

A Bioethical Analysis of the Quantified Relationship



A Research Report submitted to the Faculty of Health Sciences, in partial fulfilment of the requirements for the degree of Master of Science in Medicine in the field of Bioethics and Health Law

by

Mrs Priyanka Calyn Pillay. B.SocSci (UCT), B.SocSci Hons. (UCT), MSc Med Candidate (Wits).

Student number: 670772

Supervisor: Dr Christopher Wareham. BA (Rhodes), BA Hons. (Rhodes), MA (Rhodes), PhD (Milan). Associate Professor at the Steve Biko Centre for Bioethics, University of Witwatersrand.

University of the Witwatersrand

Johannesburg, Gauteng

April 2022

Declaration

I declare that this research is my own unaided work, produced with supervisory assistance. It is being submitted for the Degree of Master of Science in Medicine in the field of Bioethics and Health Law to the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University.



(Signature of the Candidate)

On the 15th of April 2022, at Sunningdale, Durban.

A Bioethical Analysis of the Quantified Relationship.

Abstract

Objective

Quantified Relationship Technologies refer to technologies that track and gamify components of interpersonal, romantic relationships. The tracking and gamifying occur through three interrelated phenomena: Intimate tracking, Intimate gamification, and Intimate surveillance. As intimate relationships are regarded as an intrinsic good and offer a wide range of benefits to human health and well-being, applying these technologies in this sphere of human life has ethical implications. This research report provides a bioethical assessment of the merit of three objections to the Quantified Relationship phenomenon.

Methodology

This research report uses Normative methods to assess the merit of three objections present in the Quantified Relationship literature; the instrumental-intrinsic value problem objection, the informal-reciprocation objection, and the privacy objection.

The report begins by describing the Quantified Relationship phenomenon. I then outline and critically analyse each of the three objections in turn. Finally, within the context described, this research report argues and defends the position that the Quantified Relationship phenomenon raises valid ethical concerns regarding the intrinsic and instrumental goods they produce, the relationship models used and the privacy risks for intimate partners.

Conclusions

In this bioethical analysis, I find that objections to the Quantified Relationship phenomena express valid concerns. However, the merit of these objections is such that they are not terminal arguments for the Quantified Relationship phenomenon. Instead, the concerns raised can guide us on ethically deploying Quantified Relationship technologies in intimate relationships.

Key Words: *Quantified Relationship, Bioethics, Romantic Relationships, Technology.*

Acknowledgements

I would like to thank my supervisor, Dr Christopher Wareham, for his guidance and encouragement during the conceptualising and writing of this research report. Thank you for guiding me toward a stimulating research topic that I remained happy to be researching and writing about for the duration of the thesis component. Lastly, for sharing your time and expertise with me.

I would like to thank my lecturers: Professor Kevin Behrens, Dr Jillian Gardner, Dr Christopher Wareham, Miss Lizeka Tandwa, Mrs Nicole Erasmus, Dr Norma Tsotsi and the other guest lecturers for sharing their knowledge and expertise with me.

I want to thank the Steve Biko Centre for Bioethics staff: Miss Tebogo Dithung and Miss Samkelo Nsibande, for their friendly assistance, for keeping things running smoothly throughout my degree and for their continued provision of Baker's biscuits.

I want to thank the Bioethics and Health Law class of 2021 for contributing to stimulating discussions and sharing information and encouragement throughout our degree. I am grateful to have shared this experience with you all.

I would like to thank my Alma Mater, the University of Cape Town, for providing me with the foundations that enabled this Master's degree. In particular, I would like to thank Dr Nompilo Ndlovu and Professor Tim Murithi for helping me in my research journey.

Finally, thank my family, to my parents, Winston Pillay and Mala Pillay, for your love and financial support. To my sisters, Jade Pillay and Malishca Pillay, for inspiring me to keep trying. To my niece, Alyssa Samuel, for adding so much joy to my life. Lastly, to my fiancé, David Casper, for sharing experiences of such perceptual vastness, I have to reconfigure my mental models of the world just to assimilate them.

Dedication

I dedicate this MSc Med (Bioethics and Health law) to my grandmothers:

Tolisma Naidoo, Jannie Pillay and Rosie Pillay.

Thank you for being our matriarchs.

“Although his [their] grandfather [grandparent] came to Natal as a labourer in the 1860s and owned virtually nothing but a willing pair of hands and a mind whose real quality was revealed only in his [their] descendants”– Alan Paton, *Ah but your world is beautiful* (1981).

Table of Contents

<i>Declaration</i>	<i>ii</i>
<i>Abstract</i>	<i>iii</i>
<i>Dedication</i>	<i>v</i>
<i>List of Abbreviations</i>	<i>ix</i>
<i>List of Tables</i>	<i>ix</i>
<i>List of Figures</i>	<i>ix</i>
<i>Appendices</i>	<i>x</i>
Chapter 1: Introduction and Overview of the study	1
1.1 Introduction	1
1.2 Background	1
Context of this research	3
Objections to the Quantified Relationship	4
1.3 Rationale for the study	4
1.4 Research question	6
1.5 Thesis statement	6
1.6 Research aims	6
1.7 Research objectives	6
1.8 Concept Clarification	7
1.8.1 Intimate relationships	7
1.8.2 Intimate data or Personal data	8
1.8.3 Gamification or Gamifying	8
1.2 Research Design and Methodology	8
1.2.1 Introduction.....	8
1.2.2 Research Design	9
1.2.3 Research Methodology	9
1.3 Ethics	12
1.4 Limitations	12
1.4.1 Limitations in research design and methodology.....	12

1.4.2 Limitations of the Objections.....	13
1.5. Summary of the chapters in the Research Report	13
<i>Chapter 2: The instrumental-intrinsic value problem objection</i>	<i>15</i>
2.1 Introduction.....	15
2.2 The Outline of the Instrumental-Intrinsic value problem Objection.....	15
2.3 The Critique of the Instrumental-Intrinsic value problem Objection	17
2.3.1 Introduction.....	17
2.3.2 Are Quantified Relationship Technologies changing how users perceive and prioritise the instrumental value of human love and obscuring its intrinsic value?	18
2.3.3 Is it necessarily the case that Quantified Relationship Technologies instrumentalise love?.....	18
2.4 Conclusion	24
<i>Chapter 3: The informal-reciprocation objection</i>	<i>26</i>
3.1 Introduction.....	26
3.2 The Outline of the Informal-reciprocation Objection.....	26
3.3 The Critique of the Informal-reciprocation Objection.....	28
3.3.1 Introduction.....	28
3.3.2 Healthy relationships and the Informal reciprocation model	28
3.3.3 Healthy relationships and the Exchange Based model.....	30
3.4 Conclusions.....	33
<i>Chapter 4: The privacy objection</i>	<i>35</i>
4.1 Introduction.....	35
4.2 The Outline of the Privacy Objection	36
4.3 The Critique of the Privacy Objection.....	37
4.3.2 Group 1: Risks that arise from partners collecting data on each other	38
4.3.3 Group 2: Risks that arise from collecting and storing intimate data	46
4.4 Conclusion	50
<i>Chapter 5: Conclusion and Recommendations</i>	<i>52</i>
5.1 Introduction.....	52
5.2. Summary of Arguments	52
5.2.1 Defining Quantified Relationships.....	53

5.2.2 Assessment of the instrumental-intrinsic value problem objection.....	53
5.2.3 Assessment of the informal-reciprocation objection.....	54
5.2.4 Assessment of the privacy objection.....	55
5.3. Recommendations.....	56
5.3.1 Recommendations to users.....	57
5.3.2 Recommendations to developers.....	58
5.3.3 Recommendations for further research	59
5.4 Conclusion	60
<i>References</i>	<i>61</i>
<i>Appendices</i>	<i>66</i>

List of Abbreviations

EU:	European Union
FDA:	Food and Drug Administration
GDP:	Gross Domestic Product
GDPR:	General Data Protection Regulation
HCP:	Healthcare practitioners
IT:	Information Technology
OECD:	Organisation for Economic Co-operation and Development
QS:	Quantified Self
SDG:	Sustainable Development Goal
SMS:	Short Message Services
ToS:	Terms-of-Service
TUS:	Time-Use Surveys
UNCTAD:	United Nations Conference on Trade and Development
UK:	United Kingdom
UN:	United Nations
USA:	United States of America
USD:	United States Dollar

List of Tables

Table 1: Examples of Quantified Relationship Technologies	2
Table 2: Showing the types of motivations and whether they support Nyholm’s 2nd and 3rd aspects of intrinsic love	22

List of Figures

Figure 1: Nyholm’s Framework of the features we intrinsically desire in seeking love.....	20
---	----

Figure 2: Aspects of Informed Consent.....41

Appendices

Appendix A: Complete Plagiarism Declaration66
Appendix B: Turnitin Report Summary67
Appendix C: Research Ethics Waiver68

Chapter 1: Introduction and Overview of the study

1.1 Introduction

This research report is a bioethical analysis of the merit of three objections to the Quantified Relationship phenomenon. First, I evaluate the instrumental-intrinsic value problem objection, which is the concern that quantified relationships instrumentalise intimate relationships as having physical and mental well-being benefits while ignoring and obscuring the intrinsic value of human love (Danaher, Nyholm and Earp, 2018). Second, I assess the informal-reciprocation objection, which raises the concern that these technologies can encourage users to shift to a formal, exchange-based relationship model on which healthy relationships are not built. Lastly, I consider the privacy objection resulting from the privacy risks of tracking and storing intimate data.

I will evaluate these objections and argue the position that the objections to the Quantified Relationship Phenomenon raise valid ethical concerns regarding the intrinsic and instrumental goods they produce, the relationship models they enable and the privacy risks for intimate partners. However, in evaluating these concerns, we can identify precautions that we can be mindful of in order to use Quantified Relationship Technologies ethically in intimate relationships.

In this chapter, I establish the topic's background and explain the rationale for this research. In addition to the above, this chapter provides the research question, thesis statement, research aims, and the research objectives. I will also describe the research design and methodology, including the argumentative strategy. Finally, a summary of the succeeding chapters is laid out.

1.2 Background

In 2007, Gary Wolf and Kevin Kelley encapsulated in the concept of Quantified Self (QS), an emerging trend in big data science and technology in which persons self-tracked biological, physical, behavioural, or environmental information as individuals or in groups (Swan, 2013). Persons can track and analyse data from various domains of their lives, such as their weight, mood, time usage and sleep quality (Swan, 2013); extending this tracking practice to their intimate relationships resulted in the Quantified Relationship phenomenon. The concept of the Quantified Relationship applies to technologies that track and gamify components of interpersonal romantic relationships (Danaher, Nyholm and Earp, 2018). Danaher, Nyholm and Earp's use of the Quantified Relationship concept focuses on three interrelated phenomena: Intimate tracking, Intimate gamification, and Intimate surveillance (2018). In Intimate tracking, Quantified Relationship Technologies collect data about a user's sexual behaviours (Lupton, 2015); for example, the application Eve (Period Tracker - Eve, 2021) allows users to log information about their orgasms. In Intimate gamification, game-like incentives aim at bringing about desired behaviour changes in their partners (Danaher, Nyholm and Earp, 2018). For example, in the application Love Nudge (Love Nudge™ Mobile App, 2021), each partner has a love tank, which their partner can see and be encouraged to fill. Finally, in Intimate surveillance, tracking technologies provide surveillance data on the user's partners (Danaher, Nyholm and Earp, 2018); for example, FlexiSPY allows you to track communications on your partner's phone, tablet, and computer (FlexiSPY™ Unique Monitoring Software for Mobiles & Computers, 2021).

Table 1: Examples of Quantified Relationship Technologies

Technologies	Description
Glow	a fertility tracking application. It enables users to track their mood, periods, and sexual activity data. In addition, Glow has various social-sharing features (between partners and within the user community). The application also provides tips and advice (Glow Apps, 2022).
Eve	a period tracker and sex application by Glow. It is for women enables women to track data about their periods, moods, symptoms, and sexual activity. Similar to Glow, it has a user community and provides advice and tips (Period Tracker - Eve, 2021).

Love Nudge	an application that helps users form habits to express their love to their partners via their partners' love language (Love Nudge™ Mobile App, 2021).
FlexiSPY	an application that allows you to track communications on your partner's phone, tablet, and computer (FlexiSPY™ Unique Monitoring Software for Mobiles & Computers, 2021).

Quantified Relationship Technologies can include ‘mobile applications, short message services (SMS), wearable devices, ambient sensors, social media, and interactive websites’ (Michie et al., 2017). These technologies or digital interventions seek to support behaviour change in the user, which is the primary goal of the QS movement (Berg, 2019, p.126).

Context of this research

Data collecting, tracking and analyses related to intimate behaviour are not new, as public health authorities previously carried it out to fight infectious threats and chronic diseases (Fairchild, et al., 2007). However, Levy (2014) observes that changes in our technical capacities, social norms and cultural frameworks augment intimate tracking behaviour, such that now ordinary persons participate in these activities.

Ethical analysis of technological developments that express these new technical and sociocultural changes is often scant during the technological development cycle. Only recently were ethics courses introduced into many university computer science curriculums. For example, in 2015, Professor Barbara Grosz designed and ran a course called Intelligent Systems: Design and Ethical Challenges, which eventually led to the development of their Embedded EthiCS program, which is seen as a national model among other top universities for teaching ethics within this computer science (Karoff, 2019). Professor Barbara Grosz fantasies that 'every time a computer scientist logs on to write an algorithm or build a system, a message will flash across the screen that asks, "Have you thought about the ethical implications of what you are doing?" (Karoff, 2019). Simultaneously, media attention has increased on topics like data protection and driverless cars due to their potential effects on people's lives and society's

democratic values if these technologies fail (Berg, 2019). Berg rightly notes that not only potentially life-threatening technological development needs ethics, as any technology can introduce 'small risks and small value transgressions', which over time become normal (2019, p.63). After which more significant value transgressions are 'prone to be accepted' by users because they look similar to the smaller ones. Thus, technological development and advancement need to be 'value sensitive even on a small scale'; otherwise, technology can become a more considerable risk to people's happiness (Berg, 2019, p.63). As is the case of Quantified Relationship Technologies, there is ongoing empirical and philosophical research into the impacts of these technologies. For example, a summary article by Danaher, Nyholm and Earp found that Quantified Relationship Technologies can help support and facilitate good relationships and that each of the prominent objections in the literature has some legitimacy (Danaher, Nyholm and Earp, 2018). However, they observe gaps in the careful assessment of the merit of the objections present in the literature.

Objections to the Quantified Relationship

There are concerns about the use of Quantified Relationship Technologies. Danaher, Nyholm and Earp catalogue several prominent objections in the literature from authors like Lupton (2015) and Levy (2014). These include but are not limited to unique risks to privacy and challenges to interpersonal dynamics (Levy, 2014). I will discuss the instrumental-intrinsic value problem objection, the informal-reciprocation objection, and the privacy objection in more detail in the argumentative strategy, and the consideration of these objections will be the subject of my research report.

1.3 Rationale for the study

Ethicists Danaher, Nyholm and Earp expect relationship tracking technologies to impact romantic relationships (2018). As romantic relationships can have an extremely high intrinsic value (Nyholm, 2015) and instrumental value for health and wellbeing, producing offspring (Wudarczyk et al., 2013) and raising children (Earp, Sandberg and Savulescu, 2012), the

Quantified Relationship phenomenon is worthy of bioethical inquiry (Danaher, Nyholm and Earp, 2018).

In addition, relationship tracking technologies are becoming increasingly common, and other tracking technologies can facilitate relationship tracking practices (Levy cited in Danaher, Nyholm and Earp, 2018, p.W3). Therefore, it is essential to catalogue the objections and their merit to understand the risks and benefits of the Quantified Relationship phenomenon.

Also, Berg highlights that technology can affect and influence humans along three dimensions, each with its own system of functionality and distinct set of risks and challenges (2019). First, the personal dimension includes the effect and influence on humans (users) in direct contact with the technology. Second, the interpersonal dimension includes the effect and influence on third parties related to the technology and how other humans see users. Lastly, the infrastructure dimension relates to physical and abstract systems influenced by technology, such as privacy, justice, and similar concerns (Berg, 2019). Each of these three dimensions influences the other but, at the same time, has its own inner mechanics. In this bioethical analysis of quantified relationships, I have focused on one objection representative of each dimension. The personal dimension relates most closely to the instrumental-intrinsic value problem objection, discussed in chapter 2, as this objection deals with whether certain goods can be produced for partners. The interpersonal dimension relates to the informal-reciprocation objection discussed in chapter 3 because this application of Quantified Relationship Technologies aims to affect the dynamic between partners in the relationship. Lastly, the infrastructure dimension relates to the privacy objection discussed in chapter 4, which is primarily protected through legislation. Therefore, I evaluate one objection from each dimension; while this is not comprehensive, it enables me to assess the ethical implications of using Quantified Relationship Technologies within and across these three dimensions.

Lastly, while the literature on the Quantified Relationship phenomenon has catalogued the main concerns related to Quantified Relationship Technologies, there are gaps in the careful assessment of the merit of these objections (Danaher, Nyholm and Earp, 2018). This study will contribute to filling this gap.

1.4 Research question

What are the ethical implications of the Quantified Relationship phenomenon within intimate, interpersonal relationships? Furthermore, what precautions should we take to use these technologies ethically?

1.5 Thesis statement

I will argue that the Quantified Relationship phenomenon raises valid ethical concerns regarding the intrinsic and instrumental goods they produce and the privacy risks for intimate partners. However, in evaluating these concerns, we can identify precautions that we must be mindful of in order to use Quantified Relationship Technologies ethically in intimate relationships.

1.6 Research aims

This research aims to evaluate the merit of the objections raised in response to the Quantified Relationship phenomenon through an ethical critique.

1.7 Research objectives

The main objectives of this research are:

- To define Quantified Relationships;
- To evaluate the instrumental-intrinsic value problem objection;
- To consider the informal-reciprocation objection, and;
- To evaluate the privacy objection.

1.8 Concept Clarification

The concepts of intimate, interpersonal relationships and intimate data will be discussed in accordance with the views of relevant theorists and philosophers.

1.8.1 Intimate relationships

My focus in this research paper is on discussing the merits of the objections to technologies that track and gamify components of intimate relationships or romantic relationships. Naturally, therefore, providing an understanding of what is understood by romantic relationships is a precursory task.

Danaher, Nyholm and Earp note that 'there is unlikely to be a set of necessary and sufficient conditions for defining such relationships' but rather that there is a 'range of cases' which could apply (2018, p.3). Nyholm and Frank provide that love relationships can be approached from a strictly scientific perspective involving the 'neurochemistry, evolutionary history or adaptive advantage' of human love and its relationships (2017, p.306). The second approach is used to understand human love as a 'cherished human value' and a vital component of a good human life. Through this second approach, Nyholm and Frank have identified three ideas in philosophy, common sense, arts and literature, and popular culture. These include (Nyholm and Frank, 2017, p.306):

1. The idea of being a 'good match' for each other.
2. The idea is that partners value each other as particular persons.
3. The idea that there should be 'steadfast commitment from their partner.

Therefore, when I use the term intimate, interpersonal relationship, or romantic relationship, I refer to a cluster of ideas from both the common-sense and scientific understandings.

1.8.2 Intimate data or Personal data

The general definition of personal data is information relating to an identifiable individual (Michie et al., 2017). van den Hoven et al. provide examples of personal data: ‘examples include explicitly stated characteristics such as a person’s date of birth, sexual preference, whereabouts, religion, but also the IP address of your computer or metadata pertaining to these kinds of information (2020, p.10). In addition, personal data can also be more implicit in the form of behavioural data, for example, from social media, that can be linked to individuals’ (2020, p.10).

I have referred to personal data as intimate data to emphasise the sexual, intimate, and interpersonal nature of this data as it relates to people’s bodies, romantic relationships, and sexual experiences.

1.8.3 Gamification or Gamifying

Danaher, Nyholm and Earp’s taxonomy of the Quantified Relationship Phenomenon describes three interrelated phenomena: Intimate tracking, Intimate gamification, and Intimate surveillance. Gamification is the process of adding games or game-like elements into non-game activities to make those activities more enjoyable or interesting (Barata et al., 2013, p.1). In our context, therefore, Intimate gamification is the use of game-like incentives in relationship activities aimed at bringing about desired behaviour changes in partners (Danaher, Nyholm and Earp, 2018).

1.2 Research Design and Methodology

1.2.1 Introduction

This section focuses on the methodology that will be followed in this research report, including the use of normative methods of bioethical inquiry. The argumentative strategy and ethical considerations of this research are also discussed.

1.2.2 Research Design

This subsection discusses the research design utilised to address the research question and meet the outlined objectives.

This research report is a bioethical research report and therefore uses the approach of writing in defence of a normative thesis statement. This approach is advantageous for this study because it enables an assessment of the moral implications of the Quantified Relationship Phenomena.

1.2.3 Research Methodology

The research report will be based mainly on desk-top and library-based research. This study will not collect and analyse new data and will not involve study participants. This research report is an ethical critique based on a collation and review of literature on the Quantified Relationship phenomena.

In this study, I will use the research methods and standards typically applicable to philosophical research; these include interpreting and critically analysing salient literature, identifying and evaluating objections to the Quantified Relationship phenomenon, and developing and defending arguments of the merits of these objections. The use of relevant literature includes but is not limited to the use of relevant textbooks, journal articles and legislation. The literature will be sought primarily, but not exclusively, from online databases like Google Scholar, Scopus and bioethical journals like the American Journal of Bioethics. The critical search strings used to find the literature include quantified relationships, love, intimate surveillance, intimate gamification, and intimate tracking.

This ethical critique employs normative methods to execute the aims of the research report.

1.2.3.1 Argumentative strategy

In the introductory chapter, I will describe the Quantified Relationship phenomenon by employing Danaher, Nyholm and Earp's taxonomy.

In chapters 2, 3 and 4, I outline and critique objections to the Quantified Relationship phenomenon to evaluate the merit of these objections.

In chapter 2, I will argue that Quantified Relationship Technologies can and should support the intrinsic goods we seek in romantic relationships. First, I outline the instrumental-intrinsic value problem objection, which states that Quantified Relationship Technologies encourage an instrumental view of romantic relationships and obscure the intrinsic value of romantic relationships. Within the literature, the instrumentalising of intimate relationships and instrumentalising love are often referred to interchangeably (as you will see in the outline of the objection section 2.2). However, I have chosen to focus on the instrumentalising of love in my consideration of this objection, as love is a vital aspect of romantic relationships. Second, against this objection, I will make two arguments; first, there is insufficient evidence to prove that the instrumentalisation of love changes users' attitudes and behaviours regarding the intrinsic value of their relationships. Second, I will argue that Quantified Relationship Technologies can produce the intrinsic value we humans seek when we desire the love of another; therefore, it is not necessarily the case that Quantified Relationship Technologies must focus on the instrumentalisation of love. Therefore, this claim supports my argument that the privacy objection is not a terminal objection to the Quantified Relationship phenomena.

In chapter 3, I will make the case that Quantified Relationship Technologies and the formal exchange-based models they enable can support healthy relationships. First, I will outline the informal-reciprocation objection, which states that healthy relationships thrive on 'informal, non-quantified acts of reciprocation' (Danaher, Nyholm and Earp, 2018, p.7). Against this, I will make two arguments; the first is that different relationship models can support the flourishing of romantic relationships. I will also address the objection that I argue for

relationship relativism with this claim. Against this, I will claim that there are normative constraints on what is a healthy relationship; however, this does not include what type of model is used. The second argument is that formal exchange-based models can alleviate inequalities in care work and contribute to the development of healthy relationships. I will also address the objection that data collected from Quantified Relationship Technologies, with their commercial purposes, will not be robust enough to support policy development regarding unpaid care work and changing care needs. In responding to this objection, I will claim that data collected from Quantified Relationship can still be helpful as it can help provide insights and contextualise unpaid care work and changing care needs. Lastly, I will provide a summary of my conclusions regarding the merit of this objection.

In chapter 4, I will argue that there are a number of ways that the privacy risks raised by the use of Quantified Relationship Technologies can be mitigated. I begin this chapter by outlining the Privacy objection. The privacy objection claims that Quantified Relationship Technologies threaten privacy due to the fact that they enable the tracking and storing of personal information (Danaher, Nyholm and Earp, 2018). Levy (2014) notes that privacy threats arise from two different directions: from the collected data about users by the Quantified Relationship Technology companies (Group 1 privacy risks) and their intimate relationship partners (Group 2 privacy risks).

To evaluate the privacy risks associated with group 1, I will look at how partners get consent to track and collect personal data on each other. I will also contend with the objection that economic terms-of-service agreements are insufficient for this context. I suggest this objection can be overcome by borrowing from more stringent regulatory and ethical frameworks employed in the biomedical field, such as their consent model. In addition, a more robust consent process for the use of Quantified Relationship Technologies will also ensure that non-consensual tracking by partners is avoided. Therefore, these privacy risks are not insurmountable.

To evaluate the concern that privacy risks arise from the reality that intimate data are collected and stored on non-intimate commercial platforms (Levy, 2014), which could result in intimate data being shared or sold to third parties (Payne, 2014), I will discuss two main areas of privacy protection. The first is the privacy protection laws that regulate the collection, storage and sharing of data. The second is the implementation of privacy requirements in the software, architecture, infrastructure, and work processes to make privacy violations unlikely to occur through the privacy by design approach. In addition, I will address the objection to the first area

of privacy protection, which states that some questions related to privacy protection remain indefinite, therefore making users vulnerable. To this objection, I will respond that privacy protection laws can be clarified, improved and respond to changes in the technology landscape, offering users increasingly better protection. I will also claim that where these privacy regimes are insufficient to protect users, users' have the autonomy to decide their own threshold of acceptability for these risks. I then move on to address the objection to the second area of privacy protection, which states that the plurality of understandings that can arise from the interpretation of privacy by design approach guidelines can result in varying privacy protection for users. In response to this objection, I will argue that this objection is not insurmountable as guidelines can be clarified and made more succinct.

In light of the above assessment of the privacy objection, I will conclude that these risks can be mitigated, which supports my argument that the privacy risks associated with therefore the use of Quantified Relationship Technologies are not a terminal objection to the Quantified Relationship phenomena.

1.3 Ethics

This study will not collect and analyse new data and will not involve study participants. As such, it did not require ethical considerations required for human research subjects. Therefore, ethics approval will be requested from the Assessor Committee. See Appendix 3: Ethics waiver.

1.4 Limitations

1.4.1 Limitations in research design and methodology

This research report is an ethical critique based on the collation and review of literature on the Quantified Relationship phenomena; however, due to the principal researcher being fluent only

in English, the literature on Quantified Relationship Technologies included in this ethical critique are those published in English.

1.4.2 Limitations of the Objections

In this research report, I outline and critique three objections. At the same time, other prominent objections raise valid concerns for intimate relationships, such as the Gendered objection – which states that these technologies reinforce problematic gender stereotypes within the relationship - or the neo-liberalisation objection - which states that these apps in focusing on individual responsibility and suppress the role of well-functioning communities and other contextual supports (Lupton, 2015). However, I do not pursue these objections in the following research report for two reasons. First, these other objections represent issues that are either widely discussed elsewhere (Levi, 2014; Lupton, 2015; Moore, 2017; Moore and Robinson, 2015), such as the Gendered objection or represent issues for which limited empirical data is available.

1.5. Summary of the chapters in the Research Report

The research report will be structured in the following way:

Chapter 1: Introduction to the research report

This introductory chapter introduces and conceptualises the Quantified Relationship phenomena, intimate data, intimate relationships and gamification in the literature. The research report's rationale, aims, objectives, and thesis statement are also provided. In addition, the methodology, argumentative strategy, ethics, and limitations are discussed.

Chapter 2: The Instrumental-Intrinsic value problem objection

In this chapter, the instrumental-intrinsic value problem objection is outlined and critiqued.

Chapter 3: The informal-reciprocation objection

In this chapter, the informal-reciprocation objection is outlined and critiqued.

Chapter 4: Privacy objection

In this chapter, the privacy objection is outlined and critiqued.

Chapter 5: Conclusion and Recommendations

The research report is summarised in this chapter, and the key findings are shared. Recommendations for further use and research into Quantified Relationship phenomena are also presented.

Chapter 2: The instrumental-intrinsic value problem objection

2.1 Introduction

In this chapter, I will argue that Quantified Relationship Technologies can and should support the intrinsic goods we seek in romantic relationships. First, I outline the instrumental-intrinsic value problem objection, which states that Quantified Relationship Technologies encourage an instrumental view of romantic relationships and obscure the intrinsic value of romantic relationships. Within the literature, the instrumentalising of intimate relationships and instrumentalising love are often referred to interchangeably (as you will see in the outline of the objection section 2.2). However, I have chosen to focus on the instrumentalising of love in my consideration of this objection, as love is a vital aspect of romantic relationships. Secondly, against this objection, I will make two arguments; first, there is insufficient evidence to prove that the instrumentalisation of love changes users' attitudes and behaviours regarding the intrinsic value of their relationships. Second, I will argue that Quantified Relationship Technologies can produce the intrinsic value we humans seek when we desire the love of another; therefore, it is not necessarily the case that Quantified Relationship Technologies must focus on the instrumentalisation of love. Therefore, this claim supports my argument that the privacy objection is not a terminal objection to the Quantified Relationship phenomena.

2.2 The Outline of the Instrumental-Intrinsic value problem Objection

In this section, I outline the instrumental-intrinsic value problem objection. According to the instrumental-intrinsic value problem objection:

‘the apps/technologies encourage an instrumental view of the value of love. They encourage us to see the benefits of a well-functioning relationship in terms of health and well-being, not in terms of qualities that are intrinsic to the relationship itself’ (Danaher, Earp and Nyholm, 2018, p.9).

Some theorists hold that certain human activities, such as human love, derive their value entirely or mainly from their intrinsic character (Nyholm, 2015). For example, Nyholm asserts that human love is 'commonly recognised as one of human life's most important intrinsic goods' (2015, p.190). Accompanying this assertion can be the view that loving relationships or intimate experiences should be sought for their own sake and not as a means to something else that they should be valued whether or not they contribute to other goods. Quantified Relationship Technologies, however, instrumentalise loving or intimate relationships by associating them with other values such as physical wellbeing. While, in theory, intimate relationships can be associated with many values, the self-tracking industry has tended toward the medicalised forms of instrumentalisation (Danaher, Nyholm and Earp, 2018). The medicalisation of intimate relationships ties the value of good relationships to improving physical and mental well-being (Danaher, Nyholm and Earp, 2018). For example, Sex Keeper is a mobile and smartwatch application that calculates the number of calories burned based on the duration and positions used during an intimate experience. When Sex Keeper is used along with an Apple Watch, the user's heart rate data can be monitored during sex (Sex Keeper App, 2021). These applications (Sex Keeper) and features (calorie counting) encourage persons to associate intimate experiences as a means for burning calories – losing weight or getting into shape – and not as an end itself (Danaher, Nyholm and Earp, 2018). Lupton (2014, p.446) writes that the 'body/self' (and I would add the intimate relationship) that is enacted through self-tracking applications (or relationship tracking technologies) is 'both a subject and product of scientific measurement and interpretation'. Persons using these technologies are encouraged to think (and relate) to their bodies and relationships through numbers. Lupton adds that these technologies enable comparisons of intimate experiences when rendered into digital and data form, expressing that these experiences can and should be compared to other activities (2014).

'The association of sex with burning calories also suggests the concept of sexual activity as a physical exercise like running or swimming, to be engaged in as part of a fitness or weight-control pursuit (activities that are also the target of many digital self-tracking devices and data collection)' (Lupton, 2014, p.447).

This association is noted by philosophers and evident within the self-tracking industry. For example, the application Sex Keeper is made by Run Keeper, a popular application for calorie counting. Glamour United Kingdom (UK) advertise Sex Keeper to their readers by encouraging them to "Track your performance including how long your steamy session lasts for and what positions have been tried (will doggy burn off that lunchtime KitKat?) to see if this really is one of the best cardio activities ever. #fitfam (London, 2021)." The choice of terms 'fitfam' and

‘really burn off’ and the comparisons made to other cardio activities in this article highlight the direct associations made to intimate experiences to achieve a physical health outcome.

Danaher, Nyholm and Earp elaborate that it is not about a changing locus of value between instrumental and intrinsic but rather that a hyper-focus on either that can potentially change the attitudes and beliefs of partners (2018). So instead of persons in intimate relationships engaging in sexual activity for its intrinsic pleasure or for another person as an end in themselves (Danaher, Nyholm and Earp, 2018), a user of Sex Keeper would focus on associated calorie-burning benefits for reasons associated with their physical well-being.

Ethicists Danaher, Nyholm and Earp ask, ‘Why do you need to know about heart rate and calories burned during sexual activity? If the value of sexual activity lies primarily in the occurrent subjective experiences of those involved, and shared intimacy and closeness between the lovers, this information about physiological measures and additional health benefits would seem to distract from what is truly important’ (2018, p.15).

This observation that Quantified Relationship Technologies focus on instrumental health-related benefits holds for many applications reviewed in the literature (Danaher, Nyholm and Earp, 2018). Therefore, according to this objection, quantified relationship technologies instrumentalise intimate relationships as having physical and mental well-being benefits while ignoring and obscuring the intrinsic value of human love (Danaher, Nyholm and Earp, 2018).

2.3 The Critique of the Instrumental-Intrinsic value problem Objection

2.3.1 Introduction

In this section, I evaluate the above objection. To evaluate this claim, I will first address the concern that quantified relationships technologies can change users’ attitudes and behaviour by shifting the focus onto the instrumental value of human love and obscuring its intrinsic value. Second, I will evaluate whether it is *necessarily* the case that this shifting or obscuring must occur by considering if some Quantified Relationship Technologies can support the intrinsic value of love and intimate relationships. To make my argument, I will introduce Nyholm’s four features of love and evaluate whether or not the good produced through the use of Quantified Relationship Technologies is the intrinsic good of love humans seek. In addition, I will use

Lupton's five motivations related to self-tracking to assess Nyholm's second and third features of love. Lastly, I provide a summary of my conclusions regarding the merit of this objection.

2.3.2 Are Quantified Relationship Technologies changing how users perceive and prioritise the instrumental value of human love and obscuring its intrinsic value?

According to Danaher, Nyholm and Earp, we are too early on in our use of these technologies to know (2018, p.15).

'We do not have sufficient empirical evidence on how the use of these technologies' changes peoples' attitudes or behaviour.'

As highlighted above, there is insufficient empirical evidence to support the claim that focusing on the extrinsic benefits of human relationships changes how users perceive and prioritise human love's instrumental and intrinsic values (Danaher, Nyholm and Earp, 2018). Nevertheless, the hyper-focus on instrumental benefits is worrying. This observation leads to my second argument, where I evaluate whether it is necessarily the case that this instrumentalisation of love needs to occur.

2.3.3 Is it necessarily the case that Quantified Relationship Technologies instrumentalise love?

2.3.3.1 Introduction

In this section, I describe the framework used by Nyholm in *Love Troubles: Human Attachment and Biomedical Enhancements* (2015), as this work is relevant to my purposes here. Nyholm identifies four features of love from the philosophical literature and evaluates whether the use of attachment-enhancements could enable or undermine that feature. This framework enables Nyholm to assess whether the good produced using attachment enhancement is the intrinsic good of love humans desire. Also, I will use Lupton's five motivations related to self-tracking, to assess Nyholm's second and third features of love. If Quantified Relationship Technologies

can support the intrinsic value of love as conceptualised by Nyholm, this would prove that it is not necessarily the case that instrumentalisation occurs. Thereby undermining the strength of this objection.

Nyholm's discussion is relevant to this argument for two main reasons. The first is that Nyholm makes the argument that love is 'commonly recognised as one of the most important intrinsic goods of human life' (2015, p.190); therefore, as a proponent of the intrinsic value of human love, his test for whether something can produce the intrinsic good of love is likely going to test for a strong notion or standard of it. The second is that Nyholm provides a 'basic framework' that enables me to evaluate whether or not the good produced through the use of Quantified Relationship Technologies is the intrinsic good of love humans seek. This framework enables me to assess if Quantified Relationship Technologies can support the intrinsic value of human love, which supports my argument that Quantified Relationship Technologies can focus on the intrinsic good of human love and avoid the potential undermining or obscuring of love's intrinsic value for users in quantified relationships. Thereby rendering this objection not a terminal objection to the Quantified Relationship phenomena.

Nyholm's framework includes:

'The following features seem to be part of what we intrinsically desire in seeking love.

We desire:

1. that somebody is firmly and robustly disposed to care for us across various different contingencies;
2. that this disposition depends on various internal factors within the lover;
3. that this disposition tracks us in our specific particularity; and
4. That, in other words, we ourselves have a sort of internal power or ability to call forth, and sustain, the said disposition in our lover that disposes him or her to robustly give us his or her loving care'(Nyholm, 2017, p.197).

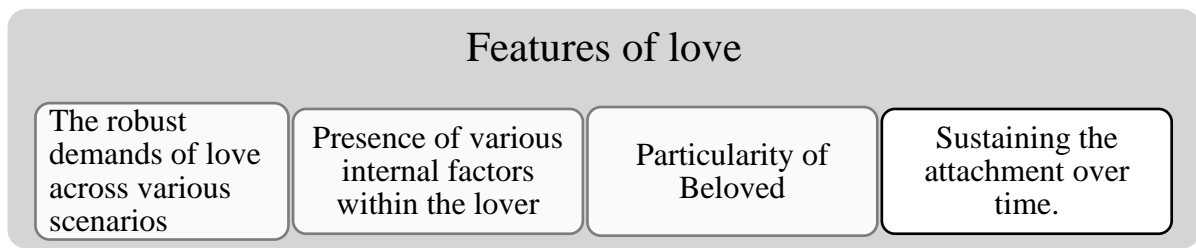


Figure 1: Nyholm’s Framework of the features we intrinsically desire in seeking love.

Feature 1: The robust demands of love across various scenarios

According to Pettit, if a lover loves their beloved, then the lover would show the beloved care in any actual circumstance where it is appropriate (2015). Pettit uses care as a singular term for a more 'complex form of indulgence' where the lover discriminates by favouring their beloved (2015, p.12). In addition, the lover must recognise and respond to a stimulus that is the needs and wishes of their beloved in a partisan manner (Pettit, 2015). Lastly, the lover should provide care not only on any actual occasion but also in a range of other possible scenarios (Pettit, 2015). This thinking can be found in the traditional Christian vows 'to have and to hold for better or for worse, for richer, for poorer, in sickness and in health' (Cranmer cited in Nyholm, 2015, p.195) and in Shakespeare's Sonnet 116: 'Love is not love, which alters when alteration finds' (Shakespeare cited in Pettit, 2015, p.12). This feature of love, according to Pettit, make love a 'robustly demanding good' (2015). If the lover were to withdraw their care from their beloved when it was less opportune for the lover, then the beloved does not enjoy the lover's love but rather some other 'thinner' good (Pettit, 2015). Therefore, this thinner good would not be the intrinsic value of love humans seek.

In this regard, Quantified Relationship Technologies could support this feature of the intrinsic value of love. For example, the application Love Nudge notes that 'lasting relationships, like anything worthwhile, take intentional commitment over time' (Love Nudge™ Mobile App, 2021); as such, the application allows users to provide and request updates on how loved their partner is feeling according to the love language framework. In this way, Love Nudge helps the lover recognise the stimulus 'updates' from their beloved. In addition, it has a chat function called Nudges that encourages lovers to communicate with each other. In this way, they can respond to the stimuli provided through Love Nudge in the chat function.

Secondly, as this information is dynamic, it provides lovers with insights to act on in accordance with reported changes in their beloved over time which can help them provide responsive care.

Lastly, the Love Nudge also helps support users through those nudges, sharing of recourses or linking them to relationship experts and a community of users within the application or on social media. Therefore, this particular Quantified Relationship Technology enables lovers to recognise, respond and share changing care needs across various scenarios through information sharing on the application.

However, it could be objected that acts of care would primarily occur outside the technology and need to be reported within the application. Therefore, while the technology provides insights or nudges, the provision of care still occurs mainly outside the technology.

In response to this objection, I argue that users' care could be provided through the application, for example, for users who respond to words of affirmation as their dominant love language. I agree that the provision of care would occur outside the application for other users. However, the applications could still support the provision of care. Therefore, this use of a Quantified Relationship Technology satisfies the first of Nyholm's features of love.

Feature 2: Presence of various internal factors within the lover

The second feature is that love as a robust attachment depends on the presence of what Pettit calls an 'internal factor', which is the 'inner state, disposition or attitude' of the lover that creates the 'robustly available care and affection' (Pettit, 2015, p.25).

Feature 3: Presence of various internal factors within the lover

The third feature is that the internal factor is particularistic in nature. That is, the beloved as the particular person calls forth this internal factor in the lover. (Pettit, 2015, p.34) Nyholm describes this second feature as:

'Part, but not the whole, of what our lover gives us in loving us, in other words, is this confirmation of us as really being able, or having the power to inspire loving devotion in another' (Nyholm, 2015, p.196).

To investigate if quantified relationships can support these two closely related aspects of love, I will be using Lupton identified five motivations related to self-tracking (2014), which I extend here to relationship-tracking. Due to the observation that self-tracking and relationship tracking are similar activities.

Lupton's five motivations for self-tracking

The first motivation is Private self-tracking motivations characterised by persons' goals to increase self-awareness or optimize their lives. Similarly, Private motivations would be characterised by relationships partners' goals to increase their relationship awareness and optimize their relationships. Second, Pushed motivations occur when motivations for tracking arise initially from external actors but are adopted by the user by choice. Third, Communal motivations, the user wants to belong to a group. Therefore, they share their collected data as part of a social movement. Fourth, with Imposed motivations, users have no choice in the tracking or processing of their data. This information was tracked to benefit others like states or companies. Lastly, Exploited motivations are characterised by users' data being used without their consent for unintended purposes or while ignoring possible adverse effects on the user.

Table 2: Showing the types of motivations and whether they support Nyholm's 2nd and 3rd aspects of intrinsic love

	Presence of Internal factor	Particularities of the beloved
Private motivations	yes	yes
Pushed motivations	yes	yes
Communal motivations	maybe	no
Imposed motivations	no	no
Exploited motivations	no	no

Table 2 above of Lupton's five motivations shows that private and pushed motivations for the use of Quantified Relationship Technologies satisfy the second and third features. Since the use of certain Quantified Relationship Technologies may indicate the presence of the internal factor in sufficient amounts in the lover, they would utilise these technologies to bring about the care of their beloved. In addition, their private motivations could arise from the particular nature of their relationship and beloved. For example, when the lover uses the technology, it could signal that the beloved has the power to inspire the lover to such an action. Similarly, as Pushed motivations result in the user adopting the use of the technology by their own choice, this satisfies both the second and third features of love.

However, if partners use these technologies for other reasons, then it is more difficult to say if the second and third aspects of love are satisfied. For example, if the government-mandated tracking of sexual activity due to low population growth, as is the case with imposed motivations. It could be possible for there to be private and imposed motivations for tracking to exist together. However, it would be less apparent to partners what the motivations of any care action are at any given point, and this uncertainty would serve to undermine the satisfaction of the second and third features. Bandura notes that partners' private motivations also need to be activated for satisfaction and effectiveness of imposed motivation outcomes (1991, p.248). Therefore, if Imposed motivations or other external motivations can change user behaviour outcomes, it is likely, according to Bandura, that their private motivations are also activated.

Therefore, if users use Quantified Relationship Technologies due to their private or pushed motivations, this use is likely to satisfy the second and third of Nyholm's features of love.

Feature 4: Sustaining loving attachment over time

Fourth, regarding sustaining loving attachment over time and across various situations, two main things are necessary for this attachment to qualify as what we seek intrinsically in loving another. First, it is vital that continually getting to know the beloved in their particular nature better should strengthen, and not weaken, their love. Secondly, the shared history that the lovers have and build together must also serve to deepen and strengthen their shared bond (Nyholm, 2015).

On this account, quantified relationships technologies support partners in sustaining their attachment as the applications can be used over time. For example, the application Love Nudge was released in 2019 and is still available. In addition, application updates of both software and content can provide relevant and user-friendly support, supporting users to strengthen their shared bond. For example, Love Nudge provides users with insights into each other's love languages and provides suggestions for actions of care to take.

However, it could be argued that if partners stop using the technologies, do not update the applications, or the applications are no longer maintained or supported, then partners' historic intimate data's potential benefits and insights might be lost or obsolete.

I agree that it is possible that this information can be lost or that its usefulness is contingent on how partners use this technology; however, this is not a unique issue. For example, if couples stop going to therapy or change therapists, then some of the value of historical data is lost. Therefore, the benefits of these technologies to store and leverage insights from data should support the sustaining of shared bonds by enabling users to strengthen their bonds through the features of the technology and as users can use the applications over time. Therefore, if users use Quantified Relationship Technologies over time and utilise features that strengthen their relationship like those offered by Love Nudge, this use is likely to satisfy the fourth of Nyholm's features of love.

In summary, I found that each of the four features could be satisfied using Quantified Relationship Technologies. However, this is contingent on several factors, including the technology used, how it is used and how long it is used. This framework enabled me to evaluate if the use of Quantified Relationship Technologies could support the intrinsic value of love. Proving that it is not necessarily the case that the instrumentalisation of love occurs with the use of Quantified Relationship Technologies.

2.4 Conclusion

In this chapter, I argued that Quantified Relationship Technologies could and should support the intrinsic goods we seek in romantic relationships. I began my argument by outlining the instrumental-intrinsic value problem objection according to the literature, which stated that Quantified Relationship Technologies encourage an instrumental view of romantic relationships and obscure their intrinsic value. Against this objection, I made two arguments; first, there is insufficient evidence to prove that the instrumentalisation of love changes users' attitudes and behaviours regarding the intrinsic value of their relationships. Second, Quantified Relationship Technologies can produce the intrinsic value we humans seek when we desire the love of another. These two arguments proved that it is not necessarily the case that Quantified Relationship Technologies must focus on the instrumentalisation of love.

Therefore, the merit of this objection is such that it is not a terminal argument for the Quantified Relationship phenomenon. Instead, it highlights that only focusing on the instrumental value of

love is concerning; however, this can be remediated by the types of technologies and how we use them.

Chapter 3: The informal-reciprocation objection

3.1 Introduction

In this chapter, I make the case that Quantified Relationship Technologies and the formal exchange-based models they enable can support healthy relationships. I will outline the informal-reciprocation objection, which states that healthy relationships thrive on 'informal, non-quantified acts of reciprocation' (Danaher, Nyholm and Earp, 2018, p.7). Against this, I will make two arguments; the first is that different relationship models can support the flourishing of romantic relationships. I will also address the objection that I argue for relationship relativism with this claim. Against this, I will claim that there are normative constraints on what is a healthy relationship; however, this does not include what type of model is used. The second argument is that formal exchange-based models can alleviate inequalities in care work and contribute to the development of healthy relationships. I will also address the objection that data collected from Quantified Relationship Technologies, with their commercial purposes, will not be robust enough to support policy development regarding unpaid care work and changing care needs. In responding to this objection, I will claim that data collected from Quantified Relationship can still be helpful as it can help provide insights and contextualise unpaid care work and changing care needs. I will also address the objection that the exchange-based model undermines the intrinsic value of love; against this, I will argue that these ideas need not be contradictory and that the exchange-based model can be used with the intrinsic value of love. Lastly, I will provide a summary of my conclusions regarding the merit of this objection.

3.2 The Outline of the Informal-reciprocation Objection

In this section, I will give an account of the informal-reciprocation objection. This objection takes a particular view on what makes a good relationship. In Danaher, Nyholm and Earp's description of this objection, they highlight that according to the informal-reciprocation objection, healthy relationships thrive on 'informal, non-quantified acts of reciprocation', i.e., that partners take actions; without keeping score (Danaher, Nyholm and Earp, 2018, p.7).

The distinction made here between informal, non-quantified acts of reciprocation and the exchange-based relationship model is the same as Clark and Mills' distinction between communal and exchange relationships. For Clark and Mills (1993, p.684), benefits in exchange relationships are given 'with the expectation of receiving a comparable benefit in return or repayment for a benefit previously received.' In contrast, with communal relationships, benefits are provided 'in response to needs or to demonstrate concern for the other person and receiving a benefit 'does not create a specific debt or obligation to return as comparable benefit' (Clark & Mills, 1993, p.684).

Proponents of this objection hold that exchange-based relationship models can be used in other social human interactions, citing business as an appropriate arena for this model but not in intimate relationships. In addition, they fear that the tracking and quantification enabled by these technologies would encourage partners/users to move towards an exchange-based model. Levy (2014, p.689) expresses this concern well, stating that 'apps that quantify or calculate previously incommensurable aspects of intimate relationships may create new motivations for certain behaviours.' Levy supports her argument by citing Professor of Psychology and Director of Northwestern University's Relationships and Motivation Lab (RAMLAB), Eli Finkel's comments on Kahnoodle and other romance quantifiers. Kahnoodle is a Quantified Relationship Technology that gamifies romantic relationships by accumulating points and rewards. In Kahnoodle, partners rank their preferred shows of affection called love signs; when a partner takes an action that demonstrates their partner's preferred show of affection, they receive points; these points accumulate towards filling their partner's love tank within the app. Partners can redeem the points for rewards (Zeilinger, 2013). Professor Eli Finkel suggests that this 'gamification may foster a tit-for-tat exchange mentality that is ultimately detrimental to the foundation of romantic relationships that divests romantic gestures of their meaning' (Neilson, cited in Levy). Proponents hold that when intimate partners engage in exchange-based relationship models or have an 'exchange mentality', they will express the wrong attitude – 'akin to cold, commoditised exchanges' regarding their beloved (Danaher, Nyholm and Earp, 2018, p.13). Their beloved only matters in relation to what the partner can get in return. It is purported that this wrong attitude will change the lovers' attitude toward each other into 'conditional and potentially resentful' (Danaher, Nyholm and Earp, 2018, p.13).

In summary, this objection states that by tracking and gamifying components of interpersonal romantic relationships and their data, users are encouraged to shift to detrimental formal,

exchange-based models of relationships. At the same time, healthy relationships are seen as being built on informal reciprocity and not on an exchange-based model (Danaher, Nyholm and Earp, 2018, p.9).

3.3 The Critique of the Informal-reciprocity Objection

3.3.1 Introduction

In evaluating the strength of this objection, I make two arguments; the first is that different relationship models support the flourishing of romantic relationships. I will also address the objection that I argue for relationship relativism with this claim. Against this, I will claim that there are normative constraints on what is a healthy relationship; however, this does not include what type of model is used. The second is that formal exchange-based models can alleviate inequalities in care work and contribute to the development of healthy relationships. I will also address the objection that data collected from Quantified Relationship Technologies, with their commercial purposes, will not be robust enough to support policy development regarding unpaid care work and changing care needs. In responding to this objection, I will claim that data collected from Quantified Relationship can still be helpful as it can help provide insights and contextualise unpaid care work and changing care needs. Lastly, I will also address the objection that the exchange-based model undermines the intrinsic value of love.

3.3.2 Healthy relationships and the Informal reciprocity model

The informal-reciprocity objection is unduly prescriptive in claiming healthy relationships are built on informal reciprocity rather than an exchange-based model. The proponents of this objection state that Quantified Relationship Technologies that enable an exchange base model are incorrect and wrong for use in intimate relationships. However, Danaher, Nyholm and Earp (2018, p.10) state that:

‘there is no single, widely accepted and normatively persuasive model of what makes for a “good” intimate relationship.’

The strong stance taken by this objection undermines the 'expressive' connotation of behaviour within a relationship – which is variable, contingent, and open for intimate partners to construe their own meanings. Specific relationship models might provide a good structure for the flourishing of some. However, Jenkins (2017) notes that this is not the only structure and will not provide flourishing for all partners in every context. For example, there is currently some evidence to suggest that Quantified Relationship Technologies can assist relationships to flourish. Married couple Daniel Reeves and Bethany Soule’s use and recommend the technology Beeminder, a self-tracking and commitment holding application; in which if users fail to meet set goals, they are required to pay a certain amount of money (Beeminder About, 2021); the couple co-created Beeminder to enable to have a formal and quantified approach to sharing time and resources in their relationship (Danaher, Nyholm and Earp, 2018).

Furthermore, their relationship illustrates that this model enables greater accountability and fairness from the perspectives of those in the relationship (Danaher, Nyholm and Earp, 2018). Lastly, Daniel Reeves and Bethany Soule note that they do not quantify all aspects of their relationship. Instead, there are spaces for spontaneity and informality, which emphasises the nuanced and variable approaches partners can and should be enabled to take in their relationship.

Therefore, healthy relationships are not only built on informal reciprocation. Instead, other models, such as the exchange-based model that Quantified Relationship Technologies may enable, can assist in the flourishing of some intimate relationships.

To avoid the objection that can be made against my claim, which might object that I have claimed that anything goes in romantic relationships or argued for a sort of relationship relativism. Instead, I provide a list of characteristics for a ‘good’ romantic relationship identified by philosophers that apply to and are drawn from analyses of the Western model of a universal, lifelong monogamous pair bonding arising from mutually declared love (Coontz, 2006).

‘valuing each other in one another’s particularity; giving each other affection and care robustly and steadfastly; and valuing the shared history that the lovers build together’(Pettit, 2015 and Nyholm, 2015).

The vital difference between these characteristics and the claim that good relationships require informal reciprocation is that these characteristics are broad enough to enable a range of relationship-specific interpretations of how individual relationships ought to be construed in with partners' aspirations (Danaher, Nyholm and Earp, 2018, p.10). In addition, to these characteristics, we could add Danaher, Nyholm and Earp's foundational normative constraints to the critical properties of good relationships. These properties include a mutual commitment to the relationship partners' autonomy, agency, and consent (Danaher, Nyholm and Earp, 2018, p.11). Outside of these properties, Danaher, Nyholm and Earp (2018, p.11) argue that:

'All else being equal, they [partners] should determine the specifications that make for a good relationship for themselves while being sensitive to the fact that some relationship partners have more bargaining power than others and some relationship partners occupy privileged social positions that should be questioned and, if necessary, counteracted'.

Therefore, I am not arguing that anything goes in romantic relationships when I suggest that partners can have healthy relationships using various models. Instead, there are normative constraints on what is a good relationship that the Quantified Relationship Phenomena can support.

3.3.3 Healthy relationships and the Exchange Based model

As the informal-reciprocation model relies on unquantified acts of care that are responsive to the partner's needs while not creating an obligation for benefit by the receiver, it can result in inequalities. Danaher, Nyholm and Earp note that intimate, interpersonal relationships are not only about 'sex and passion'; these relationships typically also include the 'sharing of resources and time in pursuit of common goals' (2018, p.13) and the problem is that resources are often not shared equitably between partners (2018, p.14). I argue that not all romantic relationships thrive on informal, non-qualified acts of reciprocation in all contexts and that Quantified Relationship Technologies can help provide data that aids relationships, policy and research in supporting healthy relationships. Unpaid care work or 'invisible' care work is the quintessential example of a context where the lack of quantifiable data results in persisting inequalities.

Unpaid care work refers to all unremunerated services provided within a household for its members necessary for the health, well-being, maintenance, and protection of someone or something (Ferrant et al., 2014, p.3). These activities like cooking, cleaning and caring for children, the ill and the elderly are considered work because the activity requires mental or physical effort, has time as resource cost associated and theoretically, one could pay a third person to perform them (Ferrant et al., 2014, p.3). In addition, these care activities are part of the 'sharing of resources and time in pursuit of common goals' that are a common feature of romantic relationships (Danaher, Nyholm and Earp, 2018, p.13).

Unpaid care work is essential for two reasons; first, according to the Organisation for Economic Co-operation and Development (OECD), women spend on average between three to six hours on unpaid care work compared to male partners, who spend on average between half an hour and two hours (2014). This unequal distribution between women and men represents an infringement of women's rights (United Nations, 2013), hinders women's economic empowerment (Ferrant et al., 2014) and is linked to discriminatory stereotypes and social institutions (Ferrant et al., 2014). Moreover, as time is a limited resource, every minute more a woman uses in unpaid care activities represents a minute less that she has to potentially spend on market-related activities or investing in education or vocational skills (Ferrant et al., 2014, p.1). These gender patterns in unpaid care work are found across various geographic regions, household incomes and societies – it is a shared characteristic of women's lives worldwide. The importance of addressing this issue to achieve gender equality, economic growth, and improve women's lives is recognised by the Sustainable Development Goal (SDG) 5 Target 5.4:

'Recognise and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies, and the promotion of shared responsibility within the household and the family as nationally appropriate (Ferrant et al., 2014, p.2).

Secondly, care needs continue to increase as people live longer. Therefore, it is important to use and improve the available tools (including Quantified Relationship Technologies) to understand and measure unpaid care work so that partners in relationships can understand the care that is required and share care work responsibly within their relationships.

Among the policy recommendations and essential issues on the unpaid care work agenda is measuring unpaid care work (Ferrant et al., 2014). In addition, the OCED highlights that measuring unpaid care work is 'critical to help implement public policies that improve the lives

of women' and 'tools and research to measure unpaid care are critical to help implement public policies that improve women's lives' (Ferrant et al., 2014, p.10).

Quantified Relationship Technologies can be tools that assist in the measuring and understanding of care work among its users. For example, as partners engage in formal exchange-based models and quantify acts of care, they create data about care work within their relationships. This data can be used to provide insight into unpaid care work and changing care needs in society which is critical to inform public policies on these issues. In addition, as some Quantified Relationship Technologies can be downloaded and accessed over the internet, women can use them in various contexts, thereby providing context-specific data. Also, as the application generally tracks and collects similar data from users, the data should be internally comparable between countries. Therefore, Quantified Relationship Technologies could collect, store and provide useful insight into unpaid care work and changing care needs, which would be useful in making relationships more equitable and able to respond to changing care needs. Therefore, a formal exchange-based model could support romantic relationships to thrive.

It can be objected that data required for policy analysis, insight and advocacy on unpaid care work is collected via statistical methods, not through commercial platforms. For example, OCED uses time-use surveys (TUS). However, TUS are quantitative summaries of how people spend their time, usually measured over a certain period (Department of Economic and Social Affairs, Statistic Division, 2005). Therefore, data tracked and collected by users of Quantified Relationship Technologies will not provide the same quality or quantity of data as these time-use surveys and, therefore, will not be as valuable or insightful for policy or research.

I agree that the data collected via these Quantified Relationship Technologies are currently not comparable to the time-use survey data used to measure unpaid care work. However, this does not mean that interoperability between a Quantified Relationship Technology and current methods measures of unpaid care work cannot be worked on and deployed. Secondly, the data tracked and collected via Quantified Relationship Technologies can be considered relevant data which can describe the problem and monitor changes in unpaid care work and changing care needs. Therefore, Quantified Relationship Technologies can still provide useful data about unpaid care work and changing care needs.

Lastly, it could be the objection that the apparent consequence is that the exchange-based model undermines the intrinsic value of love discussed in Chapter 2 because it grounds caring dispositions in economic exchange rather than intrinsic attributes of the beloved.

I agree that in some cases, exchange-based models might conflict with the intrinsic value of love. However, as this chapter argues, the exchange-based models can enable robust care in scenarios of gender parity.

As this use of the exchange-based models relies on collecting and tracking data in the relationship, each partner's particularity and internal dispositions can be known and responded to. For example, care work for women spans several different tasks; the exchange-based models can quantify these tasks according to each woman, how long they spend on tasks, when they do it or how they do it. This all works to provide an understanding of the particularity of the woman and how best to respond with care.

Lastly, to achieve the intrinsic value of love, the lover's disposition disposes him or her to robustly give us care. This is seemingly a significantly conflictual element between exchange-based models and the intrinsic value of love, as it is not the disposition of the lover but rather 'economic' considerations that the beloved is motivated by.

This can be the case if, in the name of gender parity, the beloved and lover spend equal time on childcare while ignoring the partner's preferences to spend differing amounts of time in childcare. Therefore, while the exchange-based models can elucidate the imbalances (i.e. varying amounts of time spent in different care activities), how we apply that knowledge can still be responsive to the dispositions of our lover. For example, this application of the exchange-based model and the intrinsic value of love could mean that the lover spends 5 hours with their children, according to her disposition and negotiates to trade another hour of care among other care tasks.

Therefore, it need not be the case that the exchange-based model and the intrinsic value of love are incompatible. Instead, both for women and society, we must work towards Quantified Relationship technologies facilitating exchange-based relationship models that redress inequalities in care work by elucidating data from relationships.

3.4 Conclusions

In evaluating the strength of this objection, I made two arguments; the first is that different relationship models support the flourishing of romantic relationships. I also addressed the objection that I have argued for relationship relativism. Against this, I claimed that there are normative constraints on what is a healthy relationship; however, this does not include what type of model is used. The second argument is that formal exchange-based models can alleviate inequalities in care work and contribute to the development of healthy relationships. Finally, I also addressed the objection that data collected from Quantified Relationship Technologies, with their commercial purposes, will not be robust enough to support policy development regarding unpaid care work and changing care needs. In responding to this objection, I claimed that data collected from Quantified Relationship can still be useful as it can help provide insights and contextualise unpaid care work and changing care needs. Lastly, I addressed the objection that the exchange-based model undermines the intrinsic value of love; against this, I argued that these ideas need not be contradictory and that the exchange-based model can be used with the intrinsic value of love. Therefore, Quantified Relationship Technologies and the formal exchange-based models they enable can support healthy relationships.

This supported my argument that not all romantic relationships thrive on informal, non-qualified acts of reciprocation in all contexts and that Quantified Relationship Technologies can help provide data that aids relationship, policy and research in supporting healthy relationships. Therefore, I have supported my argument that the informal reciprocation objection is not a terminal objection to the Quantified Relationship phenomena by highlighting that Quantified Relationship Technologies can support healthy relationships that are equitable and responsive to changing care needs.

Chapter 4: The privacy objection

4.1 Introduction

In this chapter, I will argue that there are a number of ways that the privacy risks raised by the use of Quantified Relationship Technologies can be mitigated. I begin this chapter by outlining the Privacy objection. The Privacy objection claims that Quantified Relationship Technologies threaten privacy due to the fact that they enable the tracking and storing of personal information (Danaher, Nyholm and Earp, 2018). Levy (2014) notes that privacy threats arise from two different directions: from the collected data about users by their intimate relationship partners (Group 1 privacy risks) and data collected by Quantified Relationship Technology companies (Group 2 privacy risks). In my discussion of privacy risks below, I focus on the issue of informed consent as a critical feature of privacy.

To evaluate the privacy risks associated with group 1, I will look at how partners get consent to track and collect personal data on each other. I will also contend with the objection that economic terms-of-service agreements are insufficient for this context. I suggest this objection can be overcome by borrowing from more stringent regulatory and ethical frameworks employed in the biomedical field, such as their consent model. In addition, a more robust consent process for the use of Quantified Relationship Technologies will also ensure that non-consensual tracking by partners is avoided. Therefore, these privacy risks are not insurmountable.

To evaluate the concern that privacy risks arise from the reality that intimate data are collected and stored on non-intimate commercial platforms (Levy, 2014), which could result in intimate data being shared or sold to third parties (Payne, 2014), I will discuss two main areas of privacy protection. The first is the privacy protection laws that regulate the collection, storage and sharing of data. The second is the implementation of privacy requirements in the software, architecture, infrastructure, and work processes to make privacy violations unlikely to occur through the privacy by design approach. In addition, I will address the objection to the first area of privacy protection, which states that some questions related to privacy protection remain indefinite, therefore making users vulnerable. To this objection, I will respond that privacy protection laws can be clarified, improved and respond to changes in the technology landscape, offering users increasingly better protection. I will also claim that where these privacy regimes are insufficient to protect users, users' have the autonomy to decide their own threshold of

acceptability for these risks. I then move on to address the objection to the second area of privacy protection, which states that the plurality of understandings that can arise from the interpretation of privacy by design approach guidelines can result in varying privacy protection for users. In response to this objection, I will argue that this objection is not insurmountable as guidelines can be clarified and made more succinct.

In light of the above assessment of the privacy objection, I will conclude that these risks can be mitigated, which supports my argument that the privacy risks associated with therefore the use of Quantified Relationship Technologies are not a terminal objection to the Quantified Relationship phenomena.

4.2 The Outline of the Privacy Objection

In this section, I will give an account of the privacy objection. According to van den Hoven et al., persons value their privacy and protection over their personal domain. However, advances in information technology generally threaten privacy, reduce the number of control persons have over their own data, and expose persons to a range of negative consequences due to access to their personal data (van den Hoven et al., 2020). According to Levy, the increased data collection facilitated by Quantified Relationship Technologies brings along with it increased privacy risks (2014). These increased risks to privacy include if data is put to unanticipated uses, if data safeguards are breached or if data is shared with commercial third parties who are outside of the immediate romantic relationship (Levy, 2014).

The first group of privacy risks that arise from partners collecting data on each other, Levy highlights that Quantified Relationship Technologies typically do not require consent from both romantic partners before a partner can input data. Therefore, monitoring enabled by these technologies can be non-consensual (Levy, 2014). For example, the application Eve (Period Tracker - Eve, 2021) allows a female partner to log information about whether she engaged in intimate relations, what kind of experience she engaged in (options provided include: sex with or without a condom, non-penal penetration, a make-out session, masturbation or none), what the quality of the intimate experience was (options provided include: mind-blowing, pretty good

and eh) and whether she orgasmed (options provided include: yes, no and faked it). Female users of Eve can log this information without the consent of their intimate partners.

The second group of privacy risks arise from the reality that intimate data are collected and stored on non-intimate commercial platforms (Levy, 2014). According to Payne, even intimate data seemingly shared between partners in a romantic relationship can be shared or sold to third parties, including application developers, internet service providers, advertisers, data brokers, and aggregators (2014). Bakos, Marotta-Wurgler and Trossen argue that the contractual relationship between users and technology companies are governed by 'fine-print privacy policies and terms-of-service agreements' that users rarely read and understand (2014, p.1). For example, the fertility application Glow enables female partners to track intimate and sensitive data, such as 'emotional mood, a woman's position when her partner ejaculates, the firmness of her cervix and other data points' (Williams, cited in Levy, 2014, p.691). Manjoo highlights that Glow 'aims to collect and aggregate enough data about its users' fertility that it can possibly spot as-yet-unknown correlations for medical study' (cited in Levy, 2014, p.691). Lupton argues that contemporary normative understandings of privacy would find it problematic if Glow protected individual privacy by aggregating the data or removing personally identifiable information before analysing or sharing the data with third parties but did not engage with users about the different use cases for their intimate and sensitive data (Lupton, 2015).

In an extreme example of the potential threat of security breaches related to intimate data, Levy cites the example of Grindr, a mobile application for dating used by homosexual men. A technical flaw in Grindr enabled real-time, pinpoint location tracking of its users (Levy, 2014), which the Egyptian authorities reportedly used to locate and prosecute homosexual men for illegal homosexual conduct (Noack, cited in Levy, 2014, p.691). Following being notified by security researchers of the technical flaw, Grindr disabled location tracking of users in several countries with anti-homosexual laws. While Grindr has made these changes, Levy notes that the weakness persists across other location-based dating applications in other countries. Therefore, privacy risks persist with these technologies.

4.3 The Critique of the Privacy Objection

This section will address both groups of privacy risks that arise when users store and share their intimate data. I will do this not by arguing that these risks do not exist or are not of grave

concern because these risks, as the example above illustrates, are real and can have severe consequences for a person's happiness and wellbeing. Instead, I will critique this objection by evaluating the privacy-protecting mechanisms available, as this will enable us to understand the full force of the privacy objection.

4.3.2 Group 1: Risks that arise from partners collecting data on each other

4.3.2.1 Introduction

In order to address the concern that privacy risks arise from partners collecting data on each other, which can result in non-consensual tracking (Levy, 2014, p.689), I will delineate two scenarios. The first is when both partners are participants in the use of the Quantified Relationship Technologies, and the second is when only one partner participates. I will evaluate the severity of this group of privacy risks by critiquing how partners get consent to track and collect personal data on each other via terms-of-service agreements (ToS). A ToS agreement is a legal agreement between a service provider (Quantified Relationship Technologies providers) and persons who want to make use of that service (partners in a quantified relationship). I will also contend with the objection that economic ToS agreements are insufficient for this use case. I suggest this objection can be overcome by borrowing from more stringent regulatory and ethical frameworks employed in the biomedical field, such as their Informed consent model. In summary, I will argue that a more robust consent process for the use of Quantified Relationship Technologies will also ensure that non-consensual tracking by partners is avoided.

Scenario 1: Both partners are participants

This scenario is characterised by all partners in the romantic relationship being participants of the Quantified Relationship Technologies. In this scenario, all partners must agree to the ToS individually. For example, the application Love Nudge requires syncing of applications on each partner's mobile phone in order for the application to function correctly. In this way, by requiring both partners to agree to the ToS individually, they are giving consent to use the Quantified Relationship Technologies individually. Also, they have to accept the linking on their application with their partners, enabling the sharing of data between each application of each partner's phone. This practice means that partners track information about each other with

consent from the other. Therefore, in this scenario, the risk of non-consensual tracking is avoided.

Scenario 2: One partner is the participant

This scenario is characterised by one partner being the participating partner, and the other is a non-participating partner whose information like sexual experiences and relationship activities is shared and tracked via the Quantified Relationship Technology. For example, the above-mentioned application Eve (Period Tracker - Eve, 2021) allows a female partner to log information about whether she engaged in intimate relations and what kind of experience she engaged in. Only the participant-partner agrees to the ToS and consents to track and collect their personal data in this scenario. Therefore, this does not avoid the risk of non-consensual tracking of the non-participating partners' data. However, this information is considered personal information of the participating partner and protected through the ToS agreements they consent to. While this offers the non-participating partner's data protection, it does not solve the lack of consent issue. I argue that depending on the nature of the information, this is not as big of a concern as it first appears. For example, research participants answer questions about their sexual history, experiences or family and are not required to get consent from all partners or family members. This is due to the fact that the research participant is of research interest, and the data about others is mainly anonymous.

Similarly, with the example of Eve, the female partner is the user, information collected about sexual experiences is continuously tracked from her perspective about her orgasms and experiences. Even though it is implicit in penal sexual encounters that a male is present, data about his experience, orgasms etc., are not required. Therefore, in this model, the Quantified Relationship Technologies focus on the tracking and collecting of data on the participating partner. Therefore, there is no legal requirement for consent from the non-participating partner. However, morally partners should discuss what information they are comfortable sharing with Quantified Relationship Technologies.

It could be objected that ToS agreements are insufficient in both scenarios. Berg argues that QS devices (and I would add Quantified Relationship Technologies) are treated contractually similar to other technology or economic items. However, QS devices and Quantified Relationship Technologies can potentially impact users' physical and mental wellbeing. Therefore, they are critically dissimilar from other technology or economic items where ToS

agreements are used (Berg, 2019). This distinction seems less pronounced on the surface, as other technological items can impact users' physical and mental wellbeing; a noteworthy example is Social Networking Applications which have been found to alter brain chemistry and be highly addictive. However, there is still a distinction to be made between applications that aim to impact physical and mental wellbeing and those that do as a by-product of how the application is used. Quantified Relationship Technologies intend to bring about some change in users through the quantifying and gamification of their relationships. Therefore, as Berg argues, the consent provided in scenarios 1 and 2 is likely to be insufficient in the context of the use of Quantified Relationship Technologies that impact the physical health and mental wellbeing of its users.

In response, I agree that ToS agreements can be insufficient to inform and protect Quantified Relationships Technologies users adequately. However, I argue that there are ways for consent provided by users to match this use case of technology more closely. For example, in her examination of QS devices, Berg uses aspects of informed consent from the medical field because these QS devices are created to and have substantial impacts and influences on the human bodies and minds (Berg, 2019, p. 89). In addition, as users cannot escape or replace their bodies or minds, it is critical that technologies that can impact these aspects directly need to be treated differently from other technologies (Berg, 2019, p. 89). Similarly, Michie et al. (2017) argue that both the notion of a minimum viable product and the 'fail fast, fail often' approaches that are employed in the development of technologies are in stark contrast to the 'first do not harm' approach of the health care profession and patient safety. Therefore, Michie et al. suggest that developers might need to adjust to the more stringent regulatory frameworks of the biomedical sector. Berg concurs with this assessment stating that:

'QS and (I would add Quantified Relationship Technologies) need to 'hold to other, more medical standards than typical consumer technology' (Berg, 2019, p. 89).

Following their suggestions, I will describe each of the ethical and legal aspects – disclosure, understanding, capacity and voluntariness - of informed consent from the biomedical field, suggest how they can be used in the context of Quantified Relationship Technologies and why this informed consent process is more sufficient than ToS agreements.

4.3.2.2 Informed Consent

The Universal Declaration of Human Rights, World Medical Association Declaration of Helsinki – Ethical Principles for Medical Research involving Human Subjects and other international codes and guidelines recognise autonomy and self-determination as vitally important. These foundational ethical principles underlay informed consent and assist in protecting human rights. According to ethical-legal principles, informed consent is:

‘the process by which competent adults make voluntary decisions following adequate disclosure of relevant information’ (Karlavish, 2022).

Rational persons meet the necessary criteria for deliberation and making choices about what is in their best interests. Also, healthcare practitioners (HCPs) have a moral and ethical duty to recognise and respect this value in their patients. Therefore, the ethical and legal aspects – disclosure, understanding, capacity and voluntariness – are required for a valid consent process (see Figure 2) (Dhai & McQuoid-Mason, 2011, p.71).

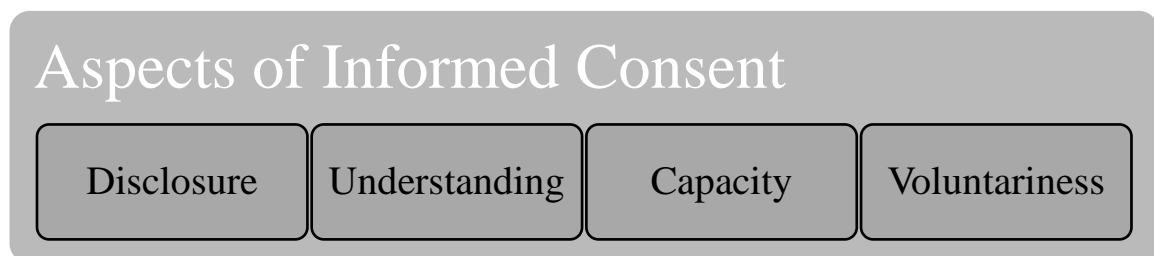


Figure 2: Aspects of Informed Consent

Disclosure

Disclosure is the condition that the HCPs have provided all the relevant facts for decision-making; these are called material facts. Material facts include diagnosis, proposed treatment or procedure, alternative options, benefits and risks of all treatments, and refusing treatment. Disclosure also requires HCPs to answer questions that patients ask honestly (Ryan and Sinha, 2021). For example, Quantified Relationship Technologies would require that technology makers share with users the necessary information they would require to decide if they want to use the application. Disclosure would include how the data will be used, whom it could possibly be shared with, the technology's benefits and risks, and other similar concerns.

Some of this information is currently shared in the ToS agreements; however, more comprehensive information about Quantified Relationship Technologies can be shared with users. For example, research by Simpson and Mazzeo noted that:

‘the usage of fitness trackers is associated with eating disorder symptoms. Interestingly, not the calorie tracking was associated, but the monitoring itself revealed the crucial association. Furthermore, the neglect of rest days and limits on fitness trackers encourages overexercising and behaviour that risks the users’ (2017, p.89).

The risks described above highlight some of the risks of fitness trackers that should be shared with users by the technology companies. Similarly, risks associated with Quantified Relationship Technologies must be shared with users. For example, if research were to show associations between counting calories during sexual activity and eating disorder symptoms. Therefore, the requirement of disclosure of all the material facts related to Quantified Relationship Technologies will provide users with more comprehensive information and enable them to make more informed decisions.

Understanding

Understanding is the condition that the person has the ability to know the meaning of information (Ryan and Sinha, 2021). For example, suppose a user decides to use a calorie-burning feature of a sex application. In that case, the user should understand what calories are, why they are burnt during movement and the benefits and risks of using this feature to understand their sexual experience. Furthermore, understanding could be ascertained via Quantified Relationship Technologies by users answering a quiz after reading, watching, or sharing the Informed consent agreements. Therefore, the requirement of understanding will help in ensuring that partners understand what they are consenting to and what activity they are engaging in.

Capacity

Capacity is the requirement that individuals providing consent and using the Quantified Relationship Technology have the ability to deliberate among options and make decisions (Ryan and Sinha, 2021). In a medical context, this refers to a patient’s ability to use the information provided about both the illness and proposed treatment choices to make congruent decisions with their values and preferences (Karlawish, 2022). Capacity is always presumed

unless there are clinical or judicial reasons to doubt capacity. Clinical reasons include severe mental illness, and judicial reasons include being deemed incompetent by a court of law (Ryan and Sinha, 2021).

In the case of Quantified Relationship Technologies, the typical users would be adults. Therefore, in most cases, the capacity to use the Quantified Relationship Technologies would be assumed. However, as teenagers often engage in romantic relationships, they might also want to use these technologies. Therefore, in this user group, different capacity guidelines would be required. For example, the application Eve explicitly states that:

‘The Service is not intended for use by children under 16 years of age. If we learn that we have collected personal information through the Service from a child under 16 without the consent of the child’s parent or guardian as required by law, we will delete it’ (Period Tracker - Eve, 2021).

Hence depending on the local and international regulations imposed on developers, capacity may be covered between the ToS agreements, as is shown with the application Eve. However, having the Informed Consent aspect of capacity as a requirement helps to explicitly ensure that thought of who users’ are and whether they can deliberate among options and make decisions is given.

Voluntariness

Voluntariness is the condition that consent must be given freely. If consent is given under the conditions of literal coercion, undue inducement or in a no-choice situation, it can become invalidated (Berg, 2019).

Literal coercion

Coercion is the threat that a person will be worse off if they do not consent compared to if they do consent. The threat of coercion can be direct or indirect. Direct coercion entails threats, such as ‘if you do not consent, I will harm you,’ while indirect or implicit threats include denying future benefits and actions (Berg, 2019, p.89). For example, one could argue that Quantified Relationship Technologies send the ‘social message’ that quantification is desirable, which further legitimises quantification (Hull, 2018). Peppett argues that privacy-invasive technologies tend to expose everyone's privacy (cited in Hull, 2018, p.30) as eventually, it becomes more obligatory to opt in as more people adopt the technology. Hull calls these

negative externalities – that the use and proliferation of Quantified Relationship Technologies will negatively affect persons who do not use these technologies (Hull, 2018, p. 29). These negative externalities could result in implicit coercion.

Hull provides four cases that highlight varying negative externalities that can arise from the spread of Quantified Relationship Technologies. The first is the case of employee wellness programs that employers adopt under the misguided belief that these programs will help reduce insurance costs. These programs reward or penalise users' behaviours (Hull adds that many of these are without proper scientific support). Hull argues that what they actually do is enable users to 'better monitor and regulate the behaviour of employees outside of the workplace, by way of wearable and quantification technologies' (2018, p.29). Using intimate data, Hull posits that an employer or insurer could decide that 'engaging in "high-risk" sexual behaviours,' or having 'multiple partners' was a risk to a user's health and a behaviour that a 'responsible' employee should avoid (Hull, 2018, p. 29). In this way, Quantified Relationship Technologies could use the tracking and sharing of intimate data, and the regulation could enable the monitoring of intimate behaviours by these 'wellness' programs.

The second is the case of an employee wellness program that provides employees with incentives to adopt and use Quantified Relationship Technologies to collect and share information about their relationship satisfaction. In this way, the fact that loving relationships provide a range of benefits for wellbeing is leveraged by employers to ensure workers are healthier and happier so that they work better.

The third is the potential for credit agencies to incorporate users' intimate data into the algorithms they use to predict individuals' creditworthiness (Hull, 2018, p.30).

Fourth is the potential of Quantified Relationship Technologies to become more obligatory as more couples use them. For example, suppose couples are given discounts depending on how well they 'score' via their Quantified Relationship Technologies. In that case, healthy couples will join the application to get the discount benefit. Then the next group down from the healthy couples joins to be associated with the healthier couples rather than lower groups. Eventually, what occurs is that even unhealthy couples must sign up to use these Quantified Relationship Technologies to provide their relationship scores to insurance companies to avoid the stigma associated with not having their relationship habits available for review (Hull, 2018, p.30). Therefore, users are implicitly coerced to use the technology in all four scenarios.

As Hull shows us with these examples, privacy-invasive technologies tend to expose everyone's privacy, and the potential negative externalities of Quantified Relationship Technologies are an example of implicit coercion as couples may only consent to use Quantified Relationship Technologies to avoid being denied employee insurance, credit, or other social benefits. Therefore, their consent is not given voluntarily and is invalidated according to biomedical standards.

Undue inducement

Undue inducement refers to offers that create temptation and make it hard for persons to make rational choices (Berg, 2019). For example, if a couple were rewarded with a free dinner at a romantic restaurant for their consenting to use a Quantified Relationship Technology.

No-choice situation

A no-choice situation refers to the absence of alternatives for users, which results in them having to make an unsafe choice (Berg, 2019). For example, if all intimate tracking applications only enable users to provide heart rate and calories metrics for intimate experiences and provide no opportunity for subjective data about the experience to be logged. Then users have no choice but to use a technology that enables them to collect and track quantifiable data.

Both undue inducements and no-choice situations highlight potential scenarios where users' choice to give consent freely would be influenced by the accompanying offers or the lack of alternatives.

Therefore, the requirement of voluntariness will protect users from undue inducements, no-choice situations and coercion that ToS agreements may not protect them from. In addition, it explicitly shows us scenarios where possible negative externalities or incentives to use Quantified Relationship Technologies may influence users' ability to choose freely to use a type of technology.

4.3.2.3 Conclusion

In considering the Group 1 privacy risks, I have looked at how partners give consent to track and collect personal data on each other in scenarios where both partners participate and only one partner participates. I have also contended with Berg's objection that ToS agreements used

for other technology and economic items are insufficient for this context. I then I suggested that this objection could be overcome by borrowing from more stringent regulatory and ethical frameworks employed in the biomedical, such as their consent model. The biomedical informed consent model with its conditions of disclosure, understanding, capacity and voluntariness were defined and applied in the context of Quantified Relationship Technologies. I sought to leverage informed consent guidelines that the law and ethics have decided are suitable for actions affecting human health and well-being. With each condition, I highlighted how its more stringent requirements avoided possible concerns associated with Quantified Relationship Technologies. In particular, I used the arguments of Hull to highlight how coercion, undue inducements and no-choice situations could arise through the use of Quantified Relationship Technologies. Therefore, the biomedical informed consent model will protect users from undue inducements, no-choice situations, coercion and other issues that ToS agreements may not protect them from. In showing that these Group 1 privacy risks are not insurmountable, I have supported my argument that the privacy objection is not a terminal objection to the Quantified Relationship phenomena.

4.3.3 Group 2: Risks that arise from collecting and storing intimate data

4.3.3.1 Introduction

In order to evaluate the concern that privacy risks arise from the reality that intimate data are collected and stored on non-intimate commercial platforms (Levy, 2014) that could result in intimate data being shared or sold to third parties (Payne, 2014), I will discuss two main areas of privacy protection. The first is the privacy protection laws that regulate the collection, storage and sharing of data. The second is the implementation of privacy requirements in the software, architecture, infrastructure, and work processes to make privacy violations unlikely to occur through the privacy by design approach. In addition, I will address the objection to the first area of privacy protection, which states that some questions related to privacy protection remain unanswered and that these grey areas are areas where users are vulnerable. To this objection, I will respond that privacy protection laws can be clarified, improved and respond to changes in the technology landscape, offering users increasingly better protection. I will also claim that where these privacy regimes are insufficient to protect users, users' have the autonomy to decide their own threshold of acceptability for these risks. I then move on to address the objection to the second area of privacy protection, which states that the plurality of

understandings that can arise from the interpretation of privacy by design approach guidelines can result in varying privacy protection for users. In response to this objection, I will argue that this objection is not insurmountable as guidelines can be clarified and made more succinct.

4.3.3.2 Privacy Protection Regulations

Quantified Relationship Technologies may produce vast amounts of personal, identifiable, and valuable data. Also, there is an acknowledgement in many countries of the moral reasons for protecting intimate data, which has resulted in these countries having and enforcing data protection laws (Van den Hoven et al., 2020). For example, developers in South Africa need to comply with local regulations, such as the Electronic Communications Security (Pty) Ltd Act, 2002 (Act 68 of 2002) and Electronic Communications and Transactions Act, 2002 (Act 25 of 2002) for the privacy and confidentiality of communications. The Protection of Personal Information Act, 2013 (Act 4 of 2013) for privacy and confidentiality of personal data (including health data) and data handling. Lastly, the National Archives of South Africa Act, 1996 (Act 43 of 1996) provides electronic records' security protocols and retention requirements (National Digital Health Strategy for South Africa, 2019). The requirement of informed consent from the persons whose data is being processed is the cornerstone of these laws. According to the OCED cited in van den Hoven et al.:

‘the processing of personal information requires that its purpose be specified, its use be limited, individuals be notified and allowed to correct inaccuracies, and the holder of the data be accountable to oversight authorities’ (2020, p.10).

Therefore, developers of Quantified Relationship Technologies need to navigate the complex ethics, regulation, and governance environment. Michie et al. (2017) note that many of the interventions belong to the blurred edges of existing regulatory frameworks. Moreover, these regulatory frameworks are developed in a pre-digital and less software-intensive area. Therefore, developers need to monitor and engage with emerging frameworks while being cognisant of the variations of frameworks between jurisdictions (Michie et al., 2017). For example, the General Data Protection Regulation (GDPR), which came into effect within the European Union in 2018, has stringent privacy and data protection laws that other countries have since modelled. Developers need to engage and employ this framework in their work.

It could be objected that questions have not been definitively answered outside the essential regulatory frameworks, such as the ‘acceptability of data collection and sharing between the competing commercial and ethical demands on data ownership’ (Michie et al. note 2017) or that there are blurred edges of existing regulatory frameworks. This can result in users being vulnerable to privacy risks in areas where these questions are not definitively answered. I argue, however, that work is being done to clarify how data collection, storing and sharing takes place. The GDPR and Protection of Personal Information Act, 2013 are examples of improvements to privacy legislation.

In addition, there are almost always risks or opportunity costs associated with specific actions. For example, in the case of Quantified Relationship Technologies, users might be willing to make trade-offs between sharing their data and the effectiveness of the interventions and the cost. The terms of these trade-offs are not fixed; instead, privacy regimes adapt to the privacy risks associated with current and new technologies. Therefore, it is likely that users must risk some of their personal information to use the technologies. However, the threshold of acceptability or the trade-offs that users are willing to make is going to vary within and outside of jurisdictions. Therefore, in countries where these regulations are in place and enforced, the lack of clarity on some issues is not an insurmountable weakness of the data protection laws. These laws will protect users where the law can, and for risks that fall outside the law’s jurisdiction users must determine their own threshold of acceptability for these risks.

4.3.3.2 The implementation of privacy requirements

The second prong of privacy-protecting systems (the traditional data regulation laws discussed above being the first) is the privacy by design approach. Traditional data regulation laws require human oversight to ensure compliance with data processing across all areas and applications is an impossible feat. Therefore, the privacy by design approach works to ensure that the technology is designed in such a way that it ‘incorporates privacy requirements in the software, architecture, infrastructure, and work processes in a way that makes privacy violations unlikely to occur’ (van den Hoven et al., 2020, p.10).

The privacy by design approach provides overarching guidelines in the form of principles for designing privacy-preserving systems. The core of the privacy by design principles is that:

‘data protection needs to be viewed in proactive rather than reactive terms, making privacy by design preventive and not simply remedial’ (Cavoukian, 2009, p.2).

The privacy by design approach aims to protect users’ personal data and should be of central importance through all technological product life cycles (Colesky, Hoepman and Hillen, 2016, p.33). Therefore, the privacy by design approach seeks to solve the problem of privacy risks from the technologies and their environments.

It could be that these overarching principles and guidelines of privacy by design technological systems do not guarantee that if the recommended methodologies are followed, the resulting system will preserve privacy. For example, these guidelines could be ‘vague and abstract’ (van den Hoven et al., 2020, p.1). In addition, the privacy by design principles needs to be interpreted and contextualised by developers, which inherently means there will be a plurality of understandings, leading to different design choices and, therefore, different effects of privacy. In response to this objection, I argue that this is not an insurmountable objection, as clarity of guidelines can be arrived at through feedback between users, developers and designers, and technology and other communities. Therefore, clarifications and more succinct understandings can be created and applied.

4.3.3.3 Conclusion

In my consideration of the concern that privacy risks arise from the reality that intimate data are collected and stored on non-intimate commercial platforms (Levy, 2014), I have discussed two main areas of privacy protection; privacy protection laws and the privacy by design approach.

I outlined the privacy protection laws regulating the collection, storage, and sharing of data in South Africa. In addition, I addressed the objection, that some questions related to privacy protection remain unanswered and that these grey areas are areas where users are vulnerable. Against this objection, I responded that privacy protection laws could be clarified, improved, and respond to changes in the technology landscape, offering users increasingly better protection. I also argued that where these privacy regimes are insufficient to protect users, users’ have the autonomy to decide their own threshold of acceptability of these risks.

I then outlined the privacy by design approach, stating it is the implementation of privacy requirements in different aspects of the technology to make privacy violations unlikely. I then addressed the objection that the plurality of understandings that can arise from the interpretation of privacy by design approach guidelines can result in varying privacy protection for users. In response to this objection, I argued that this objection is not insurmountable as guidelines can be clarified and made more succinct.

The techniques described above are not a blanket solution to the privacy concerns raised by the use of Quantified Relationship Technologies. They do, however, highlight that there are several ways that certain risks posed by the use of Quantified Relationship Technologies can be prohibited or made less likely to occur. In showing that these Group 2 privacy risks are not insurmountable, I have supported my argument that the privacy objection is not a terminal objection to the Quantified Relationship phenomena.

4.4 Conclusion

In this chapter, I have shown that privacy risks are not insurmountable, which served to support my argument that the privacy objection is not a terminal objection to the Quantified Relationship phenomena.

I began my argument by outlining the Privacy objection and focused on Group 1: privacy risks arising from partners collecting data on each other and Group 2: privacy risks related to collection and storage of intimate data on non-intimate commercial platforms.

In considering the privacy risks associated with how partners get consent to track and collect personal data on each other (Group 1), I contended with the objection that economic terms-of-service agreements are insufficient for this context. I claimed that this objection could be overcome by borrowing from more stringent regulatory and ethical frameworks employed in the biomedical, such as their consent model. In addition, a more robust consent process for the use of Quantified Relationship Technologies will also ensure that non-consensual tracking by partners is avoided. Therefore, the privacy risks users pose through non-consensual tracking

are not insurmountable; instead, more stringent ethical frameworks can mitigate this risk. In making this argument, I have shown that Group 1 privacy risks are not insurmountable.

In my consideration of the concern that privacy risks arise from the reality that intimate data are collected and stored on non-intimate commercial platforms (Group 2), there were two main areas of privacy protection that I brought forward in this chapter. Firstly, I argued that privacy protection laws could regulate data collection, storage, and sharing. Secondly, I highlighted the implementation of privacy requirements in the software, architecture, infrastructure, and work processes, to make privacy violations unlikely to occur through the privacy by design approach. Against this, I responded to the potential objection to the first area of privacy protection, which states that some questions related to privacy protection remain undefined, therefore continuing to make users vulnerable. I responded that privacy protection laws could be clarified, improved and respond to changes in the technology landscape, offering users increasingly better protection. Furthermore, I claimed that where these privacy regimes are insufficient to protect users, users' have the autonomy to decide their own threshold of acceptability for these risks.

I then responded to the potential objection to the second area of privacy protection, which states that the plurality of understandings that can arise from the interpretation of privacy by design approach guidelines, can result in varying privacy protection for users. Against this potential objection, I argued that this objection is not insurmountable as guidelines can be clarified and be made more succinct.

In light of the above assessment of the privacy objection, I concluded with a consideration of the merit of this objection. In summary, I argued that these Group 1 and 2 privacy risks are not insurmountable, and I have supported my argument that the privacy objection is not a terminal objection to the Quantified Relationship phenomena.

Chapter 5: Conclusion and Recommendations

5.1 Introduction

This research report has provided an assessment of the merits of three concerns that arise with Quantified Relationship Technologies, particularly the instrumental-intrinsic value problem objection, informal-reciprocation objection, and the privacy objection. It also showed through assessing the objections when and how it might be a good idea to use Quantified Relationship Technologies.

The research objectives of this report are:

- To define Quantified Relationships;
- To evaluate the instrumental-intrinsic value problem objection;
- To consider the informal-reciprocation objection, and;
- To evaluate the privacy objection.

The above objectives have been addressed by reviewing the literature and bioethical analysis.

In this chapter, I will summarise the bioethical analysis conducted. First, I provide an overview of the conclusions arrived at in each chapter before tying them to the research objectives. Finally, this report will make recommendations to users, developers, and further research.

5.2. Summary of Arguments

This section highlights the ethical findings and conclusions that have been arrived at through assessing three objections. I have focused on one objection from the three dimensions that technology can affect and influence humans (Berg, 2019, p.65). First, I focused on the instrumental-intrinsic value problem objection within the personal dimension, which was discussed in chapter 2. This objection dealt with whether certain goods can be produced for partners in romantic relationships. Within the interpersonal dimension, I focused on the informal-reciprocation objection discussed in chapter 3 because this application of Quantified

Relationship Technologies aimed to affect the dynamic between those in the relationship. Lastly, within the infrastructure dimension, I focused on the privacy objection discussed in chapter 4 because privacy is primarily protected through national and international legislation. I selected this approach to outline and critique how Quantified Relationship Technologies could potentially impact partners and their relationships.

This approach's findings enable us to understand better Quantified Relationship Technologies and their potential significance to users.

5.2.1 Defining Quantified Relationships

The concept of the Quantified Relationship developed from a similar and related field of Quantified Self or self-tracking. It applies to the use of technologies that track and gamify components of interpersonal romantic relationships (Danaher, Nyholm and Earp, 2018, p.3).

This research report highlighted each of three interrelated phenomena: Intimate tracking, Intimate gamification and Intimate surveillance and provided examples of each and discussed three objections to these technologies.

The instrumental-intrinsic concern emphasised that these three phenomena with the correct motivations could support the intrinsic value of human love. The informal-reciprocation concern was substantiated by the capabilities of Intimate tracking, Intimate gamification, and Intimate surveillance, as these technologies enable users to track and compare information about each other. Lastly, the privacy concerns are related to Intimate tracking, Intimate gamification, and Intimate surveillance, as each is provided for collecting, storing, and processing users' personal data.

5.2.2 Assessment of the instrumental-intrinsic value problem objection

In chapter 2, I argued that Quantified Relationship Technologies could and should support the intrinsic goods humans seek in romantic relationships. I began this argument by outlining the instrumental-intrinsic value problem objection. In my ethical critique of this objection, I raised two arguments; the first is that there is insufficient evidence to support the claims that the instrumentalisation of love through quantified relationship technologies changes users' attitudes and beliefs about how they prioritise and perceive the intrinsic and instrumental values of human love. Secondly, I argued that Quantified Relationship Technologies could produce the intrinsic value we humans seek when we desire the love of another; therefore, it is not necessarily the case that Quantified Relationship Technologies have to focus on the instrumental values of human love. I supported by claims by introducing Nyholm's four features of love and evaluating whether or not the good produced through Quantified Relationship Technologies is the intrinsic good of love humans seek. In addition, I used Lupton's five motivations related to self-tracking, to assess Nyholm's second and third features of love.

Therefore, in this chapter, I have shown that Quantified Relationship Technologies can produce the intrinsic value we humans seek when we desire the love of another. Hence, it is not a limitation or inevitable consequence of these technologies that instrumentalisation or medicalisation of love occurs. Therefore, the merit of this objection is such that it is not a terminal argument for the Quantified Relationship phenomenon. Rather, it highlights that the focus on the instrumental value of love is concerning; however, this concern can be remediated by how and what types of technologies we use.

5.2.3 Assessment of the informal-reciprocation objection

In chapter 3, I argued that the exchange-based models enabled by Quantified Relationship Technologies could enable romantic relationships to flourish. I began this argument by outlining the informal-reciprocation objection. In my ethical critique of this objection, I made two arguments; the first is that different relationship models support the flourishing of romantic relationships. The second is that formal exchange-based models can alleviate inequalities in care work and contribute to the development of healthy relationships. I also addressed the potential objection that data collected from Quantified Relationship Technologies, with their

commercial purposes, will not be robust enough to support policy development regarding unpaid care work and changing care needs. In responding to this objection, I claimed that data collected from Quantified Relationship can still be useful as it can help provide insights and contextualise unpaid care work and changing care needs. Lastly, I argued that the exchange-based models and intrinsic value of love need not be contradictory and that the exchange-based model can be used with the intrinsic value of love. Therefore, Quantified Relationship Technologies and the formal exchange-based models they enable can support healthy relationships.

This supported my argument that not all romantic relationships thrive on informal, non-qualified acts of reciprocation in all contexts and that Quantified Relationship Technologies can help provide data that aids relationship, policy and research in supporting healthy relationships. Therefore, I have supported my argument that the informal reciprocation objection is not a terminal objection to the Quantified Relationship phenomena by highlighting that Quantified Relationship Technologies can support healthy relationships in terms of unpaid care work and changing care needs.

5.2.4 Assessment of the privacy objection

In chapter 4, I argued that privacy risks are not insurmountable; this served to support my argument that the privacy objection is not a terminal objection to the Quantified Relationship phenomena. I began this argument by outlining the privacy objection in accordance with Levy's observation that privacy threats arise from two different directions: from the collected data about users by the Quantified Relationship Technology companies and their intimate relationship partners (2014). In my ethical critique of the objection of privacy risks associated with intimate partners (Group 1), I looked at how partners get consent to track and collect personal data on each other. I also contended with the objection that economic terms-of-service agreements are insufficient for this context. I suggested this objection can be overcome by borrowing from more stringent regulatory and ethical frameworks employed in the biomedical, such as their consent model. In addition, a more robust consent process for the use of Quantified Relationship Technologies will also ensure that non-consensual tracking by partners is avoided. Therefore, the privacy risks users pose through non-consensual tracking are not

insurmountable; instead, more stringent ethical frameworks can mitigate this risk. In making this argument, I have shown that Group 1 privacy risks are not insurmountable.

In my ethical critique of the objection of the privacy risks which arise from the reality that intimate data are collected and stored on non-intimate commercial platforms (Group 2). I discussed two main areas of privacy protection. The first is the privacy protection laws that regulate the collection, storage and sharing of data. The second is the implementation of privacy requirements in the software, architecture, infrastructure, and work processes to make privacy violations unlikely to occur through the privacy by design approach. In addition, I addressed the objection to the first area of privacy protection, which states that some questions related to privacy protection remain indefinite, therefore making users vulnerable. To this objection, I responded that privacy protection laws could be clarified, improved and respond to changes in the technology landscape, offering users increasingly better protection

Furthermore, I claimed that where these privacy regimes are insufficient to protect users, users' have the autonomy to decide their own threshold of acceptability for these risks. I then addressed the objection to the second area of privacy protection, which states that the plurality of understandings that can arise from the interpretation of privacy by design approach guidelines, can result in varying privacy protection for users. In response to this objection, I argued that this objection is not insurmountable as guidelines can be clarified and made more succinct.

In light of the above assessment of the privacy objection, I concluded with a consideration of the merit of this objection. In summary, I argued that these Group 1 and 2 privacy risks are not insurmountable, and I have supported the argument that the privacy objection is not a terminal objection to the Quantified Relationship phenomena.

5.3. Recommendations

This section shares the recommendations from this research. In addition, recommendations are made for users and developers of quantified relationship technologies and further research based on the limitations of this study.

5.3.1 Recommendations to users

This section shares the recommendations from this research and provides reasons for the recommendations to users of quantified relationship technologies.

5.3.1.1 Instrumental-intrinsic value problem objection

Users need to be aware of the risks of the technologies, ask questions and conduct their own research to find out the benefits and harms of the technologies they use.

5.3.1.2 Informal-reciprocation objection

Users could benefit and make their relationships happier if partners considered their values and worked to ensure that they used technologies aligned with these values. This alignment would enable users to see how technologies could be leveraged to enhance their values or assist them in living according to these values. As in the case of gender equity, relationship tracking technologies can elucidate inequalities that partners can seek to correct.

Another action that users could consider is sharing their learnings and insights with other relationship tracking users and communities. For example, Beeminder married couple Daniel Reeves, and Bethany Soule illustrate how sharing about relationship experiments can help show users what other relationship dynamics and habits are possible.

5.3.1.3 Privacy objection

Users need to be aware of the privacy agreements they accept when they download and use applications regarding this concern. Reading privacy agreements will assist in users being more aware of how their data is being used and ensuring their data is not used in ways that do not

align with their values. Users are recommended to set aside time to review user agreements before using applications.

Another area that needs to be addressed is that privacy protection is changing as technologies are developed that provide innovative and novel ways to protect information. While users are not expected to become experts in these fields, some familiarity with these topics will enable them to understand and choose options to protect their data. Therefore, users are recommended to find tutorials or training on data security and privacy protection.

If users are using Quantified Relationship Technologies that collect and track information about their relationship and do not require their partner's consent, participant-partners should discuss with their non-participant partner what information is tracked and collected.

5.3.2 Recommendations to developers

This section shares the recommendations from this research for developers of quantified relationship technologies. In general, I recommend that developers of Quantified Relationship Technologies need to comply with existing regulatory frameworks. Furthermore, they need to consider emerging regulatory frameworks around data governance, ethics, and compatibility between assorted products and systems.

5.3.2.1 Instrumental-intrinsic value problem objection

Regarding this concern, research on self-tracking technologies has shown that satisfaction and effectiveness of behaviour change applications decrease if users' private motivations are not activated. Therefore, developers are encouraged to leverage intrinsic motivations within extrinsically focused applications.

5.3.2.2 Informal-reciprocation objection

Regarding this concern, I recommend that developers ask how their applications can be cognisant of harmful relationship status quos.

Furthermore, developers can design and implement technologies to alleviate these status quo harms. In the case of unpaid care work, developers can be aware of current data collection practices in unpaid care work research. Developers should consider how the data they ask users for can be analysed in similar ways to ensure they elucidate harms where they exist.

5.3.2.3 Privacy objection

Developers' work could benefit from the value by design approach; in particular, privacy by design as a methodology can help mitigate some privacy risks for users and create privacy-preserving Quantified Relationship Technologies.

Similarly to Berg (2019 and Michie 2017), I have also suggested that regulatory and ethical frameworks from the biomedical field ought to be applied to protect users.

Lastly, developers need to keep abreast with developments in privacy protection to ensure they secure users' personal data according to recommended standards and best practices and, if possible, in line with the best available protection mechanisms.

5.3.3 Recommendations for further research

As mentioned in the introductory chapter, there are limitations to this study. The recommendations that follow feature areas for further research and address these limitations.

This research report presents a bioethical analysis of three objections from the literature. Danaher, Nyholm and Earp have catalogued eight. Critically assessing objections not included here is recommended to provide a more holistic understanding of the raised moral concerns and solutions.

I recommended that further research expand and diversify the relationship types and dynamics used as case studies to understand how Quantified Relationship technologies may uniquely impact these relationships.

Lastly, further research should attempt to contextualise these objections to various locations, as national and local regulations, internet stability and availability, along with the proliferation of technology, would augment the expression and resolution of these concerns. For example, in

chapter 4 on Privacy, I noted that ensuring compliance with national standards is vital for protecting users' privacy. In 2018, GDPR came into effect in the European Union (EU). The GDPR is the most stringent privacy and security law globally (Wolford, 2021). The GDPR prevented WhatsApp's privacy policy changes from taking effect within the EU; however, other countries with less stringent policies allowed WhatsApp's privacy policy to take effect. In addition, according to the United Nations Conference on Trade and Development (UNCTAD), only 128 countries out of 194 have legislation protecting users' data and privacy (2021). Also, some countries do not have the same power to enforce the penalties on those who transgress their EU legislation. Therefore, the ability of some countries to protect users' privacy is varied; hence privacy protection can be limited or non-existent.

5.4 Conclusion

In this research report, I ethically critiqued the merit of three objections raised in response to Quantified Relationship Technologies. These three objections were the instrumental-intrinsic value problem objection, the informal-reciprocation objection, and the privacy objection.

This research report argued and defended the position that the Quantified Relationship Phenomenon raises valid ethical concerns regarding the intrinsic and instrumental goods they produce, relationship models used and the privacy risks for intimate partners. However, in evaluating these concerns, we can identify precautions that we must be mindful of in order to use Quantified Relationship Technologies ethically in intimate relationships.

These findings are crucial as increasingly common Quantified Relationship Technologies can impact our romantic relationships, and romantic relationships can have an extremely high intrinsic value for health and wellbeing (Nyholm, 2015) and instrumental value for producing offspring (Wudarczyk et al., 2013) and raising children (Earp, Sandberg and Savulescu, 2012). Therefore, it is essential to understand and evaluate the concerns that arise through bioethical inquiry to assess their merit and guide how to remediate the concerns they raise.

Word count: 20 000.

References

- 5lovelanguages.com. 2021. *Love Nudge™ Mobile App*. [online] Available at: <<https://www.5lovelanguages.com/resources/app>> [Accessed 6 November 2021].
- App Store. 2021. *Period Tracker - Eve*. [online] Available at: <<https://apps.apple.com/us/app/period-tracker-eve/id1002275138>> [Accessed 6 September 2021].
- Back, A., Möller, U. and Stiglic, A., 2001. *Traffic analysis attacks and trade-offs in anonymity providing systems, Information hiding*. Berlin, Heidelberg: Springer, pp.245–257.
- Bakos, Y., Marotta-Wurgler, F. and Trossen, D., 2014. Does Anyone Read the Fine Print? Consumer Attention to Standard-Form Contracts. *The Journal of Legal Studies*, 43(1), pp.1-35.
- Bandura, A., 1991. Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes*, 50(2), pp.248-287.
- Barata, G., Gama, S., Jorge, J. and Gonçalves, D., 2013. Engaging engineering students with gamification. *Institute of Electrical and Electronics Engineers*, 2(1), pp.1-8.
- Beeminder. 2021. *Beeminder About*. [online] Available at: <<https://www.beeminder.com/overview>> [Accessed 9 December 2021].
- Berg, N., 2019. *Ethical Reflections on Quantified Self Devices and their Effects on Humans*. Master. Hamburg University of Applied Sciences.
- Cavoukian, A., 2009. *Privacy by Design, Information & Privacy Commissioner of Ontario*. [online] Ontario. Available at: <<https://www.ipc.on.ca/wp-content/uploads/2013/09/pbd-primer.pdf>> [Accessed 14 November 2021].
- Clark, M. and Mils, J., 1993. The Difference between Communal and Exchange Relationships: What it is and is Not. *Personality and Social Psychology Bulletin*, 19(6), pp.684-691.
- Colesky, M., Hoepman, J. and Hillen, C., 2022. A Critical Analysis of Privacy Design Strategies. *The Institute of Electrical and Electronics Engineers*, [online] pp.33-40.

- Available at: <<https://ieeexplore.ieee.org/document/7527750>> [Accessed 14 November 2021].
- Coontz, S., 2006. *Marriage, a history: How love conquered marriage*. New York: Penguin.
- Danaher, J., Nyholm, S. and Earp, B., 2018. The Quantified Relationship. *The American Journal of Bioethics*, 18(2), pp.3-19.
- Department of Economic and Social Affairs, Statistic Division, 2005. *Guide to Producing Statistics on Time Use: Measuring Paid and Unpaid Work*. [online] United Nations, p.5. Available at: <https://unstats.un.org/unsd/publication/seriesf/seriesf_93e.pdf> [Accessed 13 December 2021].
- Dhai, A. and McQuoid-Mason, D., 2011. *Bioethics, Human Rights and Health Law: Principles and Practice*. 5th ed. Cape Town: Juta and Company Ltd, pp.69-85.
- Earp, B., Sandberg, A. and Savulescu, J., 2012. Natural Selection, Childrearing, and the Ethics of Marriage (and Divorce): Building a Case for the Neuroenhancement of Human Relationships. *Philosophy & Technology*, [online] 25(4), pp.561-587. Available at: <<https://pubmed.ncbi.nlm.nih.gov/23226627/>> [Accessed 8 August 2021].
- Earp, B., Sandberg, A. and Savulescu, J., 2014. The Medicalization of Love. *Cambridge Quarterly of Healthcare Ethics*, 24(3), pp.323-336.
- Fairchild, A., Gable, L., Gostin, L., Bayer, R., Sweeney, P. and Janssen, R., 2007. Public Goods, Private Data: HIV and the History, Ethics, and Uses of Identifiable Public Health Information. *Public Health Reports*, [online] 122(1_suppl), pp.7-15. Available at: <<https://journals.sagepub.com/doi/10.1177/00333549071220S103>> [Accessed 6 August 2021].
- Flexispy.com. 2021. *FlexiSPY™ Unique Monitoring Software For Mobiles & Computers*. [online] Available at: <https://www.flexispy.com/?gclid=Cj0KCQjw1ouKBhC5ARIsAHXNMI9KS4BZ_XV52mxxQELV6sok6tooEzmUHoAaCPQP0pTi-ZBPawqeWzQaAvKSEALw_wcB> [Accessed 5 September 2021].
- Frank, L. and Nyholm, S., 2017. Robot sex and consent: Is consent to sex between a robot and a human conceivable, possible, and desirable?. *Artificial Intelligence and Law*, 25(3), pp.305-323.

- Glow. 2022. *Glow Apps*. [online] Available at: <<https://glowing.com/apps>> [Accessed 9 December 2021].
- Helm, B., 2021. *Love*. [online] Stanford Encyclopedia of Philosophy. Available at: <<https://plato.stanford.edu/archives/fall2021/entries/love/>> [Accessed 6 November 2021].
- Hull, G., 2018. The Politics of Quantified Relationships. *The American Journal of Bioethics*, 18(2), pp.29-30.
- Jenkins, C., 2017. *What love is*. New York: Basic Books.
- Karlawish, J., 2022. *Assessment of decision-making capacity in adults*. [online] Uptodate.com. Available at: <<https://www.uptodate.com/contents/assessment-of-decision-making-capacity-in-adults/print>> [Accessed 14 November 2022].
- Karoff, P., 2019. *Harvard works to embed ethics in computer science curriculum*. [online] Harvard Gazette. Available at: <<https://news.harvard.edu/gazette/story/2019/01/harvard-works-to-embed-ethics-in-computer-science-curriculum/>> [Accessed 6 November 2021].
- Levy, K., 2014. Intimate surveillance. *Idaho Law Review*, 51(3), pp.679–93.
- London, B., 2021. *The best apps that promise to amp up your sex life because sex = self-care, right?*. [online] Glamour magazine UK. Available at: <<https://www.glamourmagazine.co.uk/gallery/improve-sex-life-apps>> [Accessed 6 November 2021].
- Lupton, D., 2014. Quantified sex: a critical analysis of sexual and reproductive self-tracking using apps. *Culture, Health & Sexuality*, 17(4), pp.440-453.
- Michie, S., Yardley, L., West, R., Patrick, K. and Greaves, F., 2017. Developing and Evaluating Digital Interventions to Promote Behavior Change in Health and Health Care: Recommendations Resulting From an International Workshop. *Journal of Medical Internet Research*, [online] 19(6), p.e232. Available at: <<https://www.jmir.org/2017/6/e232/>> [Accessed 6 November 2021].
- Moore, P., 2017. *The Quantified Self in Precarity: Work, Technology, and what Counts*. London, UK: Routledge.
- Moore, P., and A. Robinson., 2015. The Quantified Self: What counts in the neo-liberal workplace. *New Media and Society* 18 (11). doi:10.1177/1461444815604328.

- National Department of Health, 2019. *National Digital Health Strategy for South Africa, 2019 – 2024*. Pretoria: National Department of Health, p.13.
- Nyholm, S., 2015. Love Troubles: Human Attachment and Biomedical Enhancements. *Journal of Applied Philosophy*, 32(2), pp.190-202.
- Payne, C., 2014. How activity trackers remove our rights to our most intimate data. *The Guardian*, [online] Available at: <<http://How activity trackers remove our rights to our most intimate data>> [Accessed 14 November 2021].
- Pettit, P., 2015. *The Robust Demands of the Good: Ethics with Attachment, Virtue and Respect*. Oxford: Oxford University Press.
- Ryan, M. and Sinha, M., 2022. *Informed procedural consent*. [online] Uptodate.com. Available at: <<https://www.uptodate.com/contents/informed-procedural-consent#H16860339>> [Accessed 14 November 2021].
- Sexkeeperapp.com. 2021. *Sex Keeper App*. [online] Available at: <<https://sexkeeperapp.com/>> [Accessed 6 November 2021].
- Simpson, C. and Mazzeo, S., 2017. Calorie counting and fitness tracking technology: Associations with eating disorder symptomatology. *Eating Behaviours*, 26, pp.89-92.
- Swan, M., 2013. The Quantified Self: Fundamental Disruption in Big Data Science and Biological Discovery. *Big Data*, [online] 1(2), pp.85-99. Available at: <<https://pubmed.ncbi.nlm.nih.gov/27442063/>> [Accessed 8 August 2021].
- van den Hoven, J., Blaauw, M., Pieters, W. and Warnier, M., 2020. *Privacy and Information Technology (Stanford Encyclopedia of Philosophy)*. [online] Stanford Encyclopedia of Philosophy. Available at: <<https://plato.stanford.edu/archives/sum2020/entries/it-privacy/>> [Accessed 6 October 2021].
- Wudarczyk, O., Earp, B., Guastella, A. and Savulescu, J., 2013. Could intranasal oxytocin be used to enhance relationships? Research imperatives, clinical policy, and ethical considerations. *Current Opinion in Psychiatry*, [online] 26(5), pp.474-484. Available at: <<https://pubmed.ncbi.nlm.nih.gov/23880593/>> [Accessed 16 August 2021].
- Zeilinger, J., 2013. Kahnoodle App Makes Reigniting Your Relationship Into A Game. [Blog] *Huffington Post*, Available at: <<https://www.huffpost.com/entry/kahnoodle-app->

makes-reigniting-your-relationship-into-a-game_n_3732916> [Accessed 26 November 2021].

Zhang, C., Shahriar, H. and Riad, A., 2020. Security and Privacy Analysis of Wearable Health Device. *2020 IEEE 44th Annual Computers, Software, and Applications Conference (COMPSAC)*, pp.1767-1772.

Appendices

Appendix A: Complete Plagiarism Declaration

I, Priyanka Calyn Pillay (Student number: 670772), am a student registered for a Master of Science in Medicine in the field of Bioethics and Health Law in the academic year 2021.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above course is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included a report from "Turnitin" software indicating the level of plagiarism in my research report document as an appendix.

Sign: P.C.Pillay, 670772

Date: 15th April 2022

Appendix B: Turnitin Report Summary

a0022938:670772_Final_Draft_17012022.docx

ORIGINALITY REPORT

13%

SIMILARITY INDEX

11%

INTERNET SOURCES

7%

PUBLICATIONS

6%

STUDENT PAPERS

PRIMARY SOURCES

1	philpapers.org Internet Source	2%
2	stanford.library.sydney.edu.au Internet Source	1%
3	docplayer.net Internet Source	1%
4	onlinelibrary.wiley.com Internet Source	1%
5	Submitted to University of Witwatersrand Student Paper	1%
6	www.jmir.org Internet Source	1%
7	www.tandfonline.com Internet Source	<1%
8	wiredspace.wits.ac.za Internet Source	<1%
9	Gordon Hull. "The Politics of Quantified Relationships", The American Journal of Bioethics, 2018	<1%

Appendix C: Research Ethics Waiver



University of the Witwatersrand Student Ethics Declaration Form
(To be completed during the protocol assessor meeting)

Background

All Research conducted by a University of the Witwatersrand student, with human subjects or animals, requires approval by the Wits Human Research Ethics Committee or Animal Research Ethics Committee, respectively.

If research has been undertaken without the necessary ethics approvals, this is considered an ethics violation. This will be reported to the relevant structures, the data will have to be discarded, and in the case of students, they cannot use the data towards their degree.

To prevent any ethics violations, the ethics requirements for the proposed project will be discussed with you at the protocol assessment.

Declaration

Based on the current protocol assessment (and any proposed changes suggested by the assessor committee), we, the undersigned, understand that the proposed research requires:

- | | | | |
|---|---|-------------------------------------|-------------------------------------|
| 1. Human Research Ethics clearance certificate | <table border="1"><tr><td>Yes</td><td><input checked="" type="checkbox"/></td></tr></table> | Yes | <input checked="" type="checkbox"/> |
| Yes | <input checked="" type="checkbox"/> | | |
| a. Covered under existing supervisor ethics | <table border="1"><tr><td>Yes</td><td><input checked="" type="checkbox"/></td></tr></table> | Yes | <input checked="" type="checkbox"/> |
| Yes | <input checked="" type="checkbox"/> | | |
| b. Requires a new HREC application | <table border="1"><tr><td>Yes</td><td><input checked="" type="checkbox"/></td></tr></table> | Yes | <input checked="" type="checkbox"/> |
| Yes | <input checked="" type="checkbox"/> | | |
| 2. Animal Research Ethics clearance certificate | <table border="1"><tr><td>Yes</td><td><input checked="" type="checkbox"/></td></tr></table> | Yes | <input checked="" type="checkbox"/> |
| Yes | <input checked="" type="checkbox"/> | | |
| 3. No Human or Animal Ethics Clearance | <table border="1"><tr><td><input checked="" type="checkbox"/></td><td>No</td></tr></table> | <input checked="" type="checkbox"/> | No |
| <input checked="" type="checkbox"/> | No | | |
| 4. Unclear, will seek appropriate guidance from the HREC/AREC committees (whichever relevant) | <table border="1"><tr><td>Yes</td><td><input checked="" type="checkbox"/></td></tr></table> | Yes | <input checked="" type="checkbox"/> |
| Yes | <input checked="" type="checkbox"/> | | |

Signatures

Supervisor/s: _____

Student: _____

Date: _____
6 October 2021