adverse effects to hormonal contraceptives. However, capitalism survives by bringing into the market matters that did not exist there prior. By

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[144] Flora, "L'Oréal Group Partners."
[145] Donna Shoupe and Daniel R. Mishell, eds., The Handbook of Contraception: A Guide for Practical Management Springer International Publishing, 2016, vii.
[146] Linda Gordon, The Moral Property of Women: A History of Birth Control Politics in America, Urbana and Chicago: University of Illinois Press, 2002,13.
[147] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.

repackaging and rebranding ancient histories of birth control, under the guise of artificial intelligence, Clue is only profiting and creating surplus value.

The second problem I propose is this new digital birth control creates a smokescreen in front of its unsustainability.[148] Clue's birth control is based on the dynamic optimal timing (DOT) algorithm which, like other machine learning algorithms, relies on increased data and computer power for improvement.[149] Digital solutions like Clue's contraception are often praised for their immateriality- they are less dependent on the movement of atoms (i.e. synthetic hormones) and focused on the manipulation of bits.[150] However, the data Clue will use to improve the accuracy of their algorithm is exceedingly material. "You can have electronic digital computers without binary digits, but you cannot have them without electricity," a keen observation made by Nathan Ensmenger on the electrical grid as an information infrastructure.[151] The material reality of algorithms as energetically and electrically inefficient poses a threat to understandings of the digital as "green."

Numerous studies have found DOT to be an efficient method of contraception, which is a promising possibility for FemTech.[152] This efficacy, however, must be assessed in light of its cost, sustainability, and privacy concerns. In 2016, Clue was granted twenty million dollars by Nokia Growth Partners to improve their algorithms.[153] This money was put toward hardware improvements- namely purchasing more powerful computers. In a 2020 study conducted by the

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[148] Thompson et. al., "The computational limits of Deep Learning," MIT Initiative on the Digital Economy Research Brief, Vol. 4. 2020.
[149] Ibid.
[150] Ibid.
[151] Nathan Ensmenger and Rebecca Slayton, "Computing and the Environment: Introducing a Special Issue of Information & Culture," Information & Culture: A Journal of History 52, no. 3 2017: 299.
[152] Victoria Jennings et al., "Perfect- and Typical-Use Effectiveness of the Dot Fertility App over 13 Cycles: Results from a Prospective Contraceptive Effectiveness Trial," The European Journal of Contraception & Reproductive Health Care 24, no. 2 (March 4, 2019): 148–153.
[153] Nokia Growth Partners Capital is a global venture capital firm investing in data-driven technologies.

MIT Initiative on the Digital Economy, it was proposed that curbing computing's environmental footprint relies on creating more efficient algorithms, rather than improving machine power through hardware.[154] This means that companies like Clue, who are truly dedicated to offering digital birth control, should focus on creating more energy efficient algorithms, rather than using deep learning algorithms like DOT.

Another example of FemTech companies partaking in partnerships that are promoted as improving user experience is Ovia. In February of 2022, Ovia Health partnered with two professors from the University of California Davis and the University of Wisconsin-Madison, to conduct the first ever randomized trial to improve WIC enrollment.[155] The study will test to see if pregnant people who are eligible for WIC are more likely to enroll in the program and have better health outcomes if they are told about WIC early in their pregnancies, through Ovia.[156] The implications of this study are exciting and promise new possibilities for the distribution of social welfare presented by FemTech. This is another example of a well-intended study which raises potential threats.

During the testing period, only Ovia users will have access to this crucial information on WIC. My fear is that if the results of this study report a positive correlation between Ovia usage and WIC enrollment, will these apps have more authority? Will this study set the precedent that in order to receive information about WIC, pregnant people must use trackers? As exciting as the next steps of this research might be, it could potentially further gaps in access to digital information.

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[154] Neil Thompson, "Curbing Computing's Environmental Footprint Requires Efficient Algorithms," VentureBeat, November 10, 2021.

[155] WIC is part of the federal Special Supplemental Nutrition Program for Women, Infants, and Children.

[156] Ovia Asks Podcast, 2022.

Part of improving disparities in the MIC is offering multiple treatment options for health conditions. This means that if Ovia is going to support WIC as a social program to improve health outcomes, there needs to be higher trust in federal agencies to actually do the positive work they profess to do. Kimberly Seals Allers, author, breastfeeding advocate, founder of her own FemTech platform, Irth, and of the First Food Friendly Community Initiative, notes that through WIC, the U.S. government is the largest purchaser of infant formula.[157] [158] [159] WIC provides federal money to states to serve low-income, pregnant and postpartum people and their children with health referrals, nutrition education and food.[160] This is a great benefit, which takes for granted the adverse health effects of formula feeding. For working class people, especially Black American women, who live with the historical traumata of breastfeeding as stigmatized due to slavery in this country, formula feeding offers a quick, destigmatized, alternative.[161] If WIC will continue to encourage formula feeding, the program equally needs to improve its breastfeeding initiatives.

Flo, Ovia, and Sprout are all part of an emerging trend in FemTech to partner with insurers, hospitals, and employers. Ovia and Flo are especially adamant about these partnerships,

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[157] Irth is a FemTech app founded by Kimberly Allers. It is a yelp-like app where users may find and post prenatal, birthing, postpartum, and pediatric reviews for and by black, brown, and inidegouns women. It allows users to search hospital and doctor reviews from their communities. Unlike the for-profit FemTech Irth is a non-profit which does not profess to provide medical care. Instead, it makes clear that it only creates a safe space for women of color to navigate these issues, in an attempt to reduce racial disparities in maternal mortality and morbidity.

[158] Also founded by Allers, the First Food Friendly Community Initiative explores the role of "place" in breastfeeding duration and success by implementing community-generated interventions to thereby improve infant and maternal health outcomes in vulnerable communities.

[159] Eisa Nefertari Ulen, "Black Women Do Breastfeed, despite Intense Systemic Barriers in the US" Truthout, August 26, 2016.

[160] Ulen, "Black Women Do Breastfeed."

[161] During slavery, Black women were prevented from breastfeeding their own children to breastfeed the slave master's children. Historical records show that many slave children died because their mothers could not breastfeed them enough. Because of this, there is sometimes a negative association with breastfeeding, especially among older relatives in the Black American community, as something forced, and associated with slavery. (Ulen, 2016).

offering variations of their apps for employers and insurers.[162] [163] Ovia offers a version of their

app designed for people who receive Ovia as a health or employer benefit.To employers, Ovia

promotes their high return of investment (ROI) rate, which is reported as 4:1.[164] [165] This 400%

ROI indicates that Ovia guarantees profit for employers. Some of Ovia's employer partners

include Yale University, University of Texas Systems, Medtronic, Athletico Physical therapy,

and News Corp, all primarily white collar employers. Similarly, at Flo they highlight how "when

employees feel their best, they work their best."[166] They report many statistics, including that

53% of users reported that using Flo made them feel more productive.[167] Flo encourages

partnerships with employers because they believe that their platform offers a resource which

allows employees to take a proactive approach to their health. Like Ovia, Flo's employer

partners also include primarily white-collar employers such as League, Myovant Sciences, and

Softswiss.

     How exactly do these platforms promise ROI to their partners? Ovia highlights their 91%

breastfeeding initiation by users.[168] Many studies have supported the conclusion that

breastfeeding is healthier both for infants and lactating people because it lowers chances of

asthma and childhood leukemia in babies, and lowers risks of gynecological cancers and

osteoporosis for mothers.[169] Ovia's promotion of breastfeeding to its users is a positive thing that

could potentially result in better health outcomes. However, their marketing of breastfeeding to

employers speaks to the links between this practice and cost reduction. The cost reduction

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[162] Flo Terms, 2021.

[163] Ovia Terms, 2022.

[164] Financial metric that calculates the probability of return on an investment (Beattie).

[165] Ovia, 2022.

[166] Flo, 2022.

[167] Ibid.

[168] Ovia, 2022.

[169] Ulen, "Black Women Do Breastfeed."

implications associated with breastfeeding make it economically appealing for many parties including families, governments, insurers, and employers.

A 2016 study conducted by the USDA examined the economic impact of breastfeeding on WIC and medicaid costs. They found that medicaid costs would have decreased by at least 111.6 million, and WIC enrollment would have increased by 252.4 million with the introduction of breastfeeding.[170] This study provides crucial statistics on the earlier suggested move of WIC to encouraging breastfeeding. If tech companies like Ovia are where promotion for federal programs will be implemented, the least they can do is promote this sort of positive change.

Ovia's promotion of breastfeeding is certainly couched within their appeal to employers and users return to work. They advertise their breast pump delivery as a benefit for employers.[171] With breast milk pumped in advance, lactating people need not worry about preparing milk when they return to work. This critique I offer about Ovia's promotion of breastfeeding and breast pumps as a means to increase employer profits is not a critique on health promotion. Rather, I am critical of the way Ovia (and employers) are able to profit off of their leveraging of "health" as a concept replete with value judgements, hierarchies, and blind assumptions.[172] The act of breastfeeding can and should still be considered healthy. At the same time, what and who is considered healthy must be interrogated. Ovia's promotion of breastfeeding as healthy, vis-a-vis their appeal to employers, leaves room to tease out the ways capitalism has co-opted health. In the same spirit that I argue against vulturous FemTech companies profiting off historical methods of contraception (and period tracking), I add that they should not be allowed to co-opt health for their own profits.

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[170] Oliveira, i, 2019
[171] Ovia, 2022.
[172] Jonathan Metzl and Anna Rutherford Kirkland, eds., Against Health: How Health Became the New Morality, Biopolitics, medicine, technoscience, and health in the 21st century (New York: New York University Press, 2010).

In addition to employer partnerships, Ovia and Sprout also have partnerships with insurers and hospitals. Sprout's hospital plus package allows hospitals to weave their own information throughout the app, for the purpose of attracting more patients.[173] This package features an interactive timeline where hospitals can promote their services, schedule appointments with users, and administer satisfaction surveys.[174] This model treats hospitals as businesses trying to maximize profits. Ovia's partnership with insurers demonstrates a similar commitment to profit maximization. Similar to their ROI advertisements for employers, Ovia boasts about cost reduction to insurers. Some of the insurance plans which cover Ovia as a benefit include: Capital District Physicians'Health Plan, Inc. (CDPHP®)- a leading plan in New York State- Blue Cross Blue Shield, Harvard Pilgrim Health Care- a partner of United Health Care in the Northeast, Cigna, and CareFirst- a branch of Blue Cross Blue Shield serving Maryand and the Washington D.C. metropolitan area. Bard Colleg's student insurance plan is provided by CDPHP.[175]

To insurers, Ovia advertises reducing costs through early intervention, a promise of their predictive analytics. They repeatedly mention the "seamless intervention" their platform allows to insurers, naturalizing this collaboration. They rebrand their health coaches for insurers to say that they provide ongoing outreach to users so they understand and follow through with "health plan-directed interventions."[176] The same health coaches are marketed to individuals on the basis of guiding them through all of their health questions. It is also mentioned that through data analytics, they are able to appropriately partner "at-risk" users with care management teams.

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[173] Sprout, 2022.
[174] Ibid.
[175] See CDPHP policy and benefit summary for the Student Accident and Sickness Insurance Plan. Available at MyStudentMedical.com
[176] Ovia, 2022.

Ovia's appeal to insurers highlights how many of the personalization features they promote to individuals can be easily converted to meet insurer needs. Ovia creates a pipeline between the use of their app and being able to receive insurance coverage. This is not different from the way using their apps allows access to vital information on WIC. Ovia's partnership with insurers highlights an emerging trend between big-data companies and insurance plans.[177] Predictive algorithms are a tool of actuarial science that have proven incredibly useful in risk assessments- precisely what insurers need to anticipate costs.[178] The more healthcare becomes digitized and personalized, the more insurers will have access to specific data on how to apply and deny coverage.[179]

What sets Ovia and Flo apart from Sprout and Clue are their positions as the largest and most popular platforms in their respective fields.[180] The grandeur of these platforms is captured by their collaboration with employers, namely white collar employers. Flo and Ovia, then, present a potential trajectory, or new horizon, for other FemTech platforms. Their collaborations with employers suggest that other FemTech companies can do the same. In February of 2021, Ovia became the first maternal health company to join the Digital Therapeutics Alliance.[181] By entering the Alliance, Ovia presents both exciting and haunting possibilities for the future of FemTech. It offers new possibilities for mitigating feminine health conditions in tandem with mental health.

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[177] O'Neil, Weapons, 164.

[178] Ronald Richman, "AI in Actuarial Science," SSRN, 24 July 2018, 2.

[179] O'Neil, Weapons, 167.

[180] Although Flo is the most used period tracker according to global statistics, in the author's survey, users reported using Flo and Clue at the same rate, each one representing 40.9% of users.

[181] The Digital Therapeutics Alliance is a global non-profit trade association with the mission of broadening the understanding, adoption, and integration of clinically-validated digital therapeutics into healthcare through education, advocacy, and research (Mullins, 2021).

The question then becomes who truly benefits from hyer-individualized, for-profit models of healthcare? This project proposes that this model of healthcare serves the white-supremacist, imperial-capitalist, cis-hetero-patriarchy that governs the United States. Without serious evaluations of digital health initiatives such as FemTech, these companies threaten to popularize and institutionalize their for-profit models of healthcare. Dissolving the MIC is not simply about the reallocation of health resources. Recognizing that FemTech platforms such as Ovia, Sprout, Flow, and Clue might provide benefits, but are still detrimental to the healthcare system is crucial. Recognizing that current state and private health models are violent to so many groups, and all are part of the MIC, is crucial. The following section will closely assess the privacy policies (and breaches) of the four FemTech companies. These policies will highlight how these companies, in their current iterations, cannot be trusted as healthcare platforms.

Terms and Privacy

"The contract is capitalism's most cherished axiom. It is a projective geometry of obligation and its interiorised calculus. Emerging simultaneous with capitalism, it has been crucial, among other things, to the organisation of private property and the subjective dispositions of capitalist legal architecture."

-Angela Mitropoulos
Contract and Contagion

Contracts have become a normalized aspect of navigating the web. Virtually all websites have variations of terms of agreement, where users must consent in order to access these (often socially obligatory) sites. Digital health technologies are no different, with their mandatory privacy and service contracts. Their veneer as health apps raise particular concerns about their human rights violations on health and security. In this section I survey the privacy policies and

user agreements of the four platforms, paying close attention to the artfulness of these

agreements as wholly contingent propositions. I argue that these contracts shape risk as a matter

belonging to individuals, neglecting the implicatory assumption of risk as a shared experience.

The aesthetic of contracts as Democratic practice relies entirely on a Divine

egalitarianism which presupposes unanimous consent.[182] Of a nation-state, residence constitutes

consent, while on a digital platform usage constitutes consent.[183] This consent is devilishly

exploited in the revelation of the lack of responsibility these companies owe their users. While

all professing to provide science backed, data driven analytics, all four companies include in

their agreements clauses that deny that they provide medical advice. Instead, they all opt for the

language of "informational and educational" to explain their purposes.[184] Ovia states that their

health coaches are not responsible for giving medical advice and are not expected to do so in real

time.[185] This directly conflicts with advertisements on their website about "real-time

interventions."[186] Considering the DEI crusades these companies run, this false marketing

potentially furthers inequities in health information access. By falsely marketing their services as

physician approved, they mislead users. It is especially concerning to see that 61.9% of people,

most of whom are college students or in their late 20s, reported not worrying about inputting

their health data into trackers.[187]

These agreements are based on contingent propositions, which add to the aesthetic of

contracts as performative documents, with often violent speculations of futurity.[188] Ovia does not

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[182] Jean-Jacques Rousseau, The Social Contract (London: Penguin, 2003).

[183]Angela Mitropoulos, Contract & Contagion: From Biopolitics to Oikonomia. Brooklyn, N.Y.: Minor Compositions, 2013.

[184] Ovia Terms, 2022

[185] Ibid.

[186] Ovia, 2022

[187] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.

[188] Mitropoulos,Contract and Contagion, 20.

guarantee that their services will result in a successful pregnancy, nor that even connecting users to fertility specialists will result in success.[189] Similarly, Sprout understands any use by users as their own risk.[190] The apps predict the worst whilst simultaneously ridding themselves of any legal responsibility for their potentially risky outcomes. This assumption of risk by individuals who choose to engage with these apps, is an appropriation of the *volenti non fit injuria* doctrine used in risk assessment by insurers. [191] This Latin phrase translates in English as "to a willing person, injury is not done." FemTech companies assume that only the individual who consents to the agreement is affected and therefore at risk. Angela Mitropoulos points to the violence of such leveraging of the concept of "informed consent" as it creates "classes of persons who are increasingly compelled to contractually assume [...] the burden of uninsurable risk."[192] By this logic, a particular class of users (low-income, black and brown, queer folk etc.) are compelled to assume risk and distribute it amongst their own popultions, so as to release others (wealthy, educated, not "as-risk," white, etc.) from it. 57.8% of people reported not even worrying about what happens to their health data over time.[193] What is known about the logics of digital technologies and artificial intelligence is that there is always more than one party at risk.

Not every term in these policies are matters of life or death, some terms are commonly found and expected of digital agreements. Like most websites and apps that are free to consumers, they all use tracking technologies that collect data on their users, which they sell to advertisers and partners. Ovia uses cookies, tags and pixels- technologies that store and receive

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[189]Ovia Terms, 2022

[190] Sprout Terms, 2020

[191] See Jordan Lord's 2020 artwork "Assumption of Risk." "In the gallery, a document printed on a white sheet of paper in black text in Times New Roman font appears on a white wall inside a black frame. It is presented as the only object on a large wall that faces the one, on which the show's intro text is printed. It is hung slightly below the standard eyeline height of 50", typically used for installing artworks." The document is of the galley's mandatory Covid-19 Waiver, which Lord refused to sign.

[192] Mitropoulos, Contract, 80.

[193] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.

data on the user's device.[194] Clue and Sprout use Google analytics for their tracking and cookies. Although still concerning, these are common practices with digital technologies,

The policies also explicitly map how they make profits. At Ovia they lay out the distinction between their two versions of the app, the consumer and enterprise versions. The consumer version is the "free" version of the app designed for individuals which readily sells data to Ovia's business associates. They claim to only share this information in "limited circumstances," and constantly reassure users that this only happens to improve personalization. They share information with Facebook and Google, so these corporations may better tailor their algorithms for advertising.[195] In contrast, the enterprise model refers to the version of the apps designed for employers and health plans. This version is paid and provided as a benefit. Although they claim not to sell data to advertisers on this version, data sharing is still common practice. Clue, Flo, and Sprout have clauses on the paid "premium" versions of their apps, which are said to provide enhanced features.[196] [197] [198] In these policies, the apps make it abundantly clear that they profit off of the collection of user data. Again, a common practice in digital technologies, nonetheless a concerning one.

Like other online sites, they all make it difficult for users to not be complicit in this data sharing economy. The privacy policies lay out a plethora of actions users must take if they do not consent to advertisements or other data sharing practices. In this model, receiving privacy becomes labor which users must go out of their way to perform. Only 11.1% of people reported not using pregnancy trackers because of privacy concerns.[199] Additionally, this data sharing

[194] Ovia Privacy, 2021
[195] Ovia Terms, 2022
[196] Clue Privacy, 2022
[197] Flo Terms, 2020
[198] Sprout Terms, 2020
[199] Stecy Mbemba, "User Attitudes of FemTech Apps." Survey. April 1, 2022.

economy binds all people with whom the consensual individual is connected with. This economy problematizes the paradigm of informed consent and the assumption of risk as an individual's responsibility.

Particularly concerning for Ovia Health is their model of privacy on their enterprise version. In 2019, Ovia was ousted for sharing employee data with employers even though they claimed not to do so in their policy.[200] To employers who offer Ovia as a health benefit, they claim to not share user data unless the employer offers an in-house care management team. Nonetheless, employers somehow still are able to access unidentifiable data (i.e. average statistics) about their employees.[201] In 2021, Flo was also ousted by the Federal Trade Commissioner agency for selling user data.[202] The case was settled on the basis that Flo had to notify affected users about the disclosure of their health information. They were to also instruct any third party that received users' health information to destroy that data.[203] Like Ovia, Flo continues to claim not to participate in any unnecessary data selling.

The sharing of data to employers is particularly concerning because it violates human rights to health, privacy, and non-discrimination, amongst many others. Although there is no global human rights agreement for digital health technologies, the HIV movement and the use of digital trackers during the Covid-19 pandemic offer effective ways to integrate human rights into these discussions.[204] The human rights framework on the right to health outlines four key

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[200] DrewHarwell, "Is your pregnancy app sharing your intimate data with your boss?," The Washington Post, April 10, 2019.
[201] Harwell, "Is your pregnancy app."
[202] United States of America v. Federal Trade Commission, 1923133. FTC, June 2021.
[203] FTC, "FTC Finalizes Order with Flo Health, a Fertility-Tracking App That Shared Sensitive Health Data with Facebook, Google, and Others," Federal Trade Commission, Last modified June 22, 2021.
[204] Nina Sun et al., "Human Rights and Digital Health Technologies." *Health and human rights* vol. 22, 2020.

elements: availability, accessibility, acceptability, and quality.[205] [206] The human right of privacy protects from the arbitrary interference of privacy.[207] By sharing personal health data with employers and other third parties, Ovia violates the right to health and privacy. It also implicitly violates the right to non-discrimination because it brings into question how employers use this data. Additionally, the question of access to, and availability of these technologies as healthcare presents a violation to the rights to non-discrimianton and health. Combining these observations with the fact that artificial intelligence algorithms have been numerously exposed for their biases, these health technologies pose a significant threat to the individualized, for-profit model of healthcare they propose.[208]

For people who receive Ovia as a benefit through their health care provider, their data is shared undoubtedly. Under the Health Insurance Portability and Accountability Act of 1996 (HIPAA), Ovia is a business associate of these said health plans, and they are therefore at liberty to contact, or take actions based on data provided by Ovia. This is especially concerning considering Ovia's stated risk escalation practices which targets users who they consider "high-risk."[209] [210]This raises the question of who gets classified as high-risk and where their cases are escalated. Ovia refused requests to provide reports in which this practice, amongst others, were clarified.

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[205] Ibid.

[206] Sekalala Sharifah, et al.,"Analyzing the Human Rights Impact of Increased Digital Public Health Surveillance during the COVID-19 Crisis" *Health Hum Rights*, December, 2020.

[207] Sun et al., "Human Rights," 25.

[208] "Twitter Finds Racial Bias in Image-Cropping AI," BBC News, May 20, 2021, sec. Technology.

[209] Ovia, 2022.

[210] Ryan Mac, "Facebook Apologizes After A.I. Puts 'Primates' Label on Video of Black Men," The New York Times, September 3, 2021, sec. Technology.

In August of 2021, Ovia Health was sold to Labcorp, one of the largest clinical laboratory networks in the world.[211] [212] It is unclear how Labcorp uses Ovia's health data, beyond extending their "leadership in women's health."[213] Nonetheless, Ovia still maintains their commitment to transferring all their data to their preferred cloud computing provider, Amazon Web Services (AWS). In other words, Amazon is single-handedly responsible for guarding all of Ovia's data. Beyond Amazon as a corporate giant who undervalues its employees, their cloud service highlights one of the fragilities of the data-economy.[214] AWS is the largest cloud server in the world, with 40 percent of the worldwide web relying on them to host their data, followed only by Microsoft at 20 percent.[215]

Electrical outages at the Amazon Cloud are very common. This again points to the material reality of the Cloud as a factory, which survives off the extrapolation and exploitation of resources (electrical and natural) in a very traditional and colonial way.[216] This should be concerning for companies who invest in Amazon, and other cloud computers, for data storage. As Nathan Ensmenger points out in "The Environmental History of Computing," the cloud is a "brilliant and wickedly misleading metaphor. It implies both ubiquity and ethereality [...] [it] seems to require no violence to the physical environment, it floats above, silent and unobtrusive, a force of nature rather than a human-built technology."[217] This illusion of a cloud rids all of

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[211] Mallory Hackett, "Labcorp Scoops up Femtech Startup Ovia Health to Deepen Women's Health Services," MobiHealthNews, August 16, 2021.

[212] Ovia, 2021

[213] Labcorp. "Labcorp Extends Leadership in Women's Health with Acquisition of Ovia Health." Back to Labcorp, August 12, 2021.

[214] Martina Fuchs, Peter Dannenberg & Cathrin Wiedemann, "Big Tech and Labour Resistance at Amazon, Science as Culture," 37.

[215] Aaron Gregg, and Drew Harwell, "Amazon Web Services' Third Outage in a Month Exposes a Weak Point in the Internet's Backbone," The Washington Post, December 22, 2021.

[216] Nathan Ensmenger and Rebecca Slayton, "Computing and the Environment: Introducing a Special Issue of Information & Culture," Information & Culture: A Journal of History 52, no. 3 (2017): 295–303, s19.

[217] Ensmenger and Slayton, "Computing," s19.

these companies the responsibility of confronting the materiality of their data. In addition to the general risks of privacy and security that cloud computing poses, it increasingly contributes to the climate crisis. As earlier suggested, more companies need to consider how to optimize algorithms to be more efficient rather than trying to consume more energy. When the assumption of risk is individuated by Clue, Flo, Ovia, and Sprout, they ignore all of the ways in which every individual's use of these platforms has implied collective consequences. Be it that unconsenting individuals are dragged into the data-sharing economies these companies depend on, or the incidental contribution to environmental degradation, what is shaped as individual risk becomes a shared experience.

Concluding Remarks

In February of 2021, the Black Maternal Health Momnibus Act of 2021 was presented to the U.S. Senate and Congress. It proposes to "end preventable maternal mortality and severe maternal morbidity in the United States and close disparities in maternal health outcomes."[218] [219] The bill was sponsored by Democratic Senator Cory Booker of New Jersey, and Representative Lauren Underwood of Illinois. It had overwhelmingly white, exclusively Democratic, co-sponsorship in both offices. Since February, the bill has ceased to progress through the legislative process. On April 13, 2021, President Joseph Biden announced a Black Maternal Health Week, predicated on the disproportionate deaths of black mothers in this country. Months later, Vice President, Kamala Harris, declared the first ever White House Maternal Day of

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[218] S.346
[219] H.R. 959

Action on December 7, 2021. Her proclamation reemphasized Biden's attention to high maternal

mortality, and detailed a plan for increased federal investment to decrease these rates.[220]

 These legislative proclamations and actions point to the Biden Administration's

commitment to addressing racial disparities in the ongoing maternal mortality crisis in the U.S.

These policies hold exciting potential for transformations in mitigating disparities in the MIC.

FemTech platforms, many of which genuinely profess the improvement of health outcomes, can

only act as additional tools. The individualized, for-profit model of healthcare they propose

worsen existing disparities in the MIC. This project investigated four of the biggest names in

FemTech: Ovia, Sprout, Clue, and Flo. It should be made clear that not all FemTech platforms

are vulturous like these one. For example, in the Service section I mention Irth, a FemTech

platform similar to Yelp for reviewing doctors and professionals in black and brown

communities. Unlike the platforms surveyed in this project, Irth exemplifies an app that returns

medical authority to professionals, rather than trying to profit off disparities within the MIC.

These are the only kinds of FemTech apps that should be on the market. These other platforms

cannot be trusted to be the distributors of knowledge or resources. Efforts to educate and allocate

resources should be far more universal, such as through public education, or a single payer

healthcare system. Receiving education and support during periods and pregnancy should not be

left up to the individual volition of people. Dissolving the MIC takes all these factors- vulturistic

FemTech, underserved state healthcare, for-profit health- into consideration. There are many

more aspects of the MIC outlined in Figures 4 and 5, on the following pages. These charts

visualize the breadth and depth of the MIC. The entanglements of all the tentacles of the MIC

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[220] Briefing fact sheet, 2021

(and their collective violence) must be addressed if we are truly committed to universalizing healthcare in this country.

In "Health Care Reform and Social Movements in the United States," Beatrix Hoffman reminds us of the power of grassroots movements in creating social and political change in healthcare.[221] The framework of the MIC as a site of able-ism, white supremacy, cis-normativity and so much more, offered to us by disability justice, is a crucial idea that should be adopted by other movements. If FemTech apps like Ovia, Sprout, Clue, and Flo will be eradicated, universal healthcare needs to actually address the specific needs these apps tailor to. Dissolving the MIC will not be easy. This project does not propose many solutions for doing this. At the very least, it suggests that FemTech tends to replicate disparities in health. This is a start.

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[221] Beatrix Hoffman, "Health Care Reform and Social Movements in the United States," American Journal of Public Health 93, no. 1, January 2003.
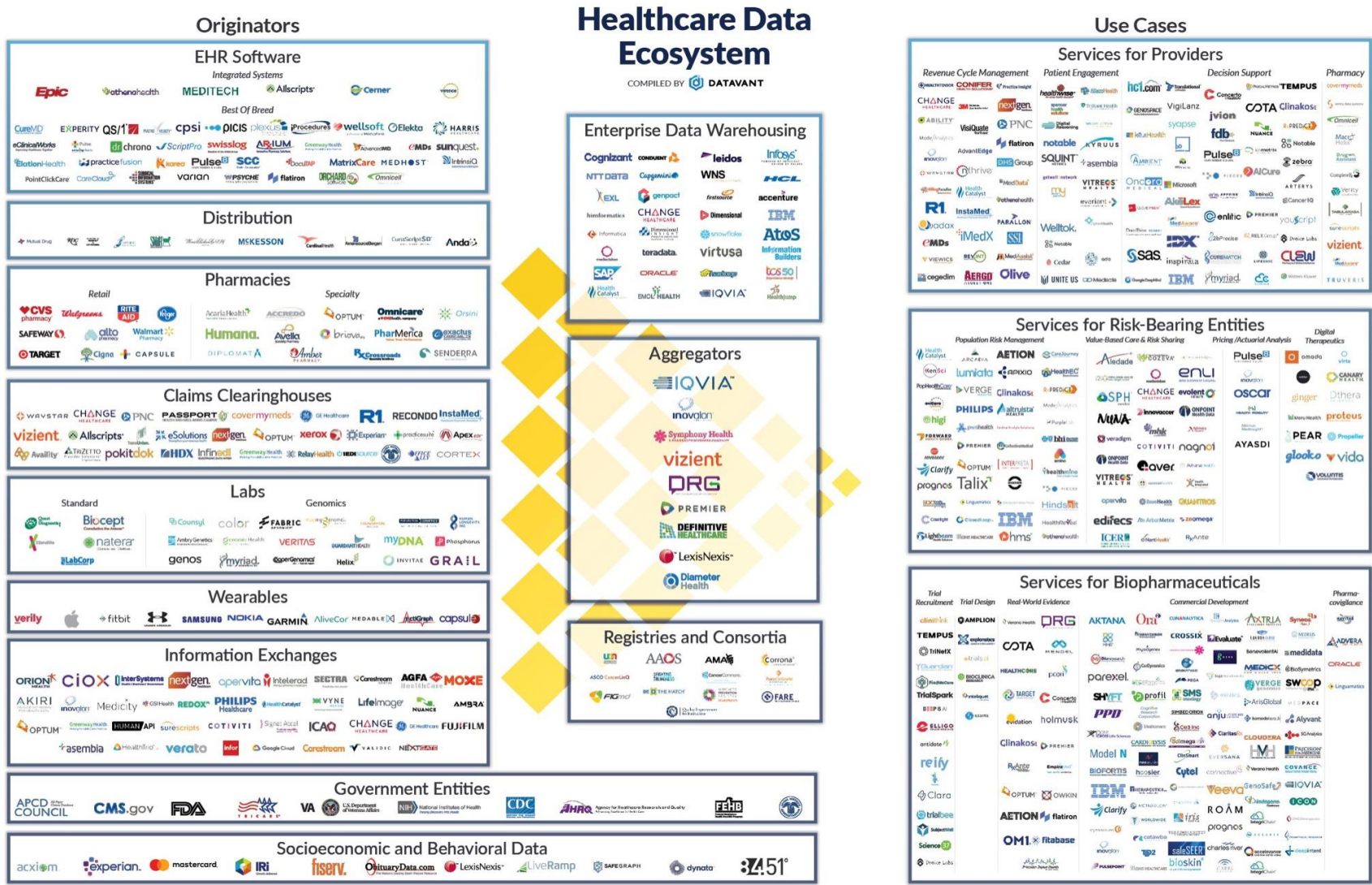
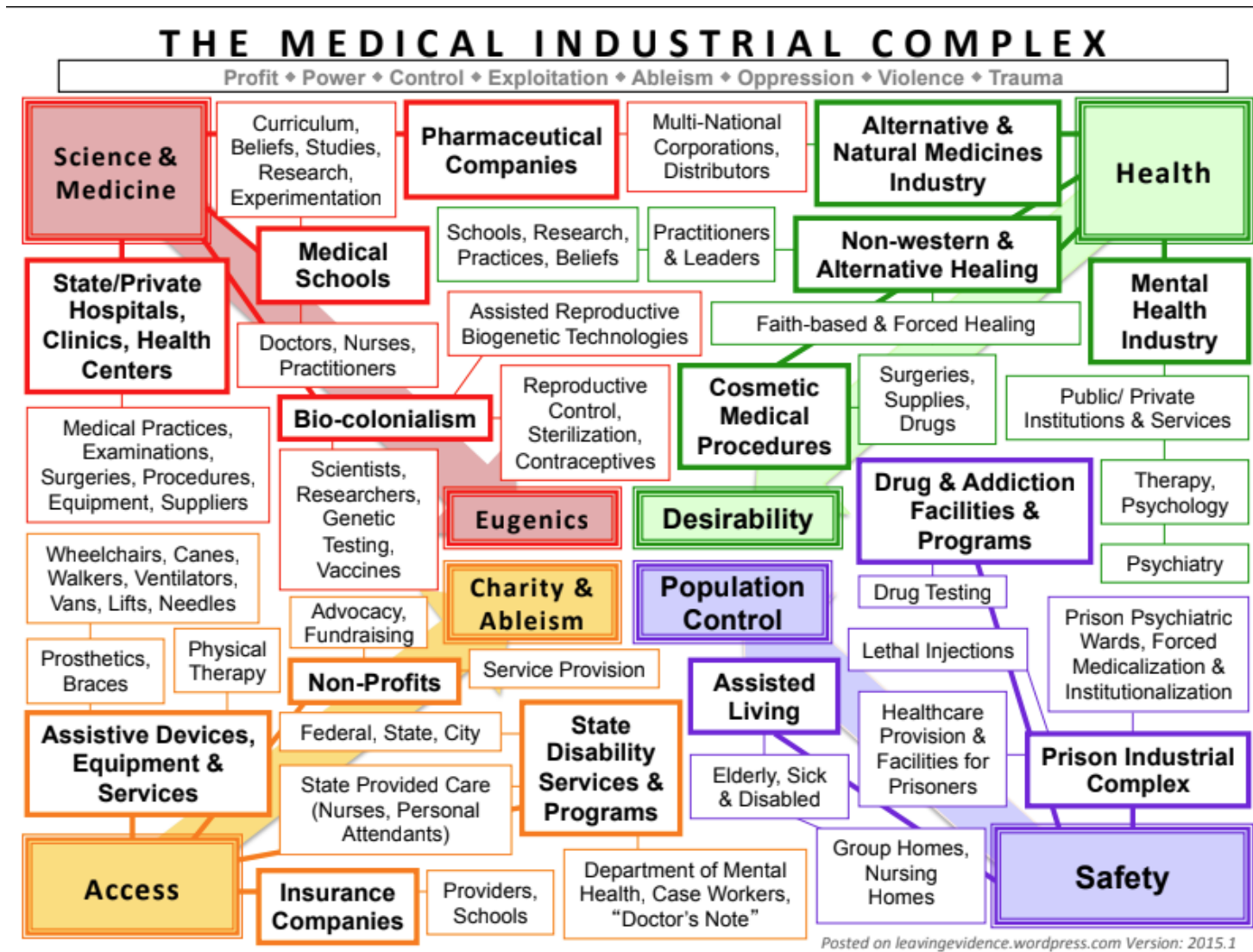**Figure 4.** Datavant, 2018.

Figure 5. Medical Industrial Complex Visual, Mia Mingus, 2015.

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Appendix

Sample Survey

Period Tracking Apps

This set of questions pertains to period tracking apps. You do not need to answer every question in this section. Mandatory questions are marked by red asterisk. After answering this set of questions you may continue to the next section or submit your answers only for this set of questions.

1. Have you ever used a period tracking app?
    a. Yes
    b. No
2. If no, what method of period tracking do you use?
3. Select which of the following apps you have used
    a. Clue
    b. Flo
    c. Ovia Fertility
    d. Eve
    e. MagicGirl
    f. Period Tracker Period Calendar
    g. MyFlo
    h. Cyces
    i. Glow
    j. Cycle Tracking
    k. Other
4. How often do you update your app with information? (symptoms, notes, etc.)
    a. Daily
    b. Weekly
    c. Monthly
    d. Yearly

Rate the extent to which you agree/disagree with the following statements.
1= Strongly disagree
2= Disagree
3= Neutral
4= Agree
5= Strongly Agree

5. Do you find your period tracking app helpful and useful?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

6. Do you enjoy using your period tracking app?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

7. Do you dislike using your period tracking app?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

8. Does your period tracking app inform you about fertility and ovulation?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

9. Does your period tracking app encourage you to conceive?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

10. Does your period tracking app discourage you from conceiving?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

11. Does your period tracking app induce positive thoughts and emotions about yourself?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

  e. Strongly agree

12. Does your period tracking app induce negative thoughts and emotions about yourself?
  a. Strongly disagree
  b. Disagree
  c. Neutral
  d. Agree
  e. Strongly agree

13. Do you ever worry about inputting your health data in your period tracking app?
  a. Strongly disagree
  b. Disagree
  c. Neutral
  d. Agree
  e. Strongly agree

Pregnancy Tracking Apps

The following questions are about pregnancy tracking apps. You may answer as many or as few questions as you would like in this section. Mandatory questions are marked by red asterisk.

14. Have you used a pregnancy tracking app?
  a. Yes
  b. No

15. If you have been pregnant and answered no, select all the reasons that apply for why you did not use pregnancy tracking apps
  a. I don't know them
  b. I don't like them
  c. Too much work
  d. Privacy concerns
  e. other

The following questions are for those who have used pregnancy tracking apps. If you have not used them, you may submit your answers. Thank you for completing this survey!!!

16. Select which of the following apps you have used
  a. Pregnancy Tracker- BabyCenter
  b. Ovia Pregnancy Tracker
  c. Pregnancy & Baby Tracker WTE
  d. The Bump- Pregnancy Tracker
  e. WebMD Pregnancy
  f. My Pregnancy
  g. Pregnancy App PregLife

      h.   Belly Your Pregnancy App

      i.   Sprout Pregnancy

      j.   Other

17. How often do you update your app with information? (symptoms, notes, etc.)

      a. Daily

      b. Weekly

      c. Monthly

18. Is your pregnancy tracking app your primary mode of obstetric care?

      a. Yes

      b. No

19. Do you recieve obstetric care outside of your pregnancy tracking app?

      a. Yes

      b. No

Rate the extent to which you agree/disagree with the following statements.

1= Strongly disagree

2= Disagree

3= Neutral

4= Agree

5= Strongly Agree

20. Do you find your pregnancy tracking app helpful and useful?

      a. Strongly disagree

      b. Disagree

      c. Neutral

      d. Agree

      e. Strongly agree

21. Do you enjoy using your pregnancy tracking app?

      a. Strongly disagree

      b. Disagree

      c. Neutral

      d. Agree

      e. Strongly agree

22. Do you dislike using your pregnancy tracking app?

      a. Strongly disagree

      b. Disagree

      c. Neutral

      d. Agree

      e. Strongly agree

23. Does your pregnancy tracking app induce positive thoughts and emotions about yourself?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

24. Does your pregnancy tracking app induce negative thoughts and emotions about yourself?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

25. Does your pregnancy tracking app induce positive thoughts and emotions about your fetus?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

26. Does your pregnancy tracking app induce negative thoughts and emotions about your fetus?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

27. Do you ever worry about inputting your health data in your pregnancy tracking app?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

    e. Strongly agree

28. Do you continue to use your pregnancy tracking app after going into labor?

    a. Yes

    b. No

29. Does your pregnancy tracking app continue to advertise to you after going into labor?

    a. Strongly disagree

    b. Disagree

    c. Neutral

    d. Agree

      e.   Strongly agree

30. Does your pregnancy tracking app induce positive thoughts and emotions after going into labor?
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

31. Does your pregnancy tracking app induce negative thoughts and emotions after going into labor?
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree