

“I am also looking for a genuine connection...”

**Psychosocial implications of dating app use and problematic use of dating
applications**

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A thesis submitted in partial fulfilment of the requirements of Nottingham Trent University
for the degree of Doctor of Philosophy

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Where the work presented in this thesis was the product of collaborative efforts, I declare that my contribution was substantial and prominent, involving the development of original ideas, as well as the definition and implementation of subsequent work. Detailed information about my contribution to collaborative work in this thesis is outlined in Appendix I.

Dedication

I would like to dedicate this thesis to everyone who made it possible with their love and support, as well as to my old self who not always believed that this moment would come.

You've made it!

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Table of contents

ABSTRACT	1
CHAPTER 1: GENERAL INTRODUCTION	2
1.1 HISTORICAL BACKGROUND.....	2
1.2 THE START OF ONLINE DATING RESEARCH	3
1.3 ONLINE ADDICTIONS: CONCEPTUALIZATION	4
1.4 PHD AIMS	5
1.5 STRUCTURE OF THE THESIS	6
CHAPTER 2: SYSTEMATIC REVIEW	9
2.1 INTRODUCTION.....	9
2.2 METHOD.....	12
2.3 RESULTS.....	14
2.3.1 <i>Usage and motivations</i>	31
2.3.2 <i>Personality correlates</i>	35
2.3.3 <i>Negative correlates</i>	39
2.3.4 <i>Sexual and impulsive behaviour</i>	43
2.3.5 <i>Substance use and behavioural addictions</i>	47
2.3.6 <i>Problematic use of online dating</i>	50
2.4 DISCUSSION.....	51
2.5 CONCLUSIONS	57
CHAPTER 3: METHODOLOGY	58
3.1 INTRODUCTION.....	58
3.2 QUALITATIVE VS. QUANTITATIVE METHODS	58
3.3 RESEARCH DESIGN: MIXED-METHODS APPROACH.....	60

CHAPTER 4: STRUCTURAL CHARACTERISTICS IN ONLINE DATING APPS: THE DEVELOPMENT OF A NEW TAXONOMY	65
4.1 INTRODUCTION.....	65
4.2 METHODS	68
4.3 RESULTS.....	70
4.3.1 <i>Profile formation structural characteristics</i>	71
4.3.1.1 App-based structural characteristics	72
4.3.1.2 User-based structural characteristics	74
4.3.1.3 Combination-based structural characteristics	75
4.3.2 <i>Communication medium structural characteristics</i>	76
4.3.3 <i>Behaviour modification structural characteristics</i>	79
4.3.3.1 Match-making.....	79
4.3.3.2 Interaction booster	83
4.3.3.3 Hooks.....	86
4.3.3.4 Exclusive designs	89
4.3.4 <i>Habit creation SCs</i>	90
4.3.4.1 Activity notifications	90
4.3.4.2 Application-automated notifications	91
4.4 GENERAL DISCUSSION.....	92
4.5 LIMITATIONS	94
4.6 CONCLUSION	95
CHAPTER 5: UNDERSTANDING DATING APP USERS’ EXPERIENCE: AN INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS STUDY.....	97
5.1 INTRODUCTION.....	97
5.2 METHODS	101
5.2.1 <i>Participants</i>	101

5.2.2	<i>Interviews</i>	103
5.2.3	<i>Analysis</i>	103
5.3	RESULTS AND PRELIMINARY DISCUSSION.....	105
5.3.1	<i>Objectification process</i>	107
5.3.1.1	Focus on the physical	107
5.3.1.2	Less value	112
5.3.1.3	Non-normative behaviours	116
5.3.2	<i>Behaviour maintenance</i>	119
5.3.2.1	Intermittent reinforcement pattern.....	120
5.3.2.2	No perception of influence	123
5.3.2.3	Cyclical usage.....	126
5.3.2.4	Intrinsic reinforcers	129
5.3.2.5	Fear of missing out	132
5.3.3	<i>The conflicted self</i>	135
5.3.3.1	Needs frustration	135
5.3.3.2	Biases.....	138
5.3.3.3	Emotional toll.....	141
5.3.4	<i>New dating paradigm</i>	143
5.3.4.1	Online dating dynamic	144
5.3.4.2	Change in focus	146
5.3.4.3	Instant need gratification	149
5.4	GENERAL DISCUSSION.....	152
5.5	LIMITATIONS	158
5.6	CONCLUSION.....	158
 CHAPTER 6: DATING APP USE INTENSITY AND WELLBEING: THE MEDIATING ROLE OF SMARTPHONE ADDICTION AND SOCIAL MEDIA ADDICTION IN A CROSS-CULTURAL SAMPLE		160

6.1	INTRODUCTION.....	160
6.2	METHODS.....	164
6.2.1	<i>Design</i>	164
6.2.2	<i>Participants</i>	165
6.2.3	<i>Materials</i>	166
6.2.3.1	Sociodemographic data.....	167
6.2.3.2	Online Dating Intensity Scale.....	168
6.2.3.3	Rosenberg Self-Esteem Scale.....	169
6.2.3.4	Hospital Anxiety and Depression Scale.....	169
6.2.3.5	Bergen Social Media Addiction Scale.....	170
6.2.3.6	Smartphone Application-Based Addiction Scale.....	170
6.2.3.7	Positive Affect and Negative Affect Schedule.....	171
6.2.3.8	Basic Psychological Need Satisfaction and Frustration Scale.....	171
6.2.4	<i>Statistical analysis</i>	172
6.3	RESULTS.....	173
6.4	DISCUSSION.....	183
6.5	LIMITATIONS.....	188
6.6	CONCLUSIONS.....	189

CHAPTER 7: DATING APP USE AND WELLBEING: AN APPLICATION-BASED STUDY EMPLOYING ECOLOGICAL MOMENTARY ASSESSMENT AND OBJECTIVE MEASURES OF USE..... 190

7.1	INTRODUCTION.....	190
7.2	METHODS.....	194
7.2.1	<i>Design</i>	194
7.2.2	<i>Participants</i>	195
7.2.3	<i>Materials</i>	196
7.2.4	<i>Statistical analysis</i>	199

7.3	RESULTS.....	200
7.4	DISCUSSION.....	206
7.5	LIMITATIONS	209
7.6	CONCLUSIONS	210
CHAPTER 8:	GENERAL DISCUSSION.....	211
8.1	CONTRIBUTIONS TO KNOWLEDGE.....	218
8.1.1	<i>The first taxonomy of dating app structural characteristics</i>	<i>218</i>
8.1.2	<i>Cross-cultural comparison of dating app users</i>	<i>219</i>
8.1.3	<i>Ecological momentary assessment of dating app use</i>	<i>220</i>
8.2	COMMENTARY ON METHODOLOGIES USED.....	220
8.3	LIMITATIONS AND FUTURE DIRECTIONS	224
8.4	IMPLICATIONS	225
8.5	FINAL REMARKS.....	228
	REFERENCES.....	229
	APPENDICES.....	275
	APPENDIX I.....	275
	DECLARATION OF COLLABORATIVE WORK.....	275
	APPENDIX II.....	277
	ETHICAL APPROVAL.....	277
	APPENDIX III.....	278
	INTERVIEW SCHEDULE.....	278
	APPENDIX IV.....	280
	EXAMPLE OF THEMES WITH EXCERPTS.....	280
	APPENDIX VI.....	283

SCALES FROM SURVEY STUDY (CHAPTER 6)	283
APPENDIX VII	292
EXAMPLE TRANSLATION AND BACK TRANSLATION	292
APPENDIX VIII	294
DIARYMOOD ITEMS	294

List of tables

Table 2.1. Studies from the systematic review	15
Table 4.1. Basic information concerning the dating apps examined ($n=9$)	70
Table 4.2. Profile formation structural characteristics	71
Table 4.3. Communication medium structural characteristics.....	76
Table 4.4. Behaviour-modification structural characteristics: Match-making	79
Table 4.5. Behaviour-modification SCs: interaction booster.....	83
Table 4.6. Behaviour-modification SCs: hooks and exclusive designs	87
Table 4.7. Habit creation SCs	90
Table 5.1. Summary of participants' key characteristics.....	102
Table 5.2. Superordinate themes and sub-themes.....	106
Table 6.1. Sociodemographic data of all samples.....	167
Table 6.2. Correlation matrix and descriptive statistics all sample	174
Table 6.3. Estimates with bias-corrected <i>CI</i> , standard error, and <i>Z</i> -values	180
Table 7.1. Demographics of total sample $N=22$	196
Table 7.2. Descriptive statistics	201
Table 7.3. Correlation matrix of study variables	202
Table 7.4. Model fit statistics.....	205
Table 7.5. Mood as outcome (Model 1).....	205
Table 7.6. Self-esteem as outcome (Model 2)	205
Table 7.7. Craving as outcome (Model 3)	206

List of figures

Figure 2.1. Flow chart displaying the search process	13
Figure 3.1. Mixed-methods sequence	64
Figure 6.1. Hypothesized model	176
Figure 6.2. Path analysis (All sample) with significant standardized coefficients	176
Figure 6.3. Path analysis (UK sample) with significant standardized coefficients	177
Figure 6.4. Path analysis (Polish sample) with significant standardized coefficients	178
Figure 6.5. Path analysis (Indonesian sample) with significant standardized coefficients....	179
Figure 6.6. ANOVA study variables, significance level, and partial eta-squared	182
Figure 6.7. Differences on variables across samples and significance level	182
Figure 7.1. <i>MoodDiary</i> mood item	198
Figure 7.2. <i>MoodDiary</i> objective measures	199
Figure 7.3. Hierarchical structure of the three-level model	200
Figure 7.4. Mood, self-esteem, and craving across the week	202
Figure 7.5. Use time across the week	203
Figure 7.6. Number of launches across the week	203
Figure 7.7. Number of dating apps' notifications across the week	204

Abstract

With the appearance of dating applications, online dating became one of the most profitable online markets in today's society. Past research has investigated how online dating users present themselves, which personality correlates are more related to higher engagement of online dating, and negative outcomes of online dating (e.g., deception and sexual health risks). However, there has been scarce literature assessing the problematic use of online dating. Therefore, the present research project aimed to assess (i) the individual experience of dating app use and problematic use, (ii) the influence of structural characteristics in users' behaviour and level of engagement, and (iii) the relation between mental health and dating app usage. To do this, different methodologies were employed including qualitative (i.e., ethnographic research and interviews), and quantitative research methods (i.e., questionnaire-based study and ecological momentary assessment via smartphone-based study). Results from the present research project found that (i) the design of dating applications aims to initiate and maintain users' behaviour and promote behaviours like sex-search interactions, (ii) users experience needs frustration when using dating applications for an extended period of time, which leads them to halt their use of dating apps for a period of time, (iii) smartphone addiction is a significant mediator between online dating use and mental health correlates, (iv) relatedness frustration is a significant cross-cultural predictor of online dating use, (v) received notifications are associated with the wellbeing of dating app users, (vi) higher-engagement predicts feelings of craving for dating app use. Overall, this project has assessed how the use of dating applications influences users' mental health, behaviours, and general engagement, providing novel evidence in the field of online dating and problematic use of online dating.

CHAPTER 1

GENERAL INTRODUCTION

1.1 Historical background

The first landmark in online dating history dates back to 1959 when two Stanford University students developed *Happy Families Planning Service* supported by a computer at the time (i.e., IBM 650) which paired 49 heterosexual couples based on a pre-registration questionnaire that participants filled out (DatingSiteReviews, 2021). After *Happy Families Planning Service*, other similar services appeared at Harvard University (i.e., *Operation Match*), and MIT (i.e., *Eros* and *Data-Mate*). However, the biggest landmark, the one that paved the way to what is known as online dating today, came with *Match.com*, founded in 1993 by Gary Kremen and officially launched in 1995 (Matthews, 2018b). Followed by *Match.com*, other sites emerged in the 2000s that are well-known today, such as *eHarmony*, *OKCupid*, and *Badoo*, which represented the main online dating sites worldwide at the time. In 2012, *Tinder* was launched, which is today's most popular smartphone-based online dating service (i.e., dating application). Although other dating applications emerged prior to *Tinder* (e.g., *Grindr* in 2009), *Tinder* was the dating application that catapulted online dating into a smartphone-based service (BoostMatches, 2021). In fact, in only five years, the online dating market has almost doubled its revenue, and active users have steadily increased year by year – in 2015, there were 185 million users, and the online dating industry had a worldwide revenue of \$1.69 billion; in 2020, there were 270 million dating app users, and the market revenue had grown to \$3.08 billion (Curry, 2021).

1.2 The start of online dating research

In 1994, a book by Fox (1994) was published aiming to guide online dating users on ‘correct’ behaviours and generally how to use it to form long-lasting relationships. A few years later, Schwartz (1999) published another handbook that offered advice to online daters to make the most of their use. Shortly after, some scholars started to investigate the affordances and potential outcomes of online dating use. Initially, Young et al. (2000) related the use of online dating websites to the increase of infidelity in married couples and they coined the term ‘cyberaffair’ to refer to those individuals who met online and maintained their relationship through online platforms. Young (1999) developed the ACE model; the acronym stands for anonymity, convenience, and escape. This model aimed to “*help understand the power and attraction of the Internet for sexual pursuits*” (Young, 2000, pp. 61). Not much later, Griffiths, (2000) added a few more factors that would make online dating services more popular, namely affordability, social acceptance, and feasibility in one’s current lifestyle (i.e., working long hours) (Griffiths, 2000).

Later on, between 2000-2010, research focusing on online dating practices and users’ behaviours started to emerge. Scholars focused extensively on how online dating users managed their self-presentation to other users, arguing that, contrary to traditional dating (i.e., offline dating), users could be more strategic in their self-presentation online (Ellison et al., 2006). As a result, further studies were published investigating deception techniques of online dating users in the pursue of standing out from the rest (Toma et al., 2008). Simultaneously, other studies started to assess the risks that online dating users encounter within the context of online dating services (Couch & Liamputtong, 2007), as well as mating behaviour and preferences (Hitsch et al., 2010; Morgan et al., 2010).

1.3 Online addictions: conceptualization

In the 2010s, the world experienced a shift that originated in the late 2000s with the appearance of the first *iPhone* (Kremer, 2019). People started to have internet access everywhere via their mobile phones. As a result, services including gambling and gaming became readily available to users every hour of every day, therefore making internet gambling potentially more addictive (Griffiths & Parke, 2002). Consequently, research on internet addiction (IA) grew considerably (see Griffiths et al., 2016). Alongside, some scholars argued that internet addiction should be reframed as addiction to internet-related activities (Starcevic, 2013), therefore focusing on the addiction potential of specific activities (e.g., gaming, pornography) rather than the internet *per se*. In line with this, researchers validated and published scales that aimed to measure the ‘addiction’ level to specific internet activities, such as social media (Andreassen et al., 2016), gaming (Lemmens et al., 2009), smartphones (Csibi et al., 2018), and online dating (Bloom & Dillman, 2019).

Furthermore, in order to conceptualize specific internet-related activities that may become problematic or addictive, Griffiths (2005) postulated the biopsychosocial components’ model of addiction. As a result, many of the published scales measuring problematic uses are based on the components’ model of addiction (e.g., Andreassen et al., 2016; Csibi et al., 2018; Orosz et al., 2016). The addiction components model comprises: (i) salience, when a specific activity dominates someone’s life, experiencing feelings of craving when they are not involved in such activity, (ii) mood modification, referring to that ‘buzz’ feeling when involved in the addictive activity, (iii) tolerance, referring to the process by which addicted individuals experience the need of using/doing more and more overtime in order to experience the ‘high’, (iv) withdrawal symptoms, referring to the emotional, cognitive, and physical responses that addicted individuals experience when they stop or significantly reduce their use, (v) conflict, referring

to inter- or intrapersonal conflicts derived from use (e.g., family disputes, financial issues), and (vi) relapse, referring to the process of going back to past patterns of use after a period of abstinence or controlled use (see Griffiths, 2005).

In addition to the aforementioned components model, other scholars attempted to formulate (or revise) models that explained the development and maintenance of addictive use of online activities (Brand et al., 2019; Luo et al., 2011). For example, the Interaction of Person-Affect-Cognition-Execution (I-PACE) model (Brand et al., 2016; updated version Brand et al., 2019) aimed to explain the process of addiction to internet activities by including (i) predisposing factors, such as psychopathological correlates and use motivations, (ii) affective and cognitive responses that reinforce use (i.e., mood modification in the components model), (iii) neurobiological factors of addiction, such as reduced impulse control, and (iv) behaviour conditioning of use (i.e., leading to habitual use).

1.4 PhD aims

Considering all past research on online addictions (e.g., SNS addiction, smartphone addiction) and the proposed conceptualization models of behavioural addictions, this project will provide novel evidence on problematic use of online dating, more specifically on the use of dating applications. To do this, the thesis will examine the design of dating applications to assess the potential ‘hooks’ that dating app developers may include in order to make dating applications more engaging and/or promote development and maintenance of usage behaviour. Further to this, the thesis will provide evidence on dating app users’ experience, placing emphasis on the emotional and psychological aspects that can make dating app use problematic. Also, the thesis will provide evidence on how higher use intensity is related to mental health, as well as how objective measures of dating app use may influence users’ wellbeing. In terms of methodology,

the thesis will employ different research methods to derive evidence from different sources. This approach is deemed the most appropriate in terms of capturing the complexities of problematic use of dating apps and mental health. As such, findings from the present study will derive from self-report data, interviews, ethnographic reports, and objective measures of use.

1.5 Structure of the thesis

An introductory systematic review was carried out to identify relevant literature published in the field of online dating, more specifically on problematic use of online dating. The resulting systematic review identified that the literature on the problematic use of online dating was scarce, and so multiple gaps in knowledge were identified. In order to assess these gaps, a mixed-methods approach was designed, and four empirical studies were carried out. All the empirical studies assess the experience dating applications use and potential addictive factors. As a mixed-methods thesis, the first two studies take a more exploratory approach, while the last two are confirmatory (i.e., hypothesis-testing). A brief outline of the thesis chapters is presented:

Chapter 1: General introduction

This chapter aims to provide an introduction to the phenomenon of online dating, containing a historical background of the origin and development of online dating services, followed by a brief introduction of the start of online dating research and online addictions.

Chapter 2: Systematic review

This review was designed to provide gaps in the literature on online dating use and problematic use of online dating. It provides a structured review of the main research topics concerning online dating use and problematic use.

Chapter 3: Methodology

This chapter provides an explanation and justification of the methodology used in the thesis. Additionally, it provides a brief overview of the two main research methodologies, quantitative and qualitative, to then introduce the use of mixed methods.

Chapter 4: Structural characteristics in online dating apps: The development of a new taxonomy

This chapter presents an ethnographic study of the structural characteristics of a sample of nine dating applications that aimed to provide an empirical assessment of how structural characteristics may influence behaviours in users and promote origin and maintenance of usage behaviour.

Chapter 5: Understanding dating app users' experience: An interpretative phenomenological analysis study.

This chapter contains an interpretative phenomenological analysis of nine interviews with dating app users. The study aimed to understand the meaning that dating app users create from their usage in terms of psychological phenomena.

Chapter 6: Dating app use intensity and wellbeing: The mediating role of smartphone addiction and social media addiction in a cross-cultural sample

This chapter contains a cross-cultural path analysis that aimed to investigate the mediating roles of social media and smartphone addiction in relation to users' wellbeing and online dating use.

Chapter 7: Dating app use and wellbeing: An application-based study employing ecological momentary assessment and objective measures of use.

This chapter contains an application-based study that aimed to assess the relationship between objective measures of dating app use and users' wellbeing.

Chapter 8: General discussion

This chapter integrates all the findings from the empirical studies in a general discussion. It also considers limitations of the thesis, future implications, and provides concluding comments of the findings presented in this thesis.

CHAPTER 2

SYSTEMATIC REVIEW

2.1 Introduction

Back in 1995, *Match.com* was launched for public use as a popular global online dating service. Within a decade, online dating became the second most popular industry for paid online content with an annual revenue of \$1.9 billion (Matthews, 2018a), passing from being a service used by a minority to a tool frequently used by millions of individuals in modern societies. In 2007, location-based smartphone dating applications appeared, which allowed users to access online dating anytime and anywhere, making them ubiquitous. Regarding the ubiquity of online dating, Jung et al. (2014) reported that higher availability may be associated with greater engagement of dating apps by showing higher rates of log-ins and use whilst engaged in day-to-day activities.

Greater use of online dating may not necessarily imply the existence of problematic use, however previous literature in the field of internet-disorders has found that extended use (higher frequency of use) is related to higher scores on smartphone addiction (Haug et al., 2015). Yet, extended use is not sufficient to describe problematic use of online dating, whose aetiology and maintenance may be a reflection of diverse factors of different nature (i.e., biological, psychological, social). Therefore, an interdisciplinary explanation (i.e., biopsychosocial framework) is needed; problematic use of online dating could be explained by the addiction component model (Griffiths, 2005): (i) salience (dating app use dominates to a great extent the cognitive and behavioural reality of the individual), (ii) mood modification (alteration of mood by use or non-use), (iii) tolerance (individual's use increases over time), (iv) withdrawal (distress when the use interrupted for a longer period of time), (v)

conflict (use of dating apps affect the social reality of the user), (vi) relapse (return to previous patterns of use after interruption).

In terms of structural characteristics of dating applications, location-based structural characteristic appears to facilitate offline encounters (Miles, 2017), enabling short-term gratification of users' needs (e.g., users seeking for sex encounters are able to find other users at walking distance). In fact, based on the Interaction of Person-Affect-Cognition-Execution (I-PACE) model (Brand et al., 2016), short-term gratification on dating apps can reinforce the appearance of dysfunctional coping styles to deal with unpleasant emotions (e.g., sadness, frustration, and anger), and dysfunctional affective and cognitive responses in relation to dating apps (e.g., craving, urge for mood regulation, and attentional bias), which are related to internet-based disorders and exemplifies the criteria of Griffiths' (2005) model previously described.

In the scope of internet disorders, and more specifically addiction to social networking sites (SNS), previous research has reported that availability increases the number of people engaged in the activity, which can lead to excessive use (Kuss & Griffiths, 2011). In turn, excessive use of SNS has been linked to factors such as introversion, extraversion, neuroticism, narcissism, and dysfunctional coping mechanisms (Kuss & Griffiths, 2011), as well as low self-esteem and anxious attachment (D'Arienzo et al., 2019). In terms of mental health problems, previous literature has noted a positive correlation between depressive symptoms and time spent on SNS (Pantic, 2014), also the use of smartphones for different purposes, including SNS and other media services (e.g., videos, chatrooms) before going to sleep has been found to correlate with depressive symptoms and sleep disturbances in adolescent population (Lemola et al., 2014). Considering the similarities of SNS and online dating (sites and applications) and similar

findings that have been found in online dating research (e.g., low self-esteem related to higher use of online dating, higher availability of online dating sites leading to longer use), it appears plausible to consider previous research investigating SNSs as a guide for online dating research.

Another overlapping phenomenon between SNS and online dating is referred to the social changes that their usage (SNS and online dating use) may infer in individuals' life. In that sense, Pantic (2014) concluded that SNS use has inferred changes on how individuals relate to each other in the present time making social interactions more shallow and decreasing communication with family members (Pantic, 2014). In parallel, online dating may potentially change the dating scene attending to the growth in popularity and ubiquity of the service due to smartphone applications. Previous literature highlighted that time needed to form long-lasting relationships (romantic and friendship) mismatches with time users spent through online dating for that same purpose (establishing a long-term relationship), therefore favouring casual encounters over other type of dates (Yeo & Fung, 2018) that may potentially lead to longer-lasting relations and stronger bonding. Social changes in relation to dating may not necessarily stand for detrimental effects. However, research is needed to assess what type of changes are produced by the inclusion of online dating to our day-today life and how these changes affect individuals in a multidisciplinary perspective.

Contrary to other internet disorders, online dating research is still in its initial stage, and as of today online dating has scarcely been studied in terms of its problematic use. Considering the extended use that online dating services have in the present, and the concerns at individual level (i.e., mental health problems) and societal level (i.e., dating scene changes) it seems plausible to review previous literature in this field attending to the need of formulating new

knowledge in relation to online dating use and problematic use. Therefore, the present review will scan through previous literature in the field of online dating that relates to longer or higher use of online dating sites and/or dating apps which may be one of the first steps towards the study of excessive and/or problematic use of online dating sites.

Consequently, the aim of the chapter is to review the empirical evidence examining the use and problematic use of online dating. Considering that previous literature concerning problematic use of online dating is scarce, the structure of this present review has been designed to assess and discuss relevant factors related to online dating use that may serve as the basis for further study of problematic use of online dating.

2.2 Method

An extensive literature search in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement (PRISMA) (Moher et al., 2009) was conducted in May 2019 using the *Web of Science* and *PsycINFO* databases. In order to be as inclusive as possible, terms also included extensively used online dating apps and platforms, as well as terms for ‘addiction’ and similar constructs, and technological mediums. The search was as following, Ti=(dating OR tinder OR grindr OR match.com OR okcupid OR jack'd OR badoo) AND (smartphone OR mobile OR online OR internet OR apps OR cyber* OR patho* OR addict* OR compuls* OR depend* OR problem* OR excess* OR misuse OR obsess* OR habit* OR impuls*). The search yielded a total of 627 studies in *Web of Science*, and 176 studies in *PsycINFO*. A total of 803 studies were identified which yielded to the final selection of 43 studies after inclusion and exclusion criteria (see Figure 2.1).

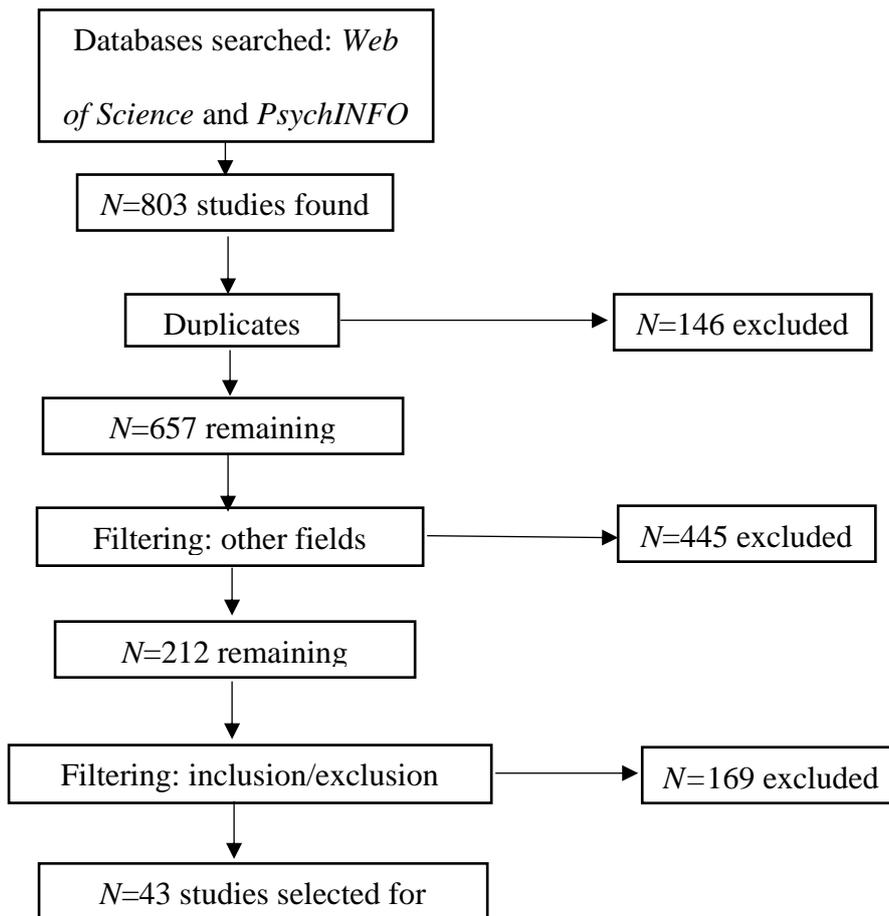


Figure 2.1. Flow chart displaying the search process

The inclusion criteria comprised full-text studies that (i) were published in peer-reviewed journals, (ii) were published from January 1 (2004) to May 30 (2019) as first studies on online dating in the consulted databases date back to 2004, (iii) were written in English or Spanish as these are the languages that the first author speaks, (iv) made reference to patterns and/or motivations of use, and (v) made reference to personality traits, negative consequences or risks, impulsive behaviours, and/or addictions. Studies were excluded if they (i) primarily concerned cyberbullying and its derivatives, (ii) primarily concerned scams, and (iii) did not assess online dating as the main variable under investigation. This yielded 43 studies (see Table 2.1), only two of which specifically covered potential addiction to online dating.

2.3 Results

This section has been divided into six subsections which cover: (i) usage and motivation, (ii) personality correlates, (iii) negative correlates, (iv) impulsive behaviour, (v) substance use and behavioural addictions, and (vi) problematic use of online dating. Across the subsections, the focus is on the main findings of each study and when applicable, how these findings relate to overuse/problematic attributes.

Table 2.1. Studies from the systematic review

Study [Year]	Aims	Sample [Design/Method]	Instruments	Main results
Best et al. [2012]	Researched the prevalence, pragmatism and social impact of filtering mechanisms, and how they are shaping the culture of dating	15 total respondents recruited through radio appeals, face-to-face recruiting, online posting and snowballing (from 18 to 62 years old) [Qualitative: exploratory, small scale, four focus groups]	N/A	Filtering starts at the first phase in order to catch incongruous behaviour; Users rely on their instinct developed by the experience; ‘Shopping culture of dating’ saps the dating energy of users
Blackhart et al. [2014]	Examined how several dispositional factors are related to the use of online dating sites and to online dating behaviours examine how several dispositional factors are related to the use of online dating sites and to online dating behaviours	725 volunteers 18–71 years of age (Mean-Age=22.31, <i>SD</i> =6.75; 73.9% female; 91.6% heterosexual; 86.6% White/Caucasian) [Quantitative: cross-sectional study with self-reported measures]	Rosenberg Self-Esteem Scale; Rejection Sensitivity Questionnaire; Relationship Questionnaire; Big Five Scales Questionnaire; Online Dating Inventory (ODI) (created by the researchers); Including items assessing potential risky behaviours	Participants with higher rejection sensitivity are more likely to use online dating platforms. The latter, those lower in conscientiousness and men are more likely to engage in risky behaviours.
Boonchutima et al. [2017]	Evaluated the behaviours of Thai men who have sex with men (MSM) dating apps users toward illicit drug usage	350 respondents: 200 were from the eight carefully selected websites and 150 were from social media sites. 3 out of 4 are between 18 to 35 years old. 61.7% Bachelor’s degree. [Quantitative: cross-sectional study with self-reported survey]	Survey created by researchers, 21 questions; 3 with 8 sub-questions. 18 remaining 5-point Likert scale.	73% of the Thai MSM community is using dating apps to find their partners as well as for inviting others into illicit drug practice with a 77% invitation success rate. Substance use was also linked with unprotected sex.

Cali et al. [2013]	Examined the stigma associated with online relationship initiation and its relation to women's self-protective behaviour	82 women at a private Midwestern University; 18 and 36 years ($M=24.36$; $SD=4.73$). 47 of the described as White, 19 as African-American, 5 as Asian-American, 4 used the term "other" to describe their racial background, and 7 of the participants identified as Hispanic.	Dating Self-Protection Against Rape Scale (DSPARS); Dating background and Internet usage questionnaire	Greater importance to self-protective behaviour after reading the online meeting scenario than the face-to-face scenario. This tendency was especially strong among participants who had never been on a date with someone they had met online
		[Quantitative: comparison of 2 case scenario and self-reported measures]		
Chan [2017]	Examined the relationships between trust toward people online, sensation-seeking, smartphone use for accessing the Internet, and the intent to use dating apps to look for romance and casual sex	257 heterosexual participants, 54.86% males. Mean age=27.14; 70.03% White, 13.61% Asian, 13.22% Hispanic, and 8.17% African American	Items: Behavioural intent, Attitude, Perceived norm, Self-efficacy, and desire for romantic relationships and general sexual drive; Trust toward people online based on Pew Internet and American Life Project; Impulsivity and Sensation Seeking Scale; Smartphone use for accessing the Internet	Attitude and perceived norm are predictive of the use of dating apps. Sensation-seeking and smartphone use had a direct relationship with intent. Use of apps looking for sex is predicted by attitude and self-efficacy, indirectly related to smartphone use. Sensation-seeking and smartphone use had direct relation with this goal.
		[Quantitative: cross-sectional study with self-reported measures]		
Chin et al. [2019]	Examined attachment-related differences in the use of dating applications	183 participants, 60% male, $M_{age}=29.97$ years, ($SD=8.50$), range: 18–65 years of age.	Attachment Style Questionnaire. Use of dating apps measured by authors' items.	Users with higher anxious attachment orientation are more likely to report using dating apps, opposite to avoidant attachment ones. Most common reason of use is to meet others, and most common reason for not using it is difficulty in trusting people online
		[Quantitative: cross-sectional study with self-reported measures]		

Choi et al. [2016a]	Aimed to explore the association between using smartphone dating applications and having unprotected sex with a casual sex partner	666 students based in Hong Kong; 17% homosexual/bisexual; 52.9% use dating apps [Quantitative: cross-sectional study with self-reported data]	Structured questionnaire: dating apps, sexual history and socio-demographic information	Using dating apps was associated with having unprotected sexual intercourse. Using dating apps for more than 12 months is associated with having a casual partner in the last sexual interaction and having unprotected sex with that partner.
Choi et al. [2017]	Examined the association between using smartphone dating applications and substance use in conjunction with sexual activities in homosexual men	666 students based in Hong Kong [Quantitative: cross-sectional study with self-reported data]	Questionnaires adapted from previous studies: the use of dating apps, sexual history, and substance use	Using dating apps for more than 1 year is associated with recreational drug use together with sexual activities; Risk factors of recreational drug use in conjunction with sexual activities included being bisexual/homosexual male, a smoker, and having one's first sexual intercourse at the age of less than 16; Risk factors for alcohol consumption in conjunction with sexual activities are: being older, having monthly income more than HKD5,000, and being a smoker; Risk factors for alcohol consumption in conjunction with the last sexual activity included currently being in a dating relationship, a smoker, and having sex with a casual partner
Choi et al. [2018]	Examined the association between using dating apps and	666 students based in Hong Kong	Questionnaires: socio-demographics, use of dating apps and experience of sexual abuse;	Users of dating apps were more likely to be sexually abused in the past year than non-users. Using dating apps was

	the sexual abuse of males and females	[Quantitative: cross-sectional study with self-reported data]	Sexual coercion subscale of revised Conflict Tactics Scales (CTS-2)	also a risk factor of lifetime sexual abuse
Choi et al. [2016b]	Explored the association between the use of dating apps and risky sexual behaviours	666 students based in Hong Kong [Quantitative: cross-sectional study with self-reported data]	Questionnaires: use of dating apps, sexual behaviours and sexual orientation	Association between having unprotected sexual intercourse with more lifetime sexual partners and use of dating apps, having one's first sexual intercourse before 16 years of age, being older, currently being in a relationship, having a monthly income at least HKD \$5,000, being a current smoker, and being a current drinker; Users and current drinkers were less likely to have consistent condom use. Bisexual/homosexual users and females were more likely not to have used condoms the last time they had sex
Chow et al. [2018]	Investigated whether MSM who met their partners via smartphone dating apps are more likely to engage in sexual practices such as rimming (oral-anal sex), and use of partner's saliva as a lubricant	1672 men; 17 to 78 years, median age of 29; 74% MSM used smartphone dating apps the last three months [Quantitative: cross-sectional study with self-reported data via short questionnaires]	Short questionnaire: a) source of dating mates, b) specific sexual practices	MSM who used smartphone dating applications were 1.78 times more likely to get rimmed, and 1.63 times more likely to use partner's saliva as a lubricant during anal sex, compared to other sources, after adjusting for age and other sources for meeting partners

Clemens et al. [2015]	Researched the role that biological and personality traits play in the use of online dating websites.	678 participants recruited from (a) the undergraduate student population ($n=584$) and (b) the general population using online networking websites ($n=94$); males (51%); 18–20 (86%) and 21–30 (11%)	“Big-Five” scale; ODS gratifications based on general Internet use, television viewing motives and SNS gratifications	Homosexual users sought a wider range of gratifications (relationship, sex partner, distraction, and convenient companion) from online dating sites than their heterosexual counterparts; Women were less likely to use ODSs to find sexual partners, but more likely to use ODSs to be social. Those who were neurotic use dating sites to build an identity, as a convenient companion, and as a distraction. People who are open to experiences were found to use dating sites to be social. Disagreeable people use dating sites because of peer pressure and as a status symbol, and conscientious people were found to use dating sites to find a relationship
		[Quantitative: cross-sectional survey study with self-reported data]		
Corriero et al. [2016]	Examined individuals’ experience of uncertainty within the context of Grindr, an all-male location-based mobile dating application	62 self-identified Grindr users, aged 18 and older ($M=22.18$). The sample was 68% Caucasian, 8% Hispanic, 5% Asian/Pacific Islander, 2% African American, 13% other, and 4% did not respond. Respondents were 84% gay, 6% bisexual, 6% other, and 4% did not respond	Open and close-ended items to measure concerns of use	Specific set of user goals and concerns predicted daters’ desire for uncertainty, which in turn predicted information seeking behaviour. Findings clearly indicate that Grindr users’ responses to uncertainty were not limited to simple reduction strategies, but were dependent upon their desire for and tolerance of uncertainty in relation to their goals and concerns of application use
		[Quantitative: cross-sectional survey with self-reported data]		

Couch et al. [2007]	Examined the behaviours and experiences of people who use online dating and how they may or may not address risk in their use of online dating	15 participants; 11 males; 24 to 44 years old; 12 heterosexual; 10 single; Most located in Melbourne metropolitan area. [Qualitative: in-depth interview study via online chat platform]	N/A	For users the control offered by the online environment was central to risk management. Additionally, the social context in which an individual encountered a potential risk would shape how they perceived the risk and responded to it. People who use online dating do consider the risks involved and they demonstrate personal autonomy in their risk management
Couch et al. [2012]	Explored what online daters perceive to be the risks of online dating, along with providing accounts of dangers and risky situations encountered by online daters	29 participants 18 to 70 years old. 12 women; All from Australia but one from the US; 23 single; 23 from metropolitan area [Qualitative: in-depth interview study via online chat platform]	N/A	Participants identified risks of lies and deceit, sexual risks, emotional and physical risks, and the risks of encountering dangerous and untrustworthy people online and in person. Participants framed these risks in terms of the risky “other” moving the ownership of risks away from themselves
Erjavec [2016]	Examined involvement of older adults in online dating: How older adults who lived the majority of their lives under socialism perceived online dating	38 retired adults; 19 women; 63 to 77 years old; All participants were Slovenian, heterosexual, middle-class, and urban. [Qualitative: semi-structured in-depth interview study]	N/A	Participants used economic metaphors and related them with extremely positive expressions of recovery; they have internalized the principles of the market economy and perceive their re-entry into the relationship market as their revival
Goedel et al. [2016]	Examined associations	174 male users of Grindr app; $M=30.8$ years old; 94.2% gay/bisexual	Survey: app use, contextual factor and transactional sexual	Engagement in condomless receptive and insertive anal intercourse with one

	between contexts of app use (e.g., using apps when drinking) and condomless anal intercourse among a sample of MSM who use these apps	[Quantitative: cross-sectional study with self-reported data via online survey]	encounters, HIV status and sexual behaviours	or more partners in the preceding 3 months was common (39.7% and 43.1% respectively) and was associated with several app-use contexts; Associations between alcohol and other drug use when using these apps and condomless receptive and insertive anal intercourse
Gunter [2008]	Find out the extent to which Internet users subscribe to online dating services and assess users' experiences of such services and their eventual outcomes.	3,844 respondents; 67% women; 16-24 s (11%), 25-34 s (31%), 35-44 s (27%), 45-54 s (20%), and 55+ (11%). [Quantitative: descriptive with self-reported data via online survey]	Survey: motivations of use and satisfaction with the service	29% said they had used an online dating site. Most of these respondents (90%) had spent up to £200 on internet dating in the past two years, with 70% of users achieving at least one date, 43% enjoying at least one sexual relationship, and 9% finding a marriage partner
Hall et al. [2010]	Examined factors like gender, self-monitoring, the big five personality traits, and demographic characteristics, that influence online dating service users' strategic misrepresentation (the conscious and intentional misrepresentation of personal characteristics)	5,020 participants; 74% female; Average age of 39.8 years old; primarily White, non-Hispanic (83.2%), with 4.1% Hispanic, 5.3% African-American, 3.5% Asian-American, and 3.6% other [Quantitative: cross-sectional with self-reported data via online survey]	Survey items: personal assets, relationship goals, personal interests, personal attributes, past relationships; 25-item Revised Self-monitoring Scale; 44-item Big Five Inventory	Men are more likely to misrepresent personal assets, relationship goals, personal interests, and personal attributes, whereas women are more likely to misrepresent weight; Self-monitoring was the strongest and most consistent predictor of misrepresentation in online dating. Agreeableness, conscientiousness, and openness also showed consistent relationships with misrepresentation

Hance et al. [2018]	Explained the relationship between rejection sensitivity and online dating site usage	Study 1: 640 participants (67% female) 18–65 years of age ($M=23.59$). Study 2: 326 participants (206 female) 18–59 years of age ($M=24.15$) [Quantitative: cross-sectional study with self-reported data]	16-item Rejection Both studies: Sensitivity Questionnaire (RSQ); Real Me Scale; Online Dating Inventory (ODI) Study 2 only: Revised Self- Disclosure Scale	True self mediated the relationship between rejection sensitivity and online dating site usage; Rejection-sensitive individuals feel they can more easily represent their “true” selves in online environments, such as online dating sites, which partially explains why they are more likely to engage in online dating
Heijman et al. [2016]	Examined the association between unprotected anal intercourse (UAI) with partners dated online and with partners dated offline; Examined whether differences can be explained by self-perceived HIV status of the index and knowledge of partnership characteristics	3050 men who have sex with men (MSM); median age was 37; Most participants (73.8 %) were Dutch [Quantitative: cross-sectional study with self-reported data via questionnaires]	Questionnaire: socio-demographics and HIV status, the three most recent partners in the preceding 6 months, and sexual behaviour with those partners	Online dating was not significantly associated with UAI among HIV-negative users. HIV-positive participants were more likely to practise UAI with partners dated online; After correction for partner and partnership characteristics, online partnership acquisition was not associated with a significantly increased risk of UAI
Heino et al. [2010]	Explored the ways in which the marketplace metaphor resonates with online dating participants and how this conceptual framework influences how they assess themselves, others, and make decisions about whom to pursue	34 participants from a large online dating site; 25 to 70 years old ($M=42$); 50% female; (76%) resided in urban Los Angeles [Qualitative: semi-structured in-depth interview study via telephone]	N/A	Marketplace metaphor was salient for participants, who employed several strategies that reflected the assumptions underlying the marketplace perspective (including resisting the metaphor); Implications of this metaphor for romantic relationship development, such as the objectification of potential partners

Hospers et al. [2005]	Described the process of Internet chatting, and subsequent dating and sexual (risk) behaviour among Dutch men who have sex with men (MSM), and to compare the demographic profile of the Internet sample with a traditional Dutch MSM sample	4984 users of an online platform; ($M=33.2$ years); Most respondents (81%) reported a Dutch cultural background; 44% had ever been tested for HIV. Among tested men, 6% reported being HIV-positive	Questionnaire: Demographics, chatting and dating behaviour, sexual behaviour, sexual behaviour with last e-date	Especially among HIV-positive men, a high percentage of unprotected anal sex was reported (39%). After correcting for the disclosure of HIV status, this percentage remained twice as high compared with HIV-negative and never tested men (28 versus 14%). Compared with a traditional MSM sample, the Internet sample was significantly younger, and comprised more non-Dutch and bisexual men, whereas the level of sexual risk behaviour with casual partners was comparable
Houran et al. [2004]	Examined whether individuals with intentions to use online matchmaking services had unrealistically optimistic expectations of finding a perfectly compatible partner	222 participants of non-married status; 109 men; 24-50 years old ($M_{age}=37.39$); 9 Asian, 15 African American, 182 Caucasian, and 16 Other	Items: probability estimates, conditional probabilities, and attitude	Individuals with intentions to use online dating are not motivated by positive distortions or unrealistic optimism as measured by attitudinal indicators
Hwang et al. [2013]	Examined dating preferences using a multiracial randomized sample of online daters	2,123 profiles (523 Asians, 504 Blacks, 473 Latinos, and 632 White)	Measures from profiles: demographics and willingness to date a different/same racial group(s)	Results indicated that willingness to date intra- racially was generally high and that willingness to date inter- racially was lower and influenced by racial social status

Jung et al. [2019]	Explored the changes in user behaviour induced by adoption of a mobile application, in terms of engagement and matching outcomes in the online dating context	100.000 users of one online platform; Female Mean age 36.10; Male Mean age 33.22: Mostly White. [Quantitative: longitudinal study with real users' data]	N/A	Mobile app adoption induces users to become more socially engaged as measured by: visiting significantly more profiles, sending significantly more messages, and importantly, achieving more matches; Men act more impulsively than women; Both men and women exhibit disinhibition, in that users initiate actions to a more diverse set of potential partners
Kim et al. [2009]	Explored the three major consumer characteristics that underlie the use of Internet dating services: self-esteem, involvement in romantic relationships, and sociability	3,345 responses Received; (47.5 %) were from men. Ages ranged from 19 to 89 [Quantitative: cross-sectional study with secondary data]	Items: self-esteem, involvement in romantic relations, sociability, and use of online dating services	Among sociable people, individuals with high self-esteem are more likely to use Internet dating services when they are highly involved in romantic relationships; Individuals with low self-esteem used Internet dating services more often than did those with high self-esteem when romantic relationships were not important
Kok et al. [2007]	Investigated social-cognitive determinants of HIV-risk precautionary intentions among men who have sex with men, who meet sex partners on the Internet	1.375 men who have sex with men from an online dating site [Quantitative: cross-sectional study with data from online survey]	Items: demographics, attitude, subjective/descriptive/personal norm, perceives behavioural control, anticipated regret, and intention	Attitude, subjective norms, and perceived control explain 55% of the variance in intention to use condoms for anal sex with future e-dates; Adding descriptive norms, personal norm and anticipated regret explains 70%, which is a very high percentage

Lawson et al. [2006]	Examined the world of Internet dating. It explored the motivations of daters, their styles of courtship, and how they negotiated problems of trust and deception	50 respondents; 25 female; 32.6 mean age male; 33 mean age female. [Qualitative: open-ended informal interviews]	N/A	Internet daters sought companionship, comfort after a life crisis, control over presentation of themselves and their environments, freedom from commitment and stereotypic roles, adventure, and romantic fantasy
March et al. [2017]	Explore the antisocial behaviour of trolling on Location- Based Real-Time Dating applications	357 adults; 71% women; 18–60 years of age ($M_{age}=22.50$); Majority heterosexual orientation (81%), bisexual orientation (10%), homosexual orientation (6%), and other orientation (3%). [Quantitative: cross-sectional study with self-reported measurement instruments]	Short Dark Triad Scale; Short Sadistic Impulse Scale; Dickman Impulsivity Inventory; Modified version of Global Assessment of Internet Trolling (GAIT)	The traits of psychopathy, sadism, and dysfunctional impulsivity were significantly associated with trolling behaviours. Subsequent moderation analysis revealed that dysfunctional impulsivity predicts perpetration of trolling, but only if the individual has medium or high levels of trait psychopathy
Menkin et al. [2015]	Identified prioritized goals in new romantic relationships and whether importance of these goals differ by participants' age and gender	5,434 users; 50% female; 20 to 95 years old; 86% non-Hispanic White [Quantitative: cross-sectional study with self-reported online questionnaire]	Questionnaire: relationship goals, individual differences (e.g., personal interests) and demographics	Users valued interpersonal communication more than sex appeal. Older users rated sexual attraction as slightly less important than younger users, but they still highly valued the goal. Women placed even greater emphasis on communication over sexual attraction; Men valued sexual attraction more than women at all ages; Only the youngest women valued communication more than young men

Orosz et al. [2018]	Investigated the motivational, personality, and basic psychological need-related background of problematic Tinder use	1.055 total participants <i>Study 1</i> : 414 Hungarian participants (female=246; 59.4%) between 18 and 43 years old <i>Study 2</i> : 346 (female=165, 47.7%) 18 and 51 <i>Study 3</i> : 298 (female=177; 59.4%) aged between 19 and 65 [Quantitative: cross-sectional study with self-reported measurement instruments; Including a validation procedure of a measurement scale]	<i>Study 1</i> : focus group towards forming items for the development of the scale <i>Study 2</i> : Tinder Use Motivation Scale (TUMS); Problematic Tinder Use Scale (PTUS); Big Five Inventory (BFI) – Hungarian version <i>Study 3</i> : Tinder Use Motivational Scale (TUMS); Problematic Tinder Use Scale (PTUS); Rosenberg Self-Esteem Scale (RSES); Basic Psychological Need Satisfaction and Need Frustration Scale (BPNSFS)	<i>Study 1</i> : 16-item first-order factor structure was identified with four motivational factors, such as sex, love, self-esteem enhancement, and boredom <i>Study 2</i> : problematic Tinder use was mainly related to using Tinder for self-esteem enhancement. The Big Five personality factors were only weakly related to the four motivations and to problematic Tinder use <i>Study 3</i> : instead of global self-esteem, relatedness need frustration was the strongest predictor of self-esteem enhancement Tinder-use motivation which, in turn, was the strongest predictor of problematic Tinder use
Orosz et al. [2016]	Created a short Problematic Tinder Use Scale (PTUS)	430 Hungarian respondents (Female=243; 56.5%) aged between 18 and 51 ($M_{age}=22.53$); Majority lives in the capital [Quantitative: development of a measurement scale]	Problematic Tinder Use Scale (PTUS) built upon the six-component concept of Griffiths (2005)	The 6-item unidimensional structure has appropriate reliability and factor structure. No salient demography-related differences were found. Users irrespectively to their relationship status have similar scores on PTUS
Paul [2014]	Examined differences in the outcomes of relationships that begin online compared to traditional offline venues	4,002 adult respondents; Mean age online venue: 46.79; Mean age offline venue: 38.85	N/A	Couples who met their partners online were more likely to be involved in dating and romantic relationships than marital relationships compared to

	including non-marital relationships in the comparison	[Quantitative: with secondary data from Waves I, II, and III of the nationally representative longitudinal survey]		couples who met offline; Breakup rates for both marital and non-marital romantic relationships was found to be higher for couples who met online
Peter et al. [2007]	Researched the individuals' antecedents towards casual dates through online sites	657 final respondents; Mean age 39.26; women 51% [Quantitative: cross-sectional study with self-reported data via online survey]	Items: demographics, dating anxiety, physical self-esteem, sensation seeking, sexual permissiveness, reduced visual cues, anonymity, controllability and control variables	Sexually-permissive people and high sensation-seekers looked for casual partners online more frequently than sexually-restrictive people and low sensation-seekers. Dating anxiety and physical self-esteem, in contrast, were unrelated to the seeking of casual partners online
Sanchez et al. [2015]	Analysed the quality of cyber-dating among adolescents by means of a mixed study	<i>Study 1</i> : 16 adolescents; 8 boys; 14-17 years old. <i>Study 2</i> : 626 respondents; 12-21 years old, Mean age 15.13; 51.4% males) [<i>Study 1</i> : qualitative, focus groups with semi-structured ad hoc interview <i>Study 2</i> : quantitative, development of a measurement scale]	<i>Study 1</i> : focus group towards forming items for the development of the scale <i>Study 2</i> : The cyberdating Q_A scale	Structure of six factors, namely online intimacy, emotional communication strategies, cyber-dating practices, online control, online jealousy, and online intrusive behaviour. Descriptive analysis showed that these scales were very frequent among adolescents, with boys scoring higher in intrusive behaviour and cyber-dating practices than girls
Solis et al. [2019]	Investigated the motivations and risks involved in the use of mobile dating applications (MDAs) to meet strangers and the outcomes of using this technology	433 users; 57.5% were males; 11 to 58 years old, Mean age 30 [Quantitative: cross-sectional study with self-reported data via online survey]	Items based in the motivation categories from previous Tinder studies: demographics and use of dating sites	Sexuality was the only predictor for the use MDAs to meet people offline for dates and casual sex; Fear of self-exposure to friends, professional networks, and the community, among the perceived risks of dating online

Stinson et al. [2016]	Examined the influence of personality (introversion and extraversion) and personal variables (social anxiety and public self-consciousness) on online dating preferences from two competing perspectives: the “social compensation” (SC) hypothesis and the “rich-get-richer” (RGR) hypothesis	162 participant; 18 to 64 years of age $M=27.43$; 43 males; Half were students. The other half were professionals [Quantitative: cross-sectional study with self-reported data via online survey]	International Personality Item Pool (IPIP); Social Anxiety subscale; Public self-consciousness; Dating preference based in existing surveys; Items on use and demographics	Stronger role of social influence in the decision to online date. Hypothesis are limited may be due to the increasing popularity of online dating sites, which may make personality and personal traits less informative of whether individuals will opt to use such services
Sumter et al. [2019]	Investigated how dating app use and motivations related to demographic identity variables (i.e., gender and sexual orientation) and personality-based variables among young adults	541 respondents; 18 and 30 years of age, $M=23.71$; 60.1% women: Majority of Dutch 92.4% [Quantitative: cross-sectional study with self-reported data via online survey]	Dating App Motivation Scale (DAMS); Dating Anxiety Scale; Brief Sensation Seeking Scale; Sexual Permissiveness Scale; Dating app user status	Non-users were more likely to be heterosexual, high in dating anxiety, and low in sexual permissiveness than dating app users. Among app users, dating goal motivations were meaningfully related to identity features: sexual permissiveness was related to the casual sex motive.
Valkenburg et al. [2007]	Investigated the demographic predictors of online dating and the validity of the social compensation and the rich-get-richer in relation to users’ use of online dating	367 Dutch adult singles; 18 to 60 years old, Mean age 38; 50% males [Quantitative: cross-sectional study with self-reported data via online survey]	Demographics; 5 items from the active-intentions-for-dating subscale of the dating anxiety survey; Visit of dating sites	Online dating was unrelated to income and educational level. Respondents between 30 and 50 years old were the most active online daters. In support of the rich-get-richer hypothesis, people low in dating anxiety were more active online daters than people high in dating anxiety

Vandeweerd et al. [2016]	Understand the positives and negatives of online dating according to the lived experience of older women	45 women aged 50+, mean age 57.3; 13% African American/Black, 7% Hispanic/Latina, 78% were White, and 2% as “other” [Qualitative: semi-structured interviews via telephone]	N/A	Benefits of online dating: expand one’s social network for both friendships and romantic partners, the ability to control dating risks and pace of relationship formation, and knowing more about one’s partner; Identified risks: pervasive lying, attempted financial exploitation, and unwanted electronic sexual aggression
Whitfield et al. [2017]	Examined whether the manner in which gay, bisexual, and other MSM find sexual partners predicts an increase in likelihood of engaging in CAS in an urban, non-coastal U.S. city	545 men; average age of 36.81 years; 54% White, 20% Hispanic/Latino, 10% Black/African American, 8.3% Multiracial, 2.4% American Indian/Alaskan Native, 2% Asian, and 0.2% Native Hawaiian/Pacific Islander [Quantitative: cross-sectional study with secondary data from Denver NHBS]	Behavioural survey: sexual behaviour, substance use, STI history, and HIV testing	Age and race are associated with the mode of finding sexual partners. Using the Internet or a mobile app to find sexual partners was not predictive of CAS
Zlot et al. [2018]	Investigated the contribution of social anxiety and sensation seeking to ratings of sex addiction among those who use dating Internet sites	279 participants; 128 males; mean age 25 years, age range of 18–38 [Quantitative: cross-sectional study with self-reported data via online questionnaires]	Demographics; Liebowitz Social Anxiety Scale; Sensation Seeking Scale; Sexual Addiction Screening Test (SAST)	Dating apps users showed higher scores on sexual addiction than non-users. Lower sex addiction scores correlated directly to social anxiety scores. There was no difference in sensation-seeking between participants with low and high scores of sexual

addiction; Social anxiety is a major factor affecting the use of Internet-dating applications for obtaining sexual partners

2.3.1 Usage and motivations

A total of 11 studies were found that examined the characteristics of use or motivations of online dating use. Out of the eleven studies, there were ten quantitative studies, all of which were cross-sectional (Corriero & Tong, 2016; Gunter, 2008; Hance et al., 2018; Houran & Lange, 2004; Hwang, 2013; Kim et al., 2009; Menkin et al., 2015; Paul, 2014; Stinson & Jeske, 2016; Valkenburg & Peter, 2007), and one qualitative study (Lawson & Leck, 2006). One study examined heterosexual respondents only (Hwang, 2013), and another study focused on male homosexual populations only (Corriero & Tong, 2016), the remaining studies did not differentiate between sexual orientations.

Before the proliferation of online dating platforms and smartphone applications, Gunter (2007) collected 3,844 responses (67% female) from the British population in an online survey available on the website of a research agency that asked questions regarding motivations and users' satisfaction with the online dating service. All group ages were represented evenly: 16-24 years (11%), 25-34 years (31%), 35-44 years (27%), 45-54 years (20%), and 55+ years (11%). Results showed that 29% had used online dating sites and 90% of these users had spent up to £200 over the previous two years using online dating services (Gunter, 2008). These results were supported by another study (Valkenburg & Peter, 2007) with 367 single respondents (50% females) from the Netherlands. They were asked to complete an online survey that contained a subscale on active intentions from the Dating Anxiety Survey (Calvert et al., 1987). Findings showed that almost half of the respondents (43%) had used the internet to date potential partners. Both studies found differences in terms of use by gender, where men were found to be more likely (40%) to have used

online dating services than women (24%) (Gunter, 2008). However, there was no difference regarding income or education. Furthermore, in relation to age, it appeared that adults aged between 30 and 50 years were the most active users. In addition to the socio-demographic pattern of use, Hwang (2013) collected data from 2,123 heterosexual users' profiles on an American online dating site in Los Angeles and compared the willingness to date between different racial groups (e.g., Asians and Latinos) and within the same group (i.e., whites with whites). In order to do this, proxy demographic measures (i.e., age, gender, marital status, educational level, and zip code of residence) were taken; also, willingness to date inter- and intra-racially was registered, however the authors did not specify how they measured that variable (willingness to date inter- and intra-racially). Generally, dating online intra-racially was favoured over inter-racial dating. However, men were found to be higher in willingness to date inter-racially in comparison to women. Nonetheless, considering the specificity of the sample, these results cannot be extrapolated to the general population. Further studies should consider including variability in terms of sexual orientations and cultural background to see if these findings can be replicated.

Considering the expectations of use in terms of finding a perfect partner, Houran and Lange (2004) studied a sample of 222 non-married participants from a paid survey panel (mean age=37.39 years) and reported that online dating users did not hold unrealistic expectations (i.e., positive distortions towards finding the perfect match). However, the authors did not consider the participants' goals for using online dating and arguably, depending on users' goals, expectations may differ. Taken together, the previous four studies indicate that young adult men are the most active online dating users tending to date intra-racially. However, three of these studies (i.e., Gunter, 2008; Houran &

Lange, 2004; Valkenburg & Peter, 2007) were carried out before the launch of smartphone dating apps, the appearance of which could have resulted in different findings.

Regarding psychological characteristics of users, Kim et al. (2009) surveyed 3,354 American respondents across a wide age range (19 to 89 years) and found that those who experienced less dating anxiety were notably more present on online dating platforms. Furthermore, they found that users high in social skills (i.e., sociability), together with high self-esteem, and high relationship involvement were more likely to use online dating services in comparison to those with high sociability, high relationship involvement but with low self-esteem. Contrariwise, individuals with low self-esteem and low relationship involvement (together with high sociability) were found to be more active users comparing to less sociable participants, and those whose self-esteem was high but scored low in relationship involvement, or vice versa. To clarify, the effect was only found in the interaction between self-esteem and relationship involvement among those high in sociability. Seemingly, being sociable appears as an important predictor of higher online dating use. However, being highly sociable is not a reliable predictor of online dating use by itself, but only in interaction with individuals' goals and self-esteem. In contrast to these results, a small survey by Stinson et al. (2016) of 162 participants found that peer pressure influences the decision to use online dating services, instead of personality factors (e.g., sociability, introversion). The authors claimed that it may be due to the spreading popularity of online dating that personality features were not as predictive in regards to usage tendency.

In terms of individuals' motives, there appear to be many possibilities as to why people date online. In a study of 5,434 respondents, Menkin (2015) found that participants generally emphasized interpersonal communication over sex appeal, with women placing greater importance on social

interaction, whereas men considered sexual attraction more important than women across all ages. However, younger individuals, aged between 20 and 39 years, consider sexual attraction more important than older individuals (75+ years old). Emphasizing sexual attraction, in a study with 62 young men using an all-male dating app (mean age=22.18 years), Corriero and Tong (2016) identified that casual sex goals are related with desire for uncertainty. Conversely, if users were concerned about their own personal information, health, and privacy, then their desire for uncertainty decreased. Therefore, it may be argued that those young users who are looking for casual sex encounters put themselves at higher risk than those who are not looking for sex. This hypothesis is discussed in a later section.

In more general terms, online daters search for companionship, comfort after a life crisis, control over the presentation of oneself to others, to refrain from commitment and societal boundaries, new experiences, and romantic fantasies (Lawson & Leck, 2006). In relation to the control over self-presentation, it has been claimed that individuals with high rejection-sensitivity tend to feel more comfortable to express themselves in the online medium, and those who feel more comfortable expressing themselves online are found to score higher in online dating use (Hance et al., 2018). One of the reasons for high-rejection sensitive individuals to engage more in the online dating arena may be related to feeling less constrained to show themselves (i.e., “*true self*”), identifying less difficulties in the online context. Nonetheless, it appears that common features in online dating like the absence of time limits (i.e., asynchronous communication) and selective self-presentation facilitate deceptive representations of oneself (Hall et al., 2010). In a study of secondary survey data from 4,002 US participants, Paul (2014) found that couples who met online had higher split up rates in comparison to partners who met offline. Arguably, typical features of

online dating services and apps such as asynchronous communication and selective self-presentation may affect negatively to the quality of a long-term relationship between two online daters. Consequently, further studies are needed in the form of longitudinal designs that would help establish the causes that affect the quality of relationships initiated via online dating services.

Overall, the results of this subsection show that the use of online dating platforms is widespread and has grown rapidly in the past few years. In terms of use, younger adult men appear to be the most prevalent users of online dating services. In terms of motivations to use online dating, men favour sex appeal more compared to women. Regarding psychological characteristics, it appears that high sociability and high rejection-sensitivity are associated with higher use of online dating services. The studies reviewed suggest that there are some features in online dating services (i.e., sites and apps) that could enhance the chances of deception and decrease the quality of long-term relationships. Nonetheless, there are some methodological weaknesses (e.g., the use of non-validated psychometric instruments, and non-representative samples) that should be amended in future research so that the internal and external validity of these findings are increased. As to the design, the research should consider longitudinal approaches to help establish the direction of causality (i.e., is relationship quality affected by online dating or there are underlying factors that directly affect relationship quality).

2.3.2 *Personality correlates*

Considering the association that exists between specific personality correlates and patterns of use, a total of seven studies (Blackhart et al., 2014; Chan, 2017; Chin et al., 2019; Clemens et al., 2015; Hall et al., 2010; Peter & Valkenburg, 2007; Sumter & Vandenbosch, 2019) were found and

reviewed focusing on the association of personality traits and use of online dating services. All the studies assessed used quantitative and cross-sectional methods.

Blackhart et al. (2014) surveyed 725 US participants (73.9% females; mean age=22.31 years), using the Online Dating Inventory (Blackhart et al., 2014) and the Big Five Inventory (Gosling et al., 2003) among other validated scales, and found that individuals low in conscientiousness were more likely to be involved in risky sexual behaviours in the context of online dating. Also, in a survey of 657 Dutch participants (51% females; mean age=39.26 years), Peter et al. (2007) found that individuals high in sexual-permissiveness and sensation-seeking search higher for sex dates. This association was also reported in a study of 257 US heterosexual participants (57.86% males; mean age=27.14 years) incorporating the Integrative Model of Behavioural Prediction, which suggests that intent to engage in a behaviour, normative beliefs, and one's self-efficacy are the key components to predict human behaviour (Fishbein, 2000). Findings suggested that those high in sensation-seeking used online dating apps to look for casual partners and romantic dates (Chan, 2017). The authors also found associations between trust towards individuals, sensation-seeking, and higher use of smartphones with increased dating app use, and a direct relationship between smartphone use and dating app use. Arguably, there may be an association between excessive smartphone use and dating app use. Furthermore, Sumter and Vandenberg (2019) collected data from 171 students of the University of Amsterdam and 370 from a research agency (N=541) (60.1% females: mean age=23.71 years) using the Dating App Motivation Scale, based on the Tinder Motivation Scale (Sumter et al., 2017), Dating Anxiety Scale (Peter & Valkenburg, 2007), Brief Sensation Seeking Scale (Hoyle et al., 2002), and Sexual Permissiveness Scale (Peter & Valkenburg, 2007). They reported a positive correlation between sexual permissiveness and dating

apps use for casual sex dates. The authors also found that the odds ratio for likelihood of being an active user increased by 1.25 for those high in sexual permissiveness. This heightened use was related to feelings of excitement of new activities, coined as the “Thrill of Excitement” (Sumter & Valdenbosch, 2019, p. 661). Thrill of excitement works also as a motivation for online dating app use for sensation-seeking individuals.

There appears to be agreement concerning the relationship between some personality traits and the motives for online dating use (Sumter & Vandenbosch, 2019). In a survey of 678 participants (584 undergraduate students and 94 individuals from the general population from online networking websites; 86% aged between 18 to 20 years), Clemens et al. (2015) took personality measures using the Big-Five Scale (Benet-Martínez & John, 1998) and online dating gratifications (i.e., identity, social, companionship, distraction, intercourse, status and relationship) with blended items from three different validated scales: General Internet Use (Charney & Greenberg, 2002), Television Viewing Motives (Rubin, 1981), and Social Networking Scale (Langstedt, 2013). Results provided significant correlations between personality traits and online dating gratifications. For example, neuroticism was significantly related to identity gratification, which means that individuals high in neuroticism pursue the creation of their own identity by being free to choose what to show to others. Openness to experience was found to be associated with being social when using online dating sites. Disagreeable individuals were found to use online dating sites to be social and to search for companion. Conversely, those who scored low in disagreeableness were found to use online dating sites with peer pressure (i.e., status). Furthermore, conscientiousness was correlated with finding a romantic relationship. Also, the authors included sex and sexual orientation in the model in order to relate them to personality traits

and dating gratifications. Significant associations were found between homosexual participants and gratifications of relationship and sex. Sexual gratification and being homosexual was the most prominent correlation. Additionally, homosexuals were found to score higher on neuroticism, together with heterosexual women.

It has already been noted that neurotic individuals aim to form their own identity via online dating sites (Clemens et al., 2015). Forming one's own identity on online sites, in this case online dating websites, can lead to misrepresentation (Hall et al., 2010). In a survey of 5,020 American online daters (74% females; mean age=39.8 years), Hall et al. (2010) found that self-monitoring, defined as the quality of adapting one's presentation in order to obtain a desired outcome (Back & Snyder, 1988), was a predictor of misrepresentation in online dating. In terms of personality traits, the authors reported that participants low in openness to experience were more likely to misrepresent themselves on online dating sites in order to appear more appealing. Neurotic individuals, who have been claimed to pursue control over their online representation, were not found to misrepresent themselves (Hall et al., 2010).

Regarding attachment styles, Chin et al. (2019) surveyed 183 single American participants, 60% of those were male (mean age=29.97 years). A multivariate regression analysis was performed utilizing data from the Attachment Style Questionnaire (Simpson et al., 1992), together with some items covering the use of dating apps. Results showed differences in use depending on the type of attachment and reported those with anxious attachment patterns tended to use online dating more than avoidant types.

The results in this section indicate that there is a relationship between the use of dating apps and personality characteristics, such as low conscientiousness, high sensation-seeking, and sexual-permissiveness. The relationship suggests that individuals high in sensation-seeking and sexual-permissiveness will use dating app services for casual sexual encounters. Further research should study the relationship between sensation-seeking and sexual permissiveness with the use of dating apps. Also, there appears to be an association between neuroticism and higher online dating use. However, only two studies have reported a clear positive correlation (Chin et al., 2019; Hance et al., 2018). Regarding the limitations of the studies, all of them were cross-sectional, therefore no causality or directionality of the findings can be inferred. In terms of samples, there are some limitations regarding generalizability considering that many of the studies used convenience and/or non-randomized samples.

2.3.3 *Negative correlates*

This section reviews risks in relation to the use of online dating. A total of ten studies were identified. There were six qualitative studies (Best & Delmege, 2012; Couch et al., 2012; Couch & Liamputtong, 2007; Erjavec & Fišer, 2016; Heino et al., 2010; Vandeweerd et al., 2016) and one study which contained two studies, one qualitative and one quantitative (Sánchez et al., 2015). Three of the studies were purely quantitative (Coleman, & Campbell, 2013; Choi & Fong, 2018; Solis & Wong, 2019) Additionally, two studies utilized female-only samples (Cali et al., 2013; Vandeweerd et al., 2016).

According to the studies found in relation to perceived risks, there appears to be agreement on the existence of potential dangers of online dating. Vandeweerd et al. (2016) in an interview-based

study with 45 women aged 50 years and older (mean age=57.3 years) found that there was acknowledgement of risks, such as pervasive lying, attempted financial exploitation, and unwanted electronic sexual aggression (Vandeweerd et al., 2016). Moreover, Solis and Wong (2019) in their study in mainland China with 433 users of dating apps (mean age=30 years; 57.5% males) reported five categories of perceived risks: lies and deception, sexual risk, dangerous individuals, self-exposure, and harassment (Solis & Wong, 2019). There were some shared perceived risk categories identified by these two studies: lying, finding individuals with ulterior motives, and aggression. In another study, with a female-only sample from a Midwestern University in the US (mean age=24.36 years), Cali et al. (2013) carried out a vignette study comparing two different dating scenarios (i.e., online vs. offline). Participants were randomly assigned to one of the two conditions and were given a description. Following this, they were asked to complete the Dating Self-Protection Against Rape Scale (Moore & Waterman, 1999) and some items on internet usage. After analysis, results showed a difference between the two groups. Online dating scenario participants placed more importance on self-protective behaviours, and those who had never used online dating before scored the highest in self-protective behaviours. Here, it appears that time spent using online dating mitigates the perceptions of risks which could lead to the underestimation of potential dangers. Further research needs to verify this hypothesis.

Choi et al. (2018) studied a sample of 666 students from four different universities in Hong Kong (mean age=20.03 years) and collected data on the use of dating apps and experience of sexual abuse with the subscale of the revised Conflict Tactics Scale (Straus et al., 1996). The data showed that users of dating apps were more likely to have been sexually abused than non-users in the past year. The use of online dating apps was also associated with lifetime sexual abuse, especially

among sexual minorities (i.e., bisexual/homosexual males). These data need to be interpreted cautiously because the data did not discern whether the abuser was met online or offline. Further studies should discriminate whether or not the abuser was met via dating apps.

Among adolescent populations, Sanchez et al. (2015) carried out two studies. The first study was qualitative, with focus groups including 16 participants (eight males) with ages ranging from 14 to 17 years. The focus group data analysis resulted in identifying several factors which were later included in the scale (second study). The scale, namely the Cyberdating Q_A assesses the quality of online dating among adolescents over six dimensions (online intimacy, emotional communication strategies, cyber-dating practices, online control, online jealousy, and online intrusive behaviour).

Couch and Liamputtong (2007) interviewed 15 participants from Melbourne (Australia) via online chat, with eleven males aged between 24 to 44 years. After carrying out thematic analysis of the transcripts, the main findings reported that participants' management of risks was dependent upon the control they had over their own personal information on the online dating site (e.g., whether they can change their name, not showing telephone number and/or address). In a later study, Couch et al. (2012) carried out a qualitative study with 29 participants from Australia, 12 females, aged between 18 to 70 years (mean age=32.83). After conducting the interviews via an online chat platform, they found that participants identified risks such as deceit, sexual risks, emotional and physical risks, and risks of encountering dangerous and untrustworthy individuals.

Additionally, one of the key features of online dating (i.e., the screening of multiple profiles in order to select potential partners to establish an interaction which could later lead to an offline

date) appears to have counterproductive effects on the users, such as partners' objectification and reduced energies for dating. Heino et al. (2010) reported objectification of the potential dates in a study with 34 American online daters (50% females, mean age=42) from a large dating site, all of them living in Los Angeles. Participants used many marketplace metaphors when referring to screening profiles, which were themed into five categories, (i) other market's worth, (ii) own market's worth, (iii) shopping for perfect parts, (iv) maximizing inventory, and (v) calibrating selectivity (Heino et al., 2010). Another study carried out with 38 older Slovenian adults between 63 to 77 years of age (18 females) found that participants used economic metaphors (e.g., the best of what the market offers, to be back in the market) when speaking about their experience of online dating (Erjavec & Fišer, 2016). Similar to these findings, Best and Delmege (2012) in a small-scale study with 15 respondents (66% females aged 18 to 62) from Western Australia found that the use of marketplace metaphors or "*shopping culture of dating*" (Best & Delmege, 2012, p. 237) affects the online daters by decreasing their willingness to date. Based on these findings, further research could study the relationship between objectification of others and self in online dating use and mental health problems.

Overall, the studies covered in this section demonstrate that online dating is perceived as more dangerous than traditional offline dating. The perceived risks appear to coincide across studies, mainly involving deception, sexual harassment, and finding untrustworthy individuals. However, only one study (Choi et al., 2018) identified the risks of being abused in relation to dating apps use, although the findings in this study may be somewhat unspecific because it was not assessed whether the experienced abuse resulted from online or offline sources of aggression. There is agreement on the general perception of risks and the objectification effect by filtering through

multiple profiles. Findings come mainly from qualitative studies. Therefore, they are informative, but further analysis on more representative populations using quantitative approaches are needed to support these results.

2.3.4 Sexual and impulsive behaviour

There is an important body of research studying impulsive behaviours mainly in the form of risky sexual choices in the context of online dating. Consequently, a total of ten studies in relation to online dating were identified examining risky sexual behaviours (Choi et al., 2016a, 2016b; Chow et al., 2018; Goedel & Duncan, 2016; Heijman et al., 2016; Hospers et al., 2005; Kok et al., 2007; Whitfield et al., 2017), antisocial behaviour (March et al., 2017), and behavioural changes based on site-to-apps shift (Jung et al., 2019). All the studies were quantitative and cross-sectional (Choi et al., 2016a, 2016b; Chow et al., 2018; Goedel & Duncan, 2016; Heijman et al., 2016; Hospers et al., 2005; Kok et al., 2007; March et al., 2017; Whitfield et al., 2017) with the exception of one longitudinal study (Jung et al., 2019). In terms of samples, six of the studies focused exclusively on men who have sex with men (MSM) (Chow et al., 2018; Goedel & Duncan, 2016; Heijman et al., 2016; Hospers et al., 2005; Kok et al., 2007; Whitfield et al., 2017).

Choi et al. (2016a; 2016b) collected data using questionnaires covering the use of dating apps and sexual history, together with some demographic variables. These data were collected in four universities in Hong Kong, which formed a convenience sample of 666 students (mean age=20.03 years). Of those, at least 296 were male participants (ten did not answer the gender question). The aim was to find the relationship between smartphone dating apps and risky sexual behaviours (i.e., condomless sex). In the first study (Choi et al., 2016a), results showed a robust positive correlation

between dating app use and condomless sex. Additionally, the use of dating apps for a longer period of 12 months was associated with having casual condomless sex in the most recent sexual interaction. In the second study (Choi et al., 2016b), similar results with further associations were found in addition to the previous findings. For example, dating app users and alcohol drinkers were less likely to use a condom during sex (alcohol consumption was categorized as current drinker or non-drinker). Being bisexual, homosexual, or female was significantly correlated with being less likely to have used a condom during the most recent sexual interaction.

Regarding homosexual populations, Chow et al. (2018) studied a large sample of 1,672 Australian men who have sex with men (MSM) from the Melbourne Sexual Health Centre (ages between 17 to 78 years; median age=29 years) in relation to dating apps and use of saliva in sex as a form of lubricant, which has been shown to pose a higher risk of being infected by gonorrhoea (Chow et al., 2016). Findings reported that MSM who used dating apps were 1.78 times more likely to perform rimming (oro-anal sex), and 1.63 times more likely to use saliva as lubricant during anal sex (Chow et al., 2018). In line with these findings, Goedel and Duncan (2016) found a positive correlation between condomless sex and use of several dating apps in a sample of 174 New York City male users (age range 19 to 58; mean age=30.8) of an all-male dating app. Additionally, a significant relationship between alcohol and drug use and condomless sex was found (drugs and alcohol consumption data were collected via an item based on a retrospective account of the last three months in conjunction with dating app use).

In contrast to these findings, Heijman et al. (2016) studied a sample of 3,050 MSM Amsterdam participants (mostly Dutch [73.8%] with a median age of 37 years). The results found no significant association with dating app use and condomless sex among HIV-negative users,

conversely HIV-positive users were found to be more likely to perform anal sex without condom, indicating that there are differences in risky sexual choices by MSM in the context of online dating. However, this association was not significant after inclusion of partnership characteristics in the multivariate model (e.g., HIV status, ethnic origin, and age). The authors suggested that knowing more information about partners (i.e., HIV status, lifestyle concordance, and ethnic origin) works as a mediating effect for condomless sex in the context of online dating.

In a previous study with MSM in the Netherlands, Hospers et al. (2005) reported a higher percentage (39%) of condomless anal sex especially in HIV-positive online daters in comparison to HIV-negative, but no differences were found between offline and online samples. Even though the sample comprised 4,984 users (mean age=33.2) of an online dating platform, the results may be interpreted with caution because smartphone dating apps were non-existent at the time the study was published. Nonetheless, a more recent study found no correlation between the use of dating apps and condomless sex among a homosexual sample of 545 men (mean age=36.81 years) (Whitfield et al., 2017). Nonetheless, Whitfield et al. (2017) found ethnic group differences in terms of condom use in online daters, and the results of their research show that individuals with Latino/Hispanic origin are found to be 0.46 times more likely to have unprotected anal sex than Whites; other ethnic origins such as American Indian, Alaskan, Asian, and Hawaiian were categorized as “other” (Whitfield et al., 2017, p. 780) which increased the chances of condomless anal sex by 0.35 in comparison to their White counterparts in individuals who use online dating.

In order to explain the factors involved in the decision-making of sexual risky behaviours among MSM who actively use online dating platforms, Kok et al. (2007) used the Theory of Planned Behaviour (Ajzen, 1991) and found that attitude (e.g., behavioural beliefs about the use of

condoms), subjective norms (i.e., normative beliefs), and perceived control (i.e., self-efficacy) explained 55% of the variance in intention of using protection during anal sex. Fantasizing about condomless sex was found to have a direct effect on intention to carry out condomless sex (intention is considered by the Theory of Planned behaviour to be the most reliable predictor of behaviour) (Ajzen, 1991; Kok et al., 2007). In relation to online dating apps, it could be argued that certain structural characteristics (e.g., chat, sharing pictures) may increase fantasizing about condomless sex, however further research is needed to relate the aforementioned structural characteristics of dating apps and sexual behaviour.

Regarding behavioural changes among computer online dating and smartphone dating apps, Jung et al. (2019), in a study that accessed data from 100,000 users (geographical location is not specified) of an online dating site (female mean age=36.10 years; male mean age=33.22 years), reported that the shift from computer-only access (i.e., online dating site) to smartphone access (i.e., dating app) produced a behavioural change in the users, such as increasing the number of visits to others' profiles, sending more messages, and achieving more matches (Jung et al., 2019). As a consequence of computer-to-smartphone shift, the authors noted that men had increased impulsivity (i.e., they became even less deliberate in terms of quantity of messages sent and their targets). Regarding disinhibition, both men and women lowered their partners' preference standards. For example, viewing profiles of individuals from a different ethnic background increased by 85.3% per week for females, and 127% for males (Jung et al., 2019). Therefore, according to these results, there appears to be an effect on the ubiquity factor to becoming more engaged and presumably increasing the chances of developing a misuse pattern of online dating services when using smartphone dating apps rather than computer-based online sites.

According to March et al. (2017), there is a relationship between dysfunctional impulsivity and antisocial behaviours, such as trolling (i.e., the act of being provocative, offensive, or threatening [Bishop, 2014]) on the Tinder app. In their study with 357 participants from Australia (mean age=22.50 years), findings suggested that traits of psychopathy, sadism, and impulsivity were positively related to acts of trolling. Taking these two studies together (Jung et al., 2019; March et al., 2017), it appears that impulsivity plays a role in increasing users' behavioural repertoire in the context of online dating and also opens the possibility to non-adjusted behaviours.

Overall, the results presented in this section suggest that online daters have higher chances of behaving impulsively in comparison to non-users in terms of risky sexual choices. The behaviours covered were mostly of sexual nature and focused mainly on homosexual men populations (MSM). Probably this biased focus is due to the fact that homosexual men's sexual practices pose a higher risk of HIV infection. Nonetheless, it could be beneficial for the sake of generalizability to know if these results can be replicated to other sexual orientations (i.e., heterosexual, bisexual, homosexual women). Apart from sexually risky behaviours, it has been reported how the ubiquity factor of dating apps facilitates users' engagement (Jung et al., 2019) potentially leading to an addictive pattern of use, but there is a need for further research to support this hypothesis.

2.3.5 Substance use and behavioural addictions

In the final selection of studies, there are only two studies that have examined the relationship between online dating and substance use addiction (Boonchutima & Kongchan, 2017; Choi et al., 2017) and one dedicated to a behavioural addiction (i.e., sex addiction and online dating) (Zlot et al., 2018).

Boonchutima et al. (2017) surveyed a sample of 350 MSM from Thailand (three of four respondents aged 18 to 35 years) and asked about their online dating app use, sexual history, drug use history, and intention of using drugs. Regression analysis reported that over 73% of the participants were using dating apps to find partners and to invite others to use illicit drugs with a 77% invitation success rate. Furthermore, one in three substance users (34.3%) engaged in condomless sex. Therefore, according to the findings there may be an association between illegal drug use and condomless sex. Nevertheless, it should be noted there is no mention regarding what type of illicit drugs were used.

Regarding alcohol consumption and online dating, Choi et al. (2016b) recruited a convenience sample of 666 students from Hong Kong, correlational analysis found that being an online dater was associated with inconsistent use of condoms during sexual interactions (use of condoms was categorized as consistent if condoms were always used, or non-consistent if condoms were not used every time), and being a current drinker (categories were non-drinker or current drinker, no specific description of those categories are provided), concluding that “dating apps tend to skew their users toward risky sexual encounters” (Choi et al., 2016b, p. 8). In a later study, Choi et al. (2017), with a convenience sample of 666 students (mean age=20 years) from Hong Kong, reported a relationship between longer use of online dating (i.e., more than a year) and recreational substance use in conjunction with sex. Again, the specific substances were not mentioned and were coined as recreational drugs (alcohol was independent of the recreational drugs category). It would be useful for further research to specify the respective substances as the scope of illicit or recreational drugs can be extensive. According to these studies, the co-occurrence of substance use with risky sexual behaviour in the context of online dating was indicated. Nonetheless, caution

needs to be used with regards to this assumption because the assessed samples were skewed towards MSM, therefore generalizing the results to the general population is not possible.

In relation to behavioural addictions in the context of online dating, Zlot et al. (2018) studied a sample of 279 participants from Israel comprising 128 males (mean age=25 years). In order to collect data, participants answered a series of validated psychometric instruments that were integrated in an online questionnaire. Measures included the Liebowitz Social Anxiety Scale (Liebowitz, 1987), the Sensation Seeking Scale (Zuckerman et al., 1964), and the Sexual Addiction Screening Test (Carnes, 1991). Following the analysis, associations were found between users of dating apps and higher scores on sexual addiction measures in comparison to non-app users, as well as a positive correlation between social anxiety and the use of smartphone dating. Again, the relationship between anxiety-tendency factors and the use of online dating was supported as was previously mentioned in the preceding sections.

The scarcity of literature limits the conclusions. However, the findings can be considered as a guide for future study examining substance use and other types of behavioural addictions with online dating. There appears to be a relationship between substance use among partners who have met via online dating, at least in MSM who use dating apps. In relation to substance use and online dating among heterosexual populations, data come from only one study that reported no direct relationship (Choi et al., 2017). However, limitations in both studies include the use of general terms such as illicit/recreational drugs which necessitates further specification and replication. In terms of behavioural addiction, only sex addiction has been studied and it was found to be related to dating app use (Zlot et al., 2018).

2.3.6 Problematic use of online dating

To date, only two studies have exclusively focused on problematic online dating. Both studies were quantitative and developed validated psychometric scales (Orosz et al., 2016; Orosz et al., 2018). One of the studies used a mixed-methods approach (Orosz et al., 2018). The two studies solely focused on one specific dating app (i.e., *Tinder*). In the first study, Orosz et al. (2016) developed a psychometric instrument to assess the problematic use of *Tinder* (Problematic *Tinder* Use Scale, PTUS). This self-report measure is based on the components model of addiction (Griffiths, 2005), which comprises six characteristics of addiction: salience, mood modification, tolerance, withdrawal, conflict, and relapse. In order to validate the PTUS, a sample of 430 Hungarian *Tinder* users (243 females; mean age=22.53 years) was selected, and the six-item unidimensional structure showed good reliability and factor structure. In the second study, Orosz et al. (2018) carried out three different studies. First, with a sample of 414 Hungarian respondents (246 females; mean age=22.71 years), the TUMS (*Tinder* Use Motivations Scale) was developed, resulting in the identification of four main motivations of *Tinder* use arising from a 16-item first-order factor structure (i.e., sex, love, self-esteem enhancement, and boredom). In the second study, with a convenience sample of 346 participants (165 females; mean age=22.02), measures were taken from the newly developed TUMS, together with the PTUS, and the Hungarian Big Five Inventory (John & Srivastava, 1999). The results were weak in relation to personality factors and the four main motivations for *Tinder* use. However, self-esteem enhancement was related to *Tinder* use. In the third study, 298 participants (177 females; mean age=25.09) were assessed with the TUMS, PTUS, and the Hungarian 10-item Rosenberg Self-Esteem Scale (RSES) (Randal et al., 2015; Urbán et al., 2014), and the Hungarian version of the Basic Psychological Need Satisfaction

and Need Frustration Scale (BPNSFS) (Chen et al., 2015; Tóth-Király et al., 2018). The results showed that relatedness frustration (i.e., needs not met by affection and care from relevant others) predicted the motivation of self-esteem enhancement which was found to be one of the motivations associated with problematic use of *Tinder*, together with the sex motive.

Overall, the studies presented in this section are not sufficient in terms of quantity to consider online dating addiction as an entity. However, the studies are of general interest to researchers considering the widespread use of dating apps and provide insight in relation to factors such as self-esteem and sex-searching that may be related to the development of problematic patterns of use. Even though there is a scarcity of literature examining problematic use of online dating, there is some research that appears to support the findings presented in this section. Further study is needed to consider the relevant factors that have been suggested as predictors of problematic use, self-esteem, and sex-searching motives, with a cross-cultural approach in order to inform of possible cultural differences in relation to problematic use. Also, other dating apps could be subject of study to find if there are any differences in terms of motives that could lead to problematic use.

2.4 Discussion

The present chapter reviewed the literature concerning the use of online dating focusing on online dating (computer-based and smartphone apps) problematic use, characteristics of users (e.g., personality correlates, users' motivations,), and consequences of use (e.g., risks associated to the use of online dating, impulsivity, use of drugs in conjunction to online dating). Due to the lack of previous literature on problematic use of online dating, sociodemographic and psychological characteristics (e.g., gender, age, and personality) are informative with regards to which specific

individual characteristics relate to greater use of online dating. Even though longer-time use cannot be considered as problematic or addictive *per se*, it could be a reference point for future research in the field.

In terms of use, two of the reviewed studies pointed out that between 29% and 43% of their samples had used online dating services. However, these studies were published in 2007 and 2008, and in one decade the usage of online dating platforms (including dating sites and dating apps) has been extended reaching up to 8,000 different dating sites in the world, representing a business worth almost US\$2 billion per year (Matthews, 2018a). The growth in this service may be due to different reasons, and as with other forms of internet use (e.g., social media use, online gaming, online shopping, etc.), much of this use may have nothing to do with addictive patterns, but with passing time and being a pleasurable activity.

Nevertheless, online dating developers have acknowledged that design is made to engage the user and increase monetization of the business (Jung et al., 2014). Even though the design of dating apps has not been studied in the field of addiction, previous literature examining SNS use suggests that user interaction such as scrolling, tapping, and typing are related to smartphone addiction (Noë et al., 2019). Considering that dating apps have similar user interaction design (i.e., typing, scrolling/swiping, and liking), comparable associations with addictive patterns of use may exist. Further research is needed to confirm such a speculation.

In terms of personality correlates, reviewed studies pointed out that sociability, anxious attachment style, social anxiety, lower conscientiousness, higher sensation-seeking, and sexual permissiveness were associated with higher use of online dating (sexual permissiveness and lower

conscientiousness have also been related to sex-searching in the context of online dating) (Blackhart et al., 2014; Chin et al., 2019; Kim et al., 2009; Peter & Valkenburg, 2007; Zlot et al., 2018). Likewise, SNS research has suggested that higher extraversion, social anxiety, loneliness, and lower self-efficacy are related to Facebook addiction (Atroszko et al., 2018), higher extraversion and neuroticism to SNS (Wang et al., 2015), and higher sensation-seeking to smartphone addiction (Wang et al., 2018). Neurotic correlates (i.e., social anxiety, neuroticism, and anxious attachment style) of SNS and online dating research have been found, with these characteristics having been associated with higher use, operationalizing the definition of neuroticism as being highly anxious, depressed, and low in self-esteem (Eysenck, 1965), it could be argued that some of the motives of use claimed for these individuals could work as a form of avoidance or escapism from distress (e.g., distraction), leading to a negative reinforcement of the behaviour (i.e., online dating) that could heighten the chances of developing any kind of misuse or excessive usage pattern. Furthermore, the relationship between anxiety traits and neuroticism has been upheld by a great body of research in behavioural addictions (Andreassen et al., 2013; Atroszko et al., 2015; Balta et al., 2018; Kuss et al., 2013, 2014). Therefore, considering this association, it is recommended that future research should study this relationship with the problematic use of online dating.

To date, only one study has related self-esteem enhancement to problematic use of Tinder (Orosz et al., 2018). Considering that anxious attachment, and generally anxiety-tendency correlates (i.e., neuroticism) are associated with lower measures of self-esteem (Lee & Hankin, 2009), it could be argued that anxious users find online dating a form of validation, which can serve as positive social reinforcement that can increase the chances of continuing the use of online dating for longer

periods of time and potentially developing addictive-like patterns of use (e.g., craving for the use/validation, salience of use, and mood modification).

Another form of problematic use of dating apps, more specifically Tinder, is sex-search use (Orosz et al., 2018). As previously discussed, sex-search use of online dating has been related to higher measures of sex-permissiveness, sensation-seeking, and lower conscientiousness. Furthermore, sex addiction was related to greater use of online dating sites (Zlot et al., 2018). Being a homosexual man has also been related to sex-search motives (Clemens et al., 2015), which may explain the bias towards homosexual men samples examining risky sexual behaviours in the context of online dating.

The reviewed studies supported an association between dating app use and condomless sex in comparison to non-dating app users, even though there are some studies that did not find this association (Heijman et al., 2016; Hospers et al., 2005; Whitfield et al., 2017). Nonetheless, homosexual men may be at higher risk of problematic use of online dating due to the prominent sex-search motive for online dating. Finding casual sexual partners in online dating services is facilitated by some apps that show how far users are from each other (i.e., geographical distance). This structural characteristic (GPS-based service) may be related to higher impulsive decisions, and problematic use of online dating. Arguably by showing up walking-distance profiles, it is easier to engage in casual dates and this may serve as a self-esteem enhancement mechanism, as previously discussed, which may increase engagement and usage of online dating services. However, further research is needed to support this association and how the different structural mechanisms of the respective dating apps affect measures of wellbeing in users. Drawing upon chatting via online dating sites and apps (one of the structural characteristics of online dating is

the possibility of engaging in online chatting with other users), it may be relevant to consider the act of “sexting” (the act of sending sexual content or explicit nude pictures or videos via text messages) (Gordon-Messer et al., 2013) as a potential factor for increasing sex-motive search. Previous research has associated sexting with risky sexual behaviour (Klettke et al., 2014), consequently, chatting (one structural characteristic of dating apps) may facilitate the appearance of sexting, in turn increasing the chances of risky sexual behaviours. Sexting through dating applications may as well increase the sex-search motive of users (i.e., casual sex dates) which has been found to be a predictor of problematic use of dating apps. Yet, further study is needed to provide evidence in order to relate chatting through dating apps and sexting, and how this may influence the appearance of sexual behaviour (e.g., risky sexual behaviour and/or heightened sex-search motive)

Some of the reviewed studies concerning associated risks converge on the findings that generally online dating users find online dating to have specific risks, including deceit, fear of physical harassment, and financial exploitation. Additionally, there is a body of research that points to the objectifying environment that emerges in online dating (e.g., through using market-like vocabulary, and filtering through numerous profiles). It is of concern that objectification of other users may increase self-objectification (Koval et al., 2019), whose mental health consequences have been noted in previous literature including clinical symptoms of depression and eating disorders (Jones & Griffiths, 2014; Register et al., 2015). Therefore, further research should study the emotional experience of users and consider how longer time of use may influence wellbeing measures and clinical mental health symptoms through self-objectification.

Regarding methodology, some weaknesses limit the strength of the findings in the reviewed studies. First, cross-sectional design prevents from making causality inferences and to know the directionality of the results (e.g., condomless sex leads to using dating apps or using dating apps leads to having condomless sex). Second, some of the measures present limitations which may bias the results (e.g., use of non-validated items, lack of categorization and specificity). Third, some samples limit the external validity of the findings (i.e., convenience samples, and specific-population samples). Therefore, it is recommended for further study to (i) use more diverse samples, (ii) consider methodologies that can establish causality, and (iii) collect data using self-reports together with interviews to increase internal validity. In addition to the latter, it could be useful to collect real-life measures of online dating use which assess the temporal stability of usage and may provide some insightful objective data that self-report measures cannot facilitate, such as using the Experience Sampling Method (ESM), which is defined as a research procedure by which participants respond to a series of questions multiple times a day during a specific period of time (Larson & Csikszentmihalyi, 2014). All of these proposals would help to overcome the present limitations of these studies and provide more robust insights in the field of online dating utilizing the highest standards of empirical research.

This systematic review presents a number of limitations. First, there are some studies that do not specify whether their findings are based on online dating sites, mobile applications, or both; this is necessary in order to differentiate the distinctive phenomena of each service. Second, online dating services include a great variety of apps and sites, therefore englobing all of them under the term online dating services may be reductionist and ignore different processes (i.e., psychological and behavioural) that may arise from their use. Third, due to the paucity in previous research in

the field of online dating, some conclusions are based on a limited number of studies, further study will be needed in order to support current findings and conclusions. Lastly, considering that the field of online dating research is growing overtime, it is likely that studies under the process of submission or publication have been not included in this review.

2.5 Conclusions

Online dating has become an extended service across technological societies. The present review is the first attempt to gather empirical findings regarding the use of online dating services (sites and smartphone applications) and problematic use of online dating. Results of this review indicate that there are personality correlates like sociability, sensation-seeking, sexual permissiveness, anxious attachment, that correlate to greater use of online dating. Self-esteem enhancement and sex-search motive have been related to problematic use of online dating (more specifically of dating app Tinder). Other results indicate that users agree considering online dating more dangerous than offline (i.e., traditional) dating, as well as more objectifying. Additionally, online dating services facilitate casual encounters (i.e., hook-up dates) which represent a public health concern in terms of sexually transmitted infections (STIs) and substance use (alcohol and recreational drugs).

CHAPTER 3

METHODOLOGY

3.1 Introduction

The main aims of this thesis are to (i) assess the unique individual experience of dating app use and problematic use, and how the structural characteristics of dating apps influence development and maintenance of usage behaviour, and (ii) to explore the relationship between dating app use and mental health of active dating app users. It was considered that a mixed methods approach was most suitable to give response to the proposed aims of the thesis. Therefore, the present chapter provides an overview of the research methods that have been used, their epistemological (i.e., philosophical theories of knowledge and how to reach it) and ontological (i.e., philosophical theories on what ‘reality’ is) underpinnings. Also, a rationale of the sequence of empirical studies (i.e., the order followed) will be provided.

3.2 Qualitative vs. quantitative methods

There are two main methodologies in research that derive from different epistemological and ontological stances, namely quantitative and qualitative methods. Quantitative methods are hypothesis testing, meaning that studies need to have quantifiable hypotheses that are numerically proven (or rejected) via statistical/mathematical analysis (Håkansson, 2013). Their ontological stance is realism with the viewpoint that there is an absolute truth, which can be discovered by research based on data and facts (Scotland, 2012). Epistemologically, quantitative methods follow an objectivism standpoint which suggests that the researcher is completely impartial to the objective reality that exists (Crotty, 2020). This is framed within the positivist paradigm, which

was popularized by Comte (1877) when he applied the scientific method to social world phenomena (Cohen et al., 2017). A positivist approach is advantageous in that its results are replicable (i.e., different researchers can test the same hypothesis using the same instruments yielding the same results), objective (i.e., the findings are based on objective measures), and generalizable (i.e., findings can be generalized to the rest of the population if a representative sample was employed) (Scotland, 2012). Nonetheless, a positivist approach lacks in-depth understanding of the relationship between variables as most of its findings are descriptive, being difficult to understand, complex or multifaceted phenomena and/or gain further insight on the research topic (Alharahsheh & Pius, 2020). Also, positivist research is essentially deductive. Therefore, studies normally derive from a theory, and form testable hypothesis that aim to further support the theory or falsify it (Creswell & Clark, 2018). Consequently, the study of new phenomena, or those lacking from a grounded theory, may be difficult from a positivist standpoint and so, methodologies with an inductive approach may be needed in such cases.

On the other hand, qualitative methodologies lay within the interpretivism paradigm which originated as a critique to the positivist stance. Qualitative methodology aims to explore the subjective experience as interpretivists assume that humans create depth in meaning, which is the reason why they cannot be studied as physical phenomena (Alharahsheh & Pius, 2020). The latter notion derives from the ontological standpoint of interpretivism, relativism, which supports that realities are constructed by the individual, meaning that there can be “*as many realities as individuals*” (Scotland, 2012, p.11). Furthermore, interpretivist epistemology is based on subjectivism. Its core idea is that reality cannot be separated from knowledge (Saunders & Lewis, 2019). Therefore, qualitative methods are essentially inductive and exploratory, meaning that

research questions tend to be broad, and theories derive from observations and patterns as opposed to deductive approaches that test to verify and/or falsify existing theories (Håkansson, 2013; Scotland, 2012). As such, qualitative methodologies are key to understand complex phenomena that require depth and richness in their findings, as well as research which aims to generate deeper insight to postulate grounded theories. However, qualitative methodologies have been criticized for not being rigorous and lacking validity and reliability (Rolfe, 2006) due to the researcher input within the process of research (i.e., researcher bias) and the difficulty of generalization of results due to smaller samples (Sarantakos, 2005).

The thesis employed the combination of both methodologies, namely mixed-methods. It was considered that using a combination of qualitative and quantitative methodologies could provide more insightful and stronger findings to counterbalance weaknesses and strengths from qualitative and quantitative approaches (Doyle et al., 2016). However, mixed-methods can present methodological challenges if not consistently designed and executed. In line with this, the following section will provide an introduction to mixed-methods approach, followed by the order of the studies contained in this doctoral thesis, an explanation for each method's choice is also provided.

3.3 Research design: Mixed-methods approach

While some scholars argue that quantitative and qualitative methodologies cannot be combined (Guba, 1987; Smith & Heshusius, 1986), Howe (1988) supports that combining both methodologies is beneficial and epistemologically coherent. As a result, a new school of thought originated – pragmatism. Pragmatism encourages mixing both methodologies to respond to

research questions (Creswell & Clark, 2018). In other words, pragmatist researchers can benefit from methodological flexibility in order to investigate complex and/or dynamic phenomena by employing a mixed-methods approach (Kelly & Cordeiro, 2020). In fact, using mixed-methods in research may lead to stronger conclusions through convergence of findings and confirmation (Cronholm & Hjalmarsson, 2011). Also, in terms of research aiming to answer practical issues and inform theory, Johnson and Onwuegbuzie (2004) support that mixed methods provide more complete knowledge in comparison to relying on only one type of methodology. Therefore, within the thesis, a pragmatic approach was employed and guided the research design by employing a mixed-methods stance.

According to Tashakkori et al. (2020), mixed methods can be implemented consecutively or sequentially. In the latter case, the procedure follows an order in which findings from one study (either quantitative or qualitative) pave the way to the following one (Cronholm & Hjalmarsson, 2011). For example, a research project may explore in-depth data to generate insights in one topic to then validate/confirm those findings via quantitative means, which is the sequence adopted in this research thesis. Conversely, an alternative sequence would employ quantitative methodology first to then explore in more detail the findings using a qualitative stance. However, for the purpose of the thesis, it was considered that starting with an inductive approach would allow the researcher to generate insight and a deeper understanding of the topic which would then be followed by testing hypothesis that arose from the initial exploration.

Therefore, in the thesis, the first half of the thesis (Chapters 4 and 5), a subjective stance was adopted in order to gain further insight and in-depth knowledge regarding the use of dating applications and their structural characteristics (i.e., dating app features). To do this, an

ethnographic study was carried out (Chapter 4) to explore and critically assess the different structural characteristics that are ingrained within dating app design and how these can influence users' behaviour in terms of development and maintenance of usage behaviour, and other behaviours that may be potentially induced by structural characteristics of dating app. Following, semi-structured interviews were carried out (Chapter 5) with active dating app users to gain in-depth understanding of their unique experience and further explore the findings from Chapter 4. For the analysis of the interviews, interpretative phenomenological analysis (IPA) was employed as IPA was considered most suitable for the aims of the study. For instance, IPA takes an idiographic approach, therefore focusing on the unique individual experience before merging results from the study sample. Moreover, IPA embraces the role of the researcher by making sense of the participant meaning (i.e., double hermeneutics), therefore the researcher is to carefully assess the transcripts to go beyond the surface level and convey deeper meanings.

In the second half of the thesis (Chapters 6 and 7), an objective approach was adopted and hypotheses from the previous chapters and past research were postulated and tested via statistical analysis. In Chapter 6, a path analysis tested the relationships between mental health correlates and online dating use intensity. Path analysis was chosen over other regression techniques due to the possibility of assessing direct and indirect relationships of the variables, the resulting graphical depiction wherein the relationships of the study variables are visually presented, and the possibility of providing how much of the dependent variable variance is explained by the model (Menard, 2012). Additionally, Chapter 6 employed a cross-cultural sample comprising of participants from three countries (i.e., UK, Poland, and Indonesia), which allowed making cross-cultural comparisons of the study's variables. Finally, in Chapter 7, an ecological momentary assessment

was carried out via a smartphone-based application (i.e., *DiaryMood*) that tested the relationships between users' wellbeing and objective measures of use. For this study, multilevel modelling (MLM) was used, which is considered the preferred method of analysis for EMA data due to its flexibility to estimate within- and between-participants variance and allowing exploration of models that may assume equal (i.e., fixed) or unequal (i.e., random) distributions of the variables across levels (Kleiman, 2017; Schwartz & Stone, 1998).

All empirical chapters provide their results and findings, as well as a discussion of those. Additionally, all findings and results are integrated in the general discussion wherein a more detailed and comprehensive discussion aims to present the convergences and divergences of the results. For comprehension, a structural flowchart of the sequence of the studies is presented in Figure 3.1.

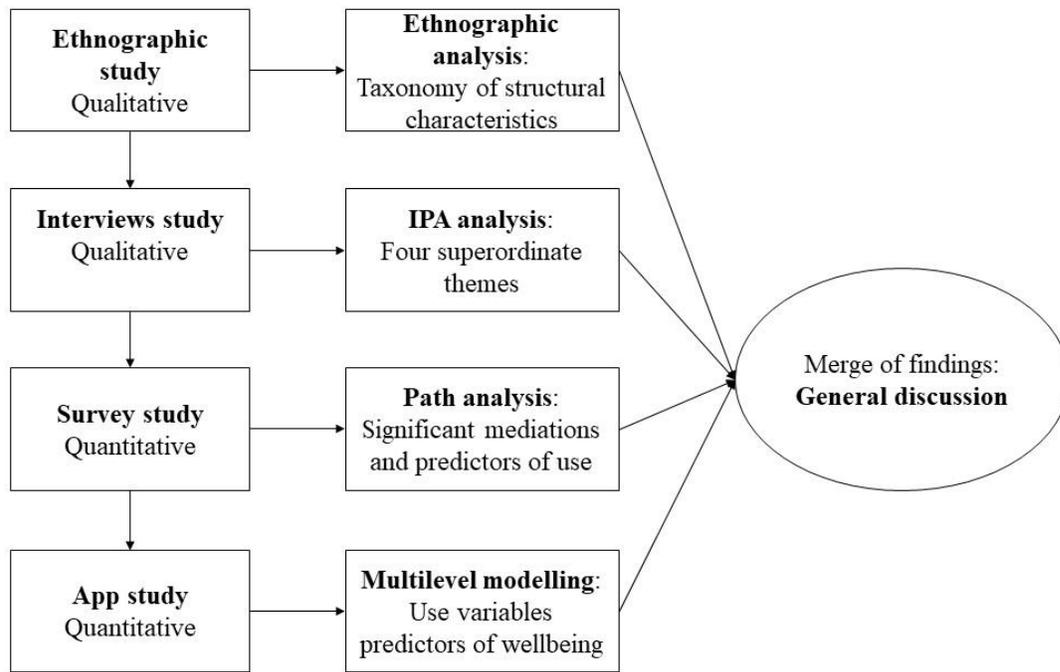


Figure 3.1. Mixed-methods sequence

CHAPTER 4

Structural characteristics in online dating apps: The development of a new taxonomy

Dating applications are becoming the new normal of dating. However, little is known regarding their design (i.e., structural characteristics) and how they work from a psychological perspective. Therefore, a review of the structural characteristics of nine dating applications (*Tinder, Grindr, Bumble, Happn, Hinge, Plenty of Fish, OKCupid, Match.com, and Coffee Meets Bagel*) was carried out through an ethnographic approach. A resulting taxonomy of structural characteristics ($N=49$) includes four main categories: (i) profile formation, (ii) communication medium, (iii) behaviour modification, and (iv) habit creation. Each structural characteristic is described and assessed, providing discussion of the implications regarding users' behaviour. The findings of the present study contribute to (i) understanding the relationship between machine-design and users' behaviour, (ii) educating online daters to prevent problematic use, and (iii) assisting online dating application developers to have a better insight into SCs and user well-being.

4.1 Introduction

Online dating is a growing business. In terms of industry revenue, the online dating industry made a profit of almost \$2 billion by 2019 and it is expected to grow up to \$2.5 billion by 2024 (Statista, 2020). In terms of prevalence, statistics show that one in three adults from the US have used online dating at least once in their lives, and it is estimated that one in two lesbian, gay, and bisexual (LGB) adults have used online dating at least once (Aderson et al., 2020). Furthermore, the mass media make frequent references to online dating. For example, there are references to dating applications in various *Netflix* series, such as *Valeria* (Benítez & López-Castaño, 2020) and *Elite*

(Montero et al., 2018-2020), and online dating is frequently discussed in online newspapers (Methab, 2020), online magazines (Andrews, 2020), by influencers (i.e., users of social media who have a higher-than-average number of followers) (Toureille, 2020), and on social media sites. Consequently, stigma associated with online dating has decreased and its use is notably more normalized (i.e., socially accepted) potentially due to the transition from computer-based online dating sites to smartphone applications (Ranzini & Lutz, 2017). This spread and normalized usage may increase the frequency of use which can potentially lead to habitual use (Oulasvirta et al., 2012).

Previous research has shown that specific psychological factors such as self-esteem and individuals' motivation to use dating apps to search for sexual encounters are related to problematic use of the popular smartphone dating app *Tinder* (Orosz et al., 2018). Furthermore, some studies have related personality correlates such as rejection-sensitivity (Hance et al., 2018), sensation-seeking, and sexual permissiveness (Peter & Valkenburg, 2007) to higher use of online dating. Some other studies have reported significant associations between the use of *Grindr* (i.e., an all-male dating application) with risky sexual behaviours (Corriero & Tong, 2016; Goedel et al., 2016). Nevertheless, the focus has been on how online daters make use of dating apps, relating psychological and behavioural factors to the use of online dating. However, there is scarce literature on how different structural characteristics (i.e., features that are deliberately designed and incorporated into products) of dating applications can influence different behaviours (i.e., psycho-structural interactions) and/or lead to any form of habitual use.

Structural characteristics (SCs) are features that promote initiation of use, reinforce behaviour, and are designed to satisfy users' needs which may facilitate excessive use (Griffiths et al., 2006). This

definition was first utilized in the field of gambling where previous research on structural characteristics and its influence on behaviour indicated that structural characteristics play a key role in the development and maintenance of gambling behaviour (Griffiths, 1999). For instance, even in situations of financial loss in gambling, Parke and Griffiths (2007) stated that structural characteristics can create rewarding psychological experiences. Furthermore, previous research on the SCs within videogames suggested that high-event frequency games (i.e., games that require continuous playing behaviour to get rewards) can elicit feelings of escapism, immersion and dissociation (King et al., 2010). Further research within the gaming field suggested that some features operate in a variable reinforcement schedule which makes behaviour more repetitive and less sensitive to extinction (Griffiths & Nuyens, 2017). Similarly, within online dating apps, the act of swiping right/left appears to operate utilizing the same variable reinforcement schedule (i.e., matches occur in a variable fashion as long as the user keep swiping). Additionally, Griffiths (2018) identified a list of ‘hooks’ that social media operators utilize that, in combination with psychological factors, can potentially lead to habitual use. One of the ‘hooks’ is *social affirmation and validation*, which refers to the validation users receive when someone presses the ‘like’ button on social media sites (with the ‘like’ button being an example of a structural characteristic). Likewise, the mechanism of ‘liking’ is also present in some dating applications. Nevertheless, as with gambling, gaming, and social networking sites, where SCs have been shown to influence the way users interact with the medium, some of them facilitating problematic use, in the field of online dating, more specifically dating applications, there is lack of theoretical and empirical studies that assess the relationship between structural characteristics and psychological factors that may lead to habitual use.

A systematic review on online dating that examined the scientific literature concerning online dating and associated psychological factors (e.g., personality, risk factors, and problematic use) was carried out in Chapter 2. In this review, it was noted that most of the research had focused on applications such as *Tinder* and *Grindr*. It was also noted that there was a lack of research addressing similarities and differences across a wider sample of dating applications, which is required to enhance the generalizability of the findings and may guide future research to assess the psychosocial impact of dating applications' usage.

Therefore, considering the increasing relevance of dating applications in the present dating landscape and the absence of empirical studies examining the structural characteristics of dating applications in relation to problematic use and dating app user behaviour, the present study fills these gaps by assessing, through an ethnographic approach, (i) the structural characteristics involved of the dating applications from the moment the user downloads it until they interact with other users, (ii) the differences and similarities across a set of popular dating applications, (iii) how structural characteristics might contribute to the creation of habit, and (iv) how structural characteristics might influence users' behaviours.

4.2 Methods

In order to compile a list of the most used dating apps in the UK, a *Google* search was undertaken in which the following phrases were used to carry out the search: (i) "the most used dating apps in the UK", and (ii) "the most popular dating apps in the UK". Both searches yielded similar sites comprising online magazines, online newspapers, and vlogs. The search resulted in ten selected apps which were chosen by means of *saturation*, i.e., when one of the apps appeared at least twice

in two different media sources, it was considered a potential app to study; and by *diversity of the target population* (i.e., apps that considered all sexual orientations). Consequently, the ten apps chosen to study comprised *Tinder, Grindr, Bumble, Happn, Hinge, Plenty of Fish, OKCupid, Match.com, Coffee Meets Bagel or CFM, and The League*). Once the list of ten apps was finalized, each of the dating apps was downloaded and installed on a smartphone. During the examination period, one of the apps (*The League*) was excluded due the inability to access it at the time of the study (i.e., the app puts new users on a waiting list that lasted longer than the period of study). For a two-week period, the remaining nine apps (see Table 4.1) were examined utilizing their free version, in order to have an objective reference point to closely examine the different structural characteristics (SCs) for each of the apps. For analytical purposes, the following questions were investigated:

- What is the registration process for signing up for the app?
- How do users design their own profile on the app?
- How do users get in touch with other users on the app?
- What type of material (e.g., pictures, videos, and music) can users share with other users on the app?
- What specific SCs are unique to each app?
- What types of notifications are there in each app?
- What are the SCs that encourage usage of each app?

4.3 Results

A total of 49 structural characteristics were identified. Due to the diversity of SCs within dating apps, four main taxonomical categories were created, namely (i) profile formation, (ii) communication medium, (iii) behaviour modification, and (iv) habit creation. *Profile formation* refers to all the SCs concerning the setting up of a user profile. This category was further divided into three different subcategories (i.e., app-based, user-based, and combination-based) according to the level of freedom that users have to alter them to suit their needs. *Communication medium* refers to SCs that are concerned with communication between users (e.g., chat services). *Behaviour modification* refers to SCs that are concerned with guiding users' dating behaviour by means of how users match with each other (i.e., match-making), the kinds of data displayed that may encourage users to chat/match (e.g., interaction booster), features that are depicted as dating facilitators and serve as marketing features (i.e., hooks), and features that are unique to some of the applications (i.e., exclusive design features). *Habit creation* refers to SCs that aim to keep users connected and habitually using the dating apps (e.g., pop-up notifications) by *activity notifications* and *application-automated notifications*. Each of these four categories are presented and further described in each subsection below. Every SC that was identified during the investigation of the nine dating apps (see Table 4.1) are also described in its corresponding subsection. Some preliminary discussion is included in each of the subsections.

Table 4.1. Basic information concerning the dating apps examined ($n=9$)

	<i>Tinder</i>	<i>Grindr</i>	<i>Bumble</i>	<i>Happn</i>	<i>Hinge</i>	<i>Plenty of fish</i>	<i>OKCupid</i>	<i>Match.com</i>	<i>Coffee meets bagel</i>
Launch year	2012	2009	2014	2014	2012	2003	2004	1995	2012
App and/ or website based	App only	App only	App only	App only	App only	Both	Both	Both	App only

Sexual orientation target	All	Gay men	All	All	All	All	All	All	All	All
Number of users (in millions)	57 ¹	27 ²	50 ³	50 ⁴	N/A	150 ⁵	50+ ⁶	21.5 ⁷	7 ⁸	
Number of downloads in Apple Play Store (in millions)	100+	10+	10+	50+	1+	50+	10+	1+	1+	1+

4.3.1 Profile formation structural characteristics

To use dating apps, and similar to any other form of online dating (e.g., computer-based dating), users are required to create a profile which is used to present the individual to other users. Therefore, profile formation features refer to those SCs that are designed for users to create a personal profile. A total of nine SCs were identified. Due to the variability of the dating apps market, these SCs differ across apps, and some differ considerably (e.g., algorithm-based vs. non-algorithm apps). However, in general terms, profiles contain picture(s) and a brief personal description – although some profiles are more informative than others.

Table 4.2. Profile formation structural characteristics

SC/Apps	Tinder	Grindr	Bumble	Happn	Hinge	Plenty of Fish	OKCupid	Match.com	Coffee Meets Bagel
App-based Facebook registration	•	•	•	•	•				•

¹ *businessofapps.com*

² *datingsitesreviews.com*

³ *expandedramblings.com*

⁴ *expandedramblings.com*

⁵ *datingsitesreviews.com*

⁶ *datingsitesreviews.com*

⁷ *differ.com*

⁸ *datingsitesreviews.com*

	Compatibility algorithm					•	•	•	•	•
	Alternative to <i>Facebook</i> registration	•	•	•	•	•	•	•	•	•
	Functional free of charge version	•	•	•	•	•	•	•		•
User-based	Limit geographical distance	•		•		•		•		•
	Bio display	•	•	•	•	•	•	•	•	•
	Profile pictures display	•	•	•	•	•	•	•	•	•
Combination-based	Pre-registration questions			•		•	•	•	•	•
	Specific bio display		•	•	•	•	•	•	•	•

The very first thing that users see in online dating apps is other people’s profiles. This makes the profile design a distinctive part of the app-using experience. In business terms, this is also relevant because apps base their marketing on how profiles are presented and how users interact with them (i.e., how users filter through the profiles). Notably, three subcategories within profile formation SCs were identified (see Table 4.2). The *app-based* SCs are immutable, meaning that users cannot alter them in any way. SCs that users are free to modify and/or to skip during the process of profile formation are *user-based* SCs. Those SCs that fall somewhere in the middle (i.e., can be modified but cannot be skipped in the process) have been categorised as *combination-based* SCs.

4.3.1.1 *App-based structural characteristics*

Once the app is downloaded on the smartphone, users are guided through a process to set up their profile. As noted above, some of the steps in this process are immutable and cannot be altered by the user (e.g., algorithm-based functioning). Those SCs that are immutable within the profile formation process have been categorized as app-based. Therefore, based on this definition, four SCs were identified: (i) *Facebook registration*, (ii) *alternative to Facebook registration*, (iii) *compatibility algorithm recommendation*, and (iv) *functional free of charge version*.

All the apps that are smartphone-only apps (i.e., *Grindr*, *Tinder*, *Hinge*, *Happn*, *Bumble*, and *Coffee Meets Bagel*) (see Table 4.2) have *Facebook registration* as the main option to register (other options may be offered, but those are presented in smaller fonts). Registering via *Facebook* makes it easier for the user because they do not need to verify their identity themselves (i.e., *Facebook* data are enough). Consequently, this makes registration more appealing because users do not need to spend extra time registering (and therefore the apps can be considered user-friendly). However, personal data can then be used by *Facebook* which raises concerns regarding data privacy regarding a sensitive topic (i.e., dating). In registering via *Facebook*, users are required to provide mandatory personal data (e.g., *Facebook* friends). Apps that were originally launched as online dating sites (e.g., *Plenty of Fish*, *OkCupid*, and *Match.com*) have different registration processes, normally email/telephone registration, referred to here as *alternative to Facebook registration*. However, apps that were designed to be smartphone-only (i.e., *Grindr*, *Tinder*, *Hinge*, *Happn*, *Bumble*, and *Coffee Meets Bagel*) also feature *alternative to Facebook registration*, which is registration via mobile phone number and a security code which is sent to the mobile phone as a verification measure. As aforementioned, *alternative to Facebook registration* is presented in smaller and uncoloured fonts, arguably priming the users towards *Facebook registration*.

Once the user is registered, the next step depends on whether the app is based on a *compatibility algorithm recommendation* or *'free-to-chat' profiles* (these are discussed further below). The *compatibility algorithm recommendation* SC refers to a specific mechanism by which users are asked questions based on their personality (e.g., “*I have a tendency to work long hours*”, “*I tend to get excited by new things*”), likes and dislikes (e.g., “*Prefer nights in or out?*”, “*Click on the following: music, sports, theatre, clubbing*”), and beliefs (e.g., religion) in order to recommend other profiles that are compatible, based on the responses given. Users cannot alter the algorithm or choose what types of questions are to be asked because this solely depends on the specific app (see Table 4.2 for apps that are based on *compatibility algorithm recommendation*).

The final SC in this category (i.e., *functional free of charge version*) refers to those apps where the free version allows users to have open access to features that are needed to date (i.e., users can create a profile and chat). All nine apps examined in the present study had free versions that were sufficient to find dates except for *Match.com*, where the free version does not allow online chat between users.

4.3.1.2 *User-based structural characteristics*

In order to launch a profile, users have the possibility to personalize their profile, and present themselves the best way they see fit on the dating app. For that reason, apps have *user-based SCs* within profile formation features which users can modify, alter, or design to their preference(s). In this sub-type, there are three specific SCs: (i) *profile picture(s) display*, (ii) *bio display*, and (iii) *distance limit range setting*. Both *profile picture(s) display* and *bio display* are the core basis of a dating app profile because they represent the personal presentation of one user to the rest of the

users. Ultimately, based on this information, users match themselves and interact. Every app examined in the present study had *profile picture(s) display* and *bio display*.

4.3.1.3 *Combination-based structural characteristics*

In this category, two SCs (*pre-registration questions*, and *specific bio display*) were defined as *combination-based* due to their design and functionality. *User-based* features allow the user to give personality to their profiles, whereas *app-based* features define the first rules of access to the application. *Combination-based* features give personality to the profile and define rules that are set by the application.

Pre-registration questions refers to a series of items that need to be answered by the user prior to designing the profile. This is used mainly in applications that work with *compatibility algorithm recommendation* (i.e., *Hinge*, *Plenty of Fish*, *OkCupid*, *Match.com*, and *Coffee Meets Bagel*). These items cannot be skipped, and the responses calculate compatibility to other users (e.g., political beliefs or environmental attitudes). Even though *Bumble* is not within the *compatibility algorithm recommendation* it has *pre-registration questions* that include political beliefs, and dating goal (i.e., searching for partner, hook-ups). Very similar, and most of the time related to *pre-registration questions*, is *specific bio display*, which refers to profiles that display answers to a number of questions featured in *pre-registration questions*. For example, users in *Plenty of Fish* have their picture(s) at the top of their profile. When scrolling down, there is a list of questions such as the user's nationality or whether the user has any children. Another example is *Hinge*, where profiles contain full questions or statements and their corresponding answer in users' profiles, the questions are pre-determined and provided by the app (e.g., typical Sunday: "*laying*

on the sofa and having a roast at the pub”; best travel story: “once I got lost in Marrakech’s main market”⁹).

4.3.2 Communication medium structural characteristics

Once the profile has been designed, users initiate the process of searching for potential matches among other users that will eventually lead to an interaction between them, mostly communication via chat messaging. Therefore, *communication medium* SCs ($n=6$) mainly refer to those SCs that are designed for the purpose of users’ communication. As can be seen in Table 4.3, communication features not only include *messaging* (which is available across all apps) but also other forms of interaction by which users communicate personal likes (e.g., *sharing songs*) to their actual geographical location when actually interacting with the app at a specific point in time. Even though every dating app has a different chat service design, the *messaging* SC is similar across all of them. Users type a message and press the ‘send’ button. Automatically, this message is displayed in the chat window that both users share. During the study period, no differences were found between the messaging chat services across the nine dating apps examined.

Table 4.3. Communication medium structural characteristics

Apps/SC	<i>Tinder</i>	<i>Grindr</i>	<i>Bumble</i>	<i>Happn</i>	<i>Hinge</i>	<i>Plenty of Fish</i>	<i>OKCupid</i>	<i>Match.com</i>	<i>Coffee Meets Bagel</i>
Messaging	•	•	•	•	•	•	•	•	•
Sharing pictures		•	•						•
Sharing exact location		•							

⁹ Both answers are only examples

Video-call		•
Voice messages	•	•
Sharing songs		•

Only *Grindr* and *Bumble* allow *sharing pictures*, a SC by which users can share additional pictures privately via the chat service (i.e., additional to the profile pictures). The nature of the pictures can range from standard profile-type pictures to erotic ones (also referred to as ‘nudes’ or ‘hot pics’). In terms of communication, *sharing pictures* is arguably used for further presentation of the physical self and to reassure the receiver that the profile is not fake. Also, *sharing pictures* is commonly used for hook-up encounters, in which users’ exchange of intimate pictures represents the ‘offer’ if both parties agree they meet. Similar to standard pictures, erotic pictures aim to reduce the receivers’ uncertainty. In this case, they play a key role in decision-making whether or not to have a sexual encounter. *Grindr* is particularly known for this feature and during the two-week study period it was noted that more than half of users asked for both erotic and non-erotic pictures. No users asked for additional pictures in *Bumble*, suggesting that *Grindr* is mainly used for sexual purposes. Arguably, sexual orientation could be the explanatory factor for *Grindr* to be mainly a hook-up app – because *Grindr* is only used by homosexual men. However, if that was the reason, then the same behaviour (i.e., looking for hook-ups) should be expected in *Bumble*, where users can also share pictures. Therefore, SCs may not be solely responsible for one type of behaviour (e.g., looking for hook-ups) and arguably, the respective app’s target, marketing, and/or word-of-mouth may play a key role in what type of behaviours users will engage in.

Furthermore, *Grindr* was the only one of the nine apps that allowed sharing the exact geographical location of the user (*sharing exact location*) which is used, as its name indicates, to inform the receiver of the sender's location. Arguably, *sharing exact location* may serve different aims (e.g., sharing home address and/or workplace location), but the underlying purpose is to facilitate encounters between two (or more) users. During the period of investigation for the present research, some users sent their location without previous agreement, suggesting an invitation for a hook-up. Again, it should be noted that the design of the apps, in this case *Grindr*, elicits specific behaviours (e.g., hook-ups).

Only *Bumble* had a *video-call* SC, while *voice-messages* were only possible on *Grindr* and *Happn*. Both *video-call* and *voice-messages* allow users to have an upgraded form of communication beyond text messaging. In terms of romantic dating (e.g., searching for dates and/or partners), both *video-call* or *voice messages* can inform users of factors they may consider relevant in order to date someone (e.g., tone of voice, facial expressions, or prosody of speech). Likewise, those users searching for sexual encounters may find both SCs valuable for informing them of specific factors (e.g., body size, body hair, penis size, etc.) prior to deciding whether to meet. During the study period, only one erotic voice-message was received via *Grindr*, which again supports the hypothesis that sexually-oriented behaviours are predominant in that app.

Sharing songs (*Spotify*-linked) was a SC offered by *Happn* via their chat service (and *Tinder* and *Grindr* feature *Spotify*-linked music on *bio display*) to allow users to exchange 'likes' and find commonalities (or not) between themselves, therefore promoting communication via a specific topic (i.e., in this case, music). Hypothetically, sharing songs may lead to longer discussions that may increase romantic interest between users.

In conclusion, there is one SC that all the apps share in terms of communication (i.e., *messaging*, although *Match.com* restricts this to premium users). Apart from *messaging*, other communication SCs have been added that potentially facilitate longer discussions between users (e.g., *sharing songs*), physical encounters (e.g., *sharing exact location*), and providing a more enhanced form of communication (e.g., *voice messages* and *video-call*). Regardless of the users' motivation to use dating apps, these forms of communication are available and may be used for different purposes (i.e., searching for romantic partners or hook-ups) as aforementioned. Arguably, users in search of hook-ups may tend to have a more habitual usage pattern than those engaging in romantic partner search because users looking for hook-ups do not intend to cease their use once they find a partner (i.e., continuous search). Conversely, those in the second group (romantic partner search) may intend to find a potential partner and ultimately uninstall the app(s).

4.3.3 Behaviour modification structural characteristics

This section covers more than half of the SCs ($n=30$) identified during the study period. These were classed into four different subcategories: (i) *match-making*, (ii) *interaction booster*, (iii) *hooks*, and (iv) *exclusive designs*. Even though the 30 SCs presented are considerably diverse, they all share the factor of being designed to promote and/or modify specific user behaviours.

4.3.3.1 Match-making

Table 4.4. Behaviour-modification structural characteristics: Match-making

Apps/SC	<i>Tinder</i>	<i>Grindr</i>	<i>Bumble</i>	<i>Happn</i>	<i>Hinge</i>	<i>Plenty of Fish</i>	<i>OK Cupid</i>	<i>Match.com</i>	<i>Coffee Meets Bagel</i>
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Mutual like match	•		•		•		•		•		•		•
Free-to-chat			•				•		•		•		•
Swiping	•		•		•		•		•		•		•
Scrolling	•		•		•		•		•		•		•
Tapping	•		•		•		•		•		•		•
Chat after match	•		•		•		•		•		•		*10
Direct like	•		•		•		•		•		•		•
Specific like							•				•		
Recommended profiles	•						•		•		•		•

Nine SCs were identified across the nine apps in relation to the match-making process. *Mutual like match* refers to two users liking each other, and consequently being matched by the software. Normally, after matching, one of the users initiates the conversation (i.e., chat). However, this sequence of *mutual like match* followed by chat does not apply to all the apps examined because some of them need no match to start the conversation (e.g., *Grindr* and *Plenty of Fish*). Therefore, matching may also be referred to as the first mutual interaction, which could be a mutual ‘like’ on *Grindr* (called a ‘tap’) or replying to a first message on *Plenty of Fish*.

There were a number of apps within the sample (i.e., *Tinder*, *Bumble*, *Happn*, and *Coffee Meets Bagel*) that functioned exclusively by the aforementioned sequence of *mutual like match* and chat, referred in the taxonomy as the *mutual like match* (see Table 4.4). This means that users cannot send messages unless there has been a match, and only then can either user send the first message

¹⁰ ‘Premium’ service only

(*Tinder* and *Happn*), or only the female user in a heterosexual search on *Bumble* can send the first message (either user in the case of homosexual users). There are other apps (i.e., *Hinge*, *Plenty of Fish*, *OkCupid*, and *Match.com*) that have the *mutual like match*, but they are not *mutual like match* exclusive, but also allow *free-to-chat* access (i.e., blended match mechanism apps). *Hinge* is included in the latter category because when users click ‘like’ on another user, they can add a text message, but they are not allowed in the chat service until the receiver of the ‘like’ sends back a ‘like’. At the other end of the spectrum (i.e., *free-to-chat*) is *Grindr*, an app that functions only by *free-to-chat* access, therefore, users can initiate chatting with any other user who is available on the app screen.

Before matching, in applications like *Tinder* or *Bumble*, the users must have ‘liked’ each other. To do this, users can swipe (i.e., *swiping* SC) right or left (i.e., like or dislike), and tap (i.e., *tapping* SC) like or dislike (e.g., on *Tinder*, users click on a heart icon for like and X mark for dislike). *Scrolling* (i.e., the action of moving the visual display down) is indirectly related to matching because users need to scroll down to see the bio and just then decide whether to like or dislike. Therefore, *scrolling* is more associated with gaining knowledge regarding someone’s profile to make a decision, whereas *swiping* and *tapping* are associated with the decision of ‘liking’ or ‘disliking’. *Scrolling* is also used to see numerous profiles in the user’s feed. Normally the list of users is categorized by a specific variable (e.g., distance, the top picks, or compatibility).

Once there is a match, in the case of *mutual like match* applications (e.g., *Tinder*, *Bumble*, or *Happn*), access to a chat service is provided. This is what is referred to as *chat access after match* (see Table 4.4). *Chat access after match* was present in all studied apps except for *Grindr* which is the only app with no match function. In the case of *Match.com*, the access to chat service is only

for paid memberships (i.e., premium accounts). Converse to the *mutual like match* SC, the *free-to-chat* SC grants access to chat services without prior actions rather than clicking on one profile and sending a first text (i.e., *chat free access*). Therefore, the *mutual like match* SC allows chatting when both users have expressed interest (i.e., they have ‘liked’ each other) and the *free-to-chat* SC allow users to contact any other user without restrictions.

A common SC on all nine applications is *direct like*. Depending on the application, it takes different names (e.g., ‘Super like’ for *Tinder* or ‘Hello’ for *Happn*), but regardless of the name, its functioning is similar across applications. When a user clicks on the *direct like* feature and the receiver is notified of who the sender is, the receiver can then send either ‘like’ or ‘dislike’ in the case of *mutual like match* applications (i.e., *Tinder*, *Bumble*, *Happn*, and *Coffee Meets Bagel*), leading to a match. This also applies for blended match mechanism applications (i.e., *Hinge*, *Plenty of Fish*, *OkCupid*, and *Match.com*). In the case of *Grindr*, the *direct like* is called a ‘tap’ and there is no specific action required as the user is free to ignore it, respond with the same, and/or send a text instead.

Another form of ‘like’ is *like specific answers/pictures*, which is on the *Hinge* and *OkCupid* apps. In essence, it works as a *direct like* with the difference being that the sender specifies what part of the receiver’s profile they like the most. *Hinge*’s app functioning is based on this type of likes, and the user must ‘like’ either one of the pictures or one of the answers and can add text to the like (e.g., “*you look amazing on this picture*”), whereas for *OkCupid* it is not the only mechanism, but one of many.

Another facilitating SC to form matches is to show users the *list of recommended profiles*. As shown (see Table 4.4), all applications have a form of *list of interested profiles*, excluding *Grindr*, *Bumble*, and *Happn*. In effect, as the name indicates, the *list of recommended profiles* is a compilation of compatible profiles offered by the application to the user. Compatibility is based upon the applications' underlying algorithm. Those applications with a *compatibility algorithm recommendation* (i.e., *Hinge*, *Plenty of Fish*, *OkCupid*, *Match.com*, and *CMG*) claim to form the *list of recommended profiles* based on the answers provided by the user when the profile was created. In the case of *Tinder*, the *list of recommended profiles* is a pop-up screen with highly-likable profiles based on user's swiping and matching history. Free-of-charge version users are allowed to press 'like' on only one of the profiles on the list.

4.3.3.2 Interaction booster

Table 4.5. Behaviour-modification SCs: interaction booster

Apps/SC	<i>Tinder</i>	<i>Grindr</i>	<i>Bumble</i>	<i>Happn</i>	<i>Hinge</i>	<i>Plenty of Fish</i>	<i>OKCupid</i>	<i>Match.com</i>	<i>Coffee Meets Bagel</i>
Distance display	•	•	•	•		•	•		
Location-based display		•				•			
Countdown chat			•						
Take on turns chat			•		•				
Anonymous notifications		•							
Common friends <i>Facebook</i>	•								
Common <i>Facebook</i> interests	•								

<i>Spotify-linked</i>	•	•	•	
<i>Instagram-linked</i>	•	•	•	•
New user label		•		
Online user display		•		•

Once two users match, the next step is to encourage users to interact with each other, which can lead to a physical encounter, regardless of the nature of that encounter (i.e., sex or a date). *Communication medium* SCs allow users to interact, but do not necessarily encourage interaction between users. Therefore, *interaction boosters* refer to SCs designed to promote chatting (e.g., *take turns to chat*), shared interests between users (e.g., *Spotify-linked*), and ice-breakers (e.g., *common Facebook interests*). A total of 11 interaction boosters were identified during the period of the study (see Table 4.5).

Presumably, meeting users that are geographically closer is easier or, at least, more likely than meeting users who are geographically further away. Therefore, showing the distance between users may play a role in encouraging users to interact. Accordingly, two SCs were identified, *distance display* and *location-based display*. Both are based on how far users are from each other, but their designs and functionalities are different. *Distance display* refers to those applications that include the numerical distance in kilometres or miles between two users (e.g., “*Ben is 20 km away*”). This SC was found in *Tinder*, *Grindr*, *Happn*, *Bumble*, *Plenty of Fish*, and *OkCupid*. *Location-based display* apps include seeing a display of users ordered by nearest to furthest. This feature is available on *Grindr* and *Plenty of Fish*. Therefore, *distance display* is designed as more information on users’ profiles, meanwhile *location-based display* modifies the screen display of

users by distance. In terms of functions, both are informative of distance, but *location-based display* encourages interaction between nearby users, therefore facilitating physical encounters, arguably, playing a key role in hook-ups.

Chatting is the baseline form of interaction in dating applications. Three SCs were found that encourage chat interaction and maintenance (i.e., *countdown chat*, *take on turns chat*, and *anonymous chat notifications*). *Bumble* was the only application which included a *countdown chat* (i.e., users have 24 hours to send the first message after matching). For *take on turns chat*, users are reminded of whose turn it is to send a message in a reciprocal fashion (i.e., user A sends message, user B replies). Both *Bumble* and *Hinge* have this SC. *Anonymous chat notification* is exclusive to *Grindr* and refers to receiving message notifications without the name (or nickname) of the sender. This is unlike the other eight dating apps studied. Arguably, the uncertainty factor increases the chances of launching the application, consequently promoting interaction and usage.

Additionally, social media links are present in dating applications, not only for registering a profile as previously discussed, but ultimately to promote interaction via mutual likes or acquaintances. Four different SCs were found that involve social media (i.e., *common friends Facebook*; *common interest Facebook*; *Spotify-linked*; and *Instagram-linked*). *Tinder* involves *Facebook*-related SCs. Here, common friends are shown between two users, as well as their common likes (e.g., followed pages and followed artists). The *Spotify-linked* SC was found on *Tinder*, *Bumble*, and *Happn*. Hypothetically, these three SCs can be considered ice-breakers between two users, and therefore facilitate the interaction between them. *Instagram-linked* was found on four applications (*Tinder*, *Grindr*, *Bumble*, and *Hinge*), and in the case of *Grindr*, there is a link to the user's *Instagram*

account, whereas the other three applications display *Instagram* pictures from users' accounts on their dating profiles.

Users who want to interact instantly with other users can do this if they know which users are online. This is what is referred to as *online user display* (normally represented by a green dot on users' profile picture) which was found on *Grindr*, *Plenty of Fish*, and *OkCupid*. For the latter two applications, there is a feature that shows only online users, therefore facilitating the instant search for active users. To do the same on *Grindr*, users have to pay a membership fee. Without paying the fee, online and offline profiles are shown together. Additionally, *Grindr* includes a label on profile pictures on new users (i.e., *new user label*) (see Table 4.5) represented as a blue dot with white lines. Because *Grindr* only shows nearby profiles, the tendency is to see the same profiles unless users travel or move to a different place. Therefore, *new user label* is a way to let regular users know that there is someone with whom they have never interacted before.

4.3.3.3 *Hooks*

In the present study, only free versions of the nine dating apps were used. Nevertheless, applications are products to monetize. Therefore, companies design SCs in a way to be appealing to users. In many cases, free versions have limited SCs, so they can try out the apps, but ultimately are redirected to the screen showing membership prices. This type of SC has been named *hooks* and account for a total of six SCs (see Table 4.6).

Table 4.6. Behaviour-modification SCs: hooks and exclusive designs

SC/Apps	Tinder	Grindr	Bumble	Happn	Hinge	Plenty of Fish	OKCupid	Match.com	Coffee Meets Bagel
Hooks									•
Token-economy									
Chat restrictions								•	
Block limit		•							
Likes limit	•				•				
Interested profiles	* ¹¹		*	*	•	*	*	*	
“Users who have seen you”		•				•			
“Have you met?”					•				
Exclusive designs			•						
Females decide			•						
Profiles passed by				•					
News feed	•								

The most common *hook* SC identified was the *list of interested profiles*. In essence, as its name indicates, the *list of interested profiles* is a compilation of profiles that have liked the user.

¹¹ Asterisks mean ‘Premium’ service only

Consequently, the user can decide whether to match with one, or more, interested profiles, removing the uncertainty of whether the other user will like them back or not. This SC is limited to paid memberships, but is shown repeatedly in free versions, giving the chance to users to move from free to premium. Even though users of free versions cannot access this list on many applications (e.g., *Tinder* and *OkCupid*), they receive notifications on the number of interested profiles (e.g., *Tinder*), or on every ‘like’ received (e.g., *Plenty of Fish* and *OkCupid*). Once the user clicks on the notification, the application redirects them to the tariffs of premium membership. *Hinge* is different to the other eight dating apps because its functioning is based on knowing who ‘liked’ the user (i.e., by either liking one picture or one response).

Another *hook* SC is the *likes limit daily* (see Table 4.6) which is found on *Tinder* and *Hinge*. During the study, it soon became apparent how many daily likes were permitted on each of the applications because the daily limit was not pre-announced. Only when users have reached the daily likes limit, are they informed of the daily likes limit by an application pop-up notification.

Some of the *hook* SCs were application-specific (i.e., SC is exclusive to one application). First, *token-economy for likes* was specific to *Coffee meets Bagel*. This is based on a system of ‘beans’ (i.e., points) that grant access to giving ‘likes’. If the user launches the application every day (at least once), then a specific amount of ‘beans’ are given – ‘beans’ allowance grows if the user connects on consecutive days. Once the user does not connect for one day, the allowance goes back to the initial amount. However, if users want to get access to more ‘beans’ than those offered by regular launches, then they are redirected to premium membership. Second, *chat restricted to premium users* was specific to *Match.com*. As discussed in previous sections, users can access the free version of the app. Users are able to ‘like’ other users, but are neither able to chat with them,

nor to reply to other users' texts. Third, *block limit daily* was specific to *Grindr*. This SC allows users to block a limited number of users daily which may serve as a tool for 'cleaning' user feeds. Once a user has blocked a profile, it will no longer appear on the user's feed. Therefore, blocking non-appealing profiles lets users keep appealing candidates on their feed rather than the ones that are not appealing.

4.3.3.4 *Exclusive designs*

Beyond *swiping*, *matching*, and *messaging*, there are some SCs that are application-specific and aim to differentiate dating applications from one another. In the present study, there were four such identified SCs (i.e., *have you met?*; *females decide*; *profiles passed by*; and *news feed*) from four different applications (*Hinge*, *Bumble*, *Happn*, and *Tinder*) that make them distinct from the other dating apps (see Table 4.6).

Hinge claims to be an application that has the aim to be deleted. It encourages its users to meet in person and once users have chatted, the application asks users if they have met (i.e., "*Have you met?*"). Following the question, users can respond affirmatively or negatively. If they have met, *Hinge* asks if users will meet again. The application claims to store the responses for an improved recommendation of profiles to users. *Bumble* is known as the feminist dating application due to its *females decide* SC, by which only female users can send the first message once there has been a match (this SC only applies for heterosexual dating). *Happn* is known for its SC *profiles passed by*. Once users have opened their profile, the application shows users who have crossed paths with each other, stating in which street the crossing occurred. Additionally, *Happn* shows profiles that have not crossed paths yet, but might potentially cross based on the vicinity the user is in. On the

other hand, *Tinder's news feed SC* is similar to that of social media sites such as *Facebook* or *Instagram*, where users can see the changes in matches' profiles (e.g., new pictures and changes in bio), therefore creating a form of social network between users and matched profiles.

4.3.4 Habit creation SCs

This section covers the SCs that dating apps developed (i) to inform users of updates on any type of activity within the application, (ii) are not application specific, and/or (iii) promote habitual use. During the period of study, four different SCs (see Table 4.7) were identified that fitted these criteria. Within these, two different groups were identified (i.e., *activity notifications* and *application-automated notifications*). Furthermore, notifications can be administered through the settings section of each application. However, during the research period, these settings were not modified. Therefore, the data collected belonged to the default version of each application.

Table 4.7. Habit creation SCs

	SC/Apps	<i>Tinder</i>	<i>Grindr</i>	<i>Bumble</i>	<i>Happn</i>	<i>Hinge</i>	<i>Plenty of Fish</i>	<i>OKCupid</i>	<i>Match.com</i>	<i>Coffe meets bagel</i>
Activity notifications (AN)	Pop-up AN	•	•	•	•	•	•	•	•	•
	Email AN	•	•	•	•	•	•	•	•	•
App-automated notifications (AAN)	Pop-up AAN	•		•	•	•	•	•	•	•
	Email AAN	•	•	•	•	•	•	•	•	•

4.3.4.1 Activity notifications

Two types of notifications that refer exclusively to activity within the application (i.e., *pop-up ANs* and *email ANs*) were identified. *Pop-up ANs* (i.e., notifications that appear on the top screen of the smartphone) refer to notifications that are smartphone-based and appear after every message, tap, like, or match that users receive. These notifications are generated so the user does not need to log on to the application to be updated. Furthermore, these notifications function as links so the user can click on the pop-up notification, and this will automatically launch the application. Depending on the number of messages, taps, or matches, the user receives more or fewer activity notifications – the higher the use, the higher the number of notifications. Therefore, once the user engages in frequent (i.e., habitual) usage, activity notifications serve as a maintenance factor of usage.

Email ANs serve as an alternative pathway for behaviour maintenance because they are sent for every new activity (i.e., matches, likes, and messages). Arguably, if users are not engaged with their smartphones but working on their computer, an email could make its way to users' attention and facilitate the app's launch.

4.3.4.2 *Application-automated notifications*

Activity notifications follow a cause-effect fashion (i.e., activity-notification). However, this is not the case for *application-automated notifications* which are automatically generated and do not necessarily obey a cause, but rather pursue an effect in the user (i.e., higher engagement in the application). Two different SCs (*pop-up AANs* and *email AANs*) were identified within this category.

Pop-up AAN inform users of the number of interested profiles in the user's profile and encourage usage by motivational messages. A type of content in *Pop-up AAN* is number of users who have

liked their profile (e.g., *Tinder* and *Happn*), or have shown interest (e.g., *Plenty of Fish* and *OkCupid*). Nevertheless, as previously discussed with *list of interested profiles*, the information concerning the specific profiles is not provided. Therefore, applications notify their users and encourage them to become premium members or to increase their use to not “miss out”. Additionally, *pop-up AANs* also encourage users to launch the app and make use of it. They are normally accompanied with motivational messages (e.g., “*your profile is on fire, it is time to swipe*”, “*there are many people in your area who are looking for someone like you*”) and/or messages that invite the user not to miss out (e.g., “*don’t miss your chance, there are many active users now*”). Therefore, these notifications serve as motivators of use which, arguably, may serve as a starting point to create habitual usage that will be later maintained by *activity notifications*.

Email AANs refer to the emails sent that show the number of interested profiles and encourage use. Similar to *email ANs*, *email AANs* can be considered alternatives to smartphone notifications. *Email notifications* promote initiation of behaviour by constant reminders to avoid missing out.

4.4 General discussion

The present study explored the SCs present in dating applications, yielding the creation of the first taxonomy, to the best of our knowledge, that aims to understand how dating applications work from a human-machine interaction perspective. The taxonomy has addressed the similarities and differences between the nine studied dating applications by registering all SCs from when the users open the app to when they create their profile until they interact with other users. The study has also identified SCs that may promote habitual use (e.g., *habit creation SCs*) in users and SCs that could influence users’ behaviour (e.g., *behaviour-modification SCs*).

The nine studied dating apps have a number of similarities (i.e., shared SCs) inherent to all dating applications, namely *bio display*, *profile pictures display*, *messaging*, *scrolling*, *tapping*, *direct like*, and *habit creation features* (i.e., smartphone and email notifications). However, a difference was found between the first-wave of online dating sites, which were later converted to smartphone dating applications, (i.e., *POF*, *OkCupid*, *Match.com*) and the second-wave of dating applications, those which were conceived as dating applications only (i.e., *Tinder*, *Grindr*, *Bumble*, *Hinge*, *Happn*, *Coffee Meets Bagel*). Notably, first wave applications tend to have a blended design, combining different SCs that allow users to match and interact in different ways (e.g., *mutual like match* and *free-to-chat*), whereas second wave applications tend to be more homogeneous, and have only one specific way per application to initiate interaction between users. For example, *Grindr* is only *free-to-chat* and *Tinder* is only *mutual like match*.

In relation to habitual use, dating applications feature SCs that aim to initiate and maintain user behaviour (e.g., *habit creation SCs*). The presented findings suggest that application-automated notifications stimulate use via motivational-message notifications (i.e., encouragement of use), including messages that encourage users not to miss out. Fear of missing out (FOMO), which is defined as the “pervasive apprehension that others might be having rewarding experiences from which one is absent” (Przybylski et al., 2013, p. 1841), has been identified as a predictor of social media addiction as well as being related to lower wellbeing (Kuss & Griffiths, 2017). As FOMO may also be present among online dating users, there may be similar associations between frequent use, addiction, and decreased wellbeing, all of which require additional research to be empirically supported. In the case on maintaining users’ behaviour, *activity notifications* may function as a

reward which increases the likelihood of frequent checking, potentially evolving into a habitual behaviour (Van Deursen et al., 2015).

Also, considering previous research that related problematic use of *Tinder* with a self-esteem boost and sex-search (Orosz et al., 2018), further research examining SCs is needed to address self-esteem boost and/or sex-search behaviour across different online dating platforms. For instance, *profile picture display* may be associated with a self-esteem boost because more likes and/or matches may yield higher self-esteem, which has been supported in previous research among *Facebook* users (Burrow & Rainone, 2017). Furthermore, from anecdotal experience, the behaviours associated with SCs that are designed to (directly or indirectly) encourage matches (e.g., *swiping*, *scrolling*, and *tapping*) tend to become automatized after several repetitive moves (i.e., leading to lower self-regulation) which has been associated with smartphone addiction (Gökçearsan et al., 2016) and problematic social media use (Ostendorf et al., 2020). On the other hand, sex-search seems very prominent on *Grindr*. The findings in the present study suggest that SCs including *sharing pictures*, *sharing exact location*, and *location-based display* are facilitators of sexual behaviour (i.e., hook-ups). However, *location-based display* is also available on *Plenty of Fish*, and *sharing pictures* is present on *Bumble* and *Coffee Meets Bagel*, so future research should assess whether similar behaviours are elicited by those SCs within different dating applications.

4.5 Limitations

The present study is not without limitations. First, the timeframe of the study may have meant that not all currently available SCs were identified because (i) they were added after the period of use,

or (ii) were missed due to temporal limitations (i.e., usage time) within the two-week period of use. Second, the selection of sample applications may have influenced the results, and although the dating applications selected are considered popular in the UK, some other applications may be relevant to include in future studies to address cross-cultural variations in the popularity of different dating apps.

4.6 Conclusion

The present study is the first to assess a sample of dating applications and their structural characteristics in relation to problematic use. It proposes a taxonomy that conceptualizes the structural characteristics that were identified in nine popular dating applications in the UK. The taxonomy is divided into four main categories (i.e., *profile formation SCs*, *communication SCs*, *behaviour modification SCs*, and *habit creation SCs*). As a novel piece of research, this study aims to serve as a catalyst for further research in the field of online dating, especially psychological research that aims to explain the relationships between online dating and psychological correlates (i.e., well-being and problematic use).

Previous research in gambling studies, gaming studies, and social media use supports the view that structural characteristics may facilitate habitual behaviour. Similarly, online dating applications possess some SCs that appear to initiate and maintain users' behaviour. Whilst SCs have been extensively studied in other fields, online dating research lacks empirical research assessing SCs in general, and more specifically, the SC-behaviour interaction.

The present study may contribute to (i) understanding the relationship between machine-design and users' behaviour, (ii) educating online daters to prevent problematic use, and (iii) assisting

online dating application developers to have a better insight into SCs and user well-being. The dating application industry is constantly evolving, continuously introducing new applications and/or SCs to already existing applications. Therefore, it is important for researchers to understand the psychological and social consequences that may arise from SCs in current online dating applications.

CHAPTER 5

Understanding dating app users' experience: An interpretative phenomenological analysis study

This chapter aimed to assess the emotional and psychological experience of a cross-cultural sample of dating app users via one-to-one semi-structured interviews. The study evaluated the individual experience of users regarding general structural characteristics of dating apps and their insight into addictive patterns of use. To do this, interpretative phenomenological analysis (IPA) was employed. By using IPA, the study aimed to evaluate experiences (i.e., phenomenology) from each individual perspective (i.e., idiographic approach). A sample of nine dating app users was interviewed with open-ended questions. Superordinate themes that emerged are objectification process; behaviour maintenance; the conflicted self; and new dating paradigm. The study aimed to enhance the knowledge of dating app usage and its influence on users and society by adding new insights to the existing literature. Furthermore, it aims to provide rich data findings that support and advocate for improvements in the design of dating applications.

5.1 Introduction

Online dating refers to individuals using online platforms to connect with other individuals with the potential intention of dating. Among platforms, there is a clear distinction between online dating sites (e.g., *Match.com*) and mobile dating applications (e.g., *Tinder*; Chan, 2017). Online dating sites refer to platforms that first emerged in the online dating arena. These platforms were solely used by those users who had access to a Wi-Fi-enabled computer, unlike dating applications whose usage is mainly smartphone-based. Unlike dating sites, dating applications are

conceptualized as being ubiquitous (Kaviani & Nelson, 2020), where users can log-in anytime and anywhere. Dating applications experienced a boost in popularity ever since the launch of Tinder in 2012, which, to date, has become the most used dating application worldwide (Tankovska, 2021). However, with the growth of the dating app market, more and more dating applications have appeared and have become part of popular culture, namely *Bumble*, *Hinge*, and *Grindr*, among others (Corpuz, 2022). Data from online dating companies' revenue – over three billion dollars in 2021 - indicate that individuals are increasingly turning to online dating, and it appears that the tendency is expected to continue growing (Curry, 2022).

Online dating research has extensively focused on self-presentation which refers to how users choose to depict themselves on their profiles (Ellison et al., 2006; Schlenker, 2002) and how self-presentation in online dating sites facilitates the adoption of deceptive strategies (Brym & Lenton, 2001; Toma & Hancock, 2010). Additionally, further research has identified the risks of online dating. AnKee and Yazdanifard (2015) explored the negative aspects of online dating, resulting in various downsides, including deception, short relationships, scams, and risks to sexual health (see also Chapter 2). Online daters have also identified further risks, such as emotional and physical risks (Couch et al., 2012), and unwanted explicit sexual material sent from men to women (Vandeweerd et al., 2016) on online dating platforms. Consequently, online dating users perceive online dating sites as a risky form of dating (Brym & Lenton, 2001). In fact, a more recent survey in 2016 in the US reported that at least 45% of online dating users referred to online dating as riskier than other forms of dating (Smith, 2016). Conversely, other authors suggest that online dating can level up the risks encountered in offline interactions for specific groups, including LGBT and women by providing easier and safer environments (Johnson & Pontes, 2017; Varsava,

2017), and refer to online dating as the *causing* variable for more interracial marriages and higher percentage of marriages (Bellou, 2015; Ortega & Hergovich, 2018).

In more recent years, with the popularization of dating applications, research has started to look at how the different affordances (i.e., structural characteristics) of smartphone dating applications (Chan, 2017) may differ from online dating sites in terms of human-machine interactions. For instance, dating app structural characteristics seem to encourage continuous search of dates over initiation and further development of relationships (LeFebvre, 2018), overriding the primary online dating intent (i.e., dating) by means of promoting a more hedonic-led usage (Wang, 2020). Furthermore, the proposed taxonomy of structural characteristics based on nine popular dating applications (see Chapter 4) suggested that structural characteristics can modify and maintain users' usage behaviour (e.g., mutual-like match and activity notifications). In line with this, research has supported that 'matches' – the result of two users liking each other on *Tinder* and other similar-functioning dating apps – trigger users' emotions, ranging from “euphoric sensations” to “anger, sadness, uncertainty, and self-doubt” (Degen & Kleeberg-Niepage, 2020, p.9). Therefore, dating app structural characteristics (or affordances) seem to exert a certain level of behavioural influence in users for which LeFebvre (2018) suggested that users may choose a dating app according to their needs/motives.

In addition to structural characteristics' influences on users, there is a body of research which has assessed personality and psychological correlates in relation to frequency of use (see Chapter 2), paving the way to research assessing problematic use of online dating (Coduto et al., 2020; Orosz et al., 2018; RoCHAT et al., 2019; Wang, 2020). Nevertheless, prior to problematic use of online dating, research assessed excessive and/or problematic use of social networking sites (SNSs; Kuss

& Griffiths, 2017), which pointed at high availability of SNSs with higher-level engagement and potential excessive usage (Kuss & Griffiths, 2011). Additionally, personality correlates such as introversion, extraversion, neuroticism, narcissism, dysfunctional coping mechanisms, and anxious attachment have been associated with excessive use of SNSs (D'Arienzo et al., 2019; Kuss & Griffiths, 2011). Similarly, some of the findings in excessive use of SNSs have also been found in online dating research (see Chapter 2) which have served as a guide for online dating researchers, given the similarities of SNSs and online dating platforms (Linne, 2020). For instance, in an interview study, Wang (2020) reported the case of one woman who was experiencing attentional difficulties in the work setting and decreased self-control over her online dating usage as a consequence of feeling lonely in the offline world. Further research has supported the mediating role of loneliness between preference of online social interaction and excessive use of online dating (more specifically *Tinder*; Coduto et al., 2020) as well as high-level usage of dating applications and decreased wellbeing (Langert, 2021). In terms of self-control, users who possess less self-control are more at risk of developing problematic use of dating applications, as well as those with anxious attachment, high levels of sensation-seeking, and medium levels of self-esteem (Rochat et al., 2019). Relatedly, Orosz et al. (2018) supported that self-esteem enhancement and sex-searches (on *Tinder*) were associated with problematic use of dating applications.

With the appearance of problematic use of online dating, some research has examined the underlying processes of this new concept (including excessive use and compulsive use), whereby the focus has been on understanding how online daters are experiencing online dating. For example, Degen and Kleeberg-Niepage (2020) found that users experience contradictions and ambivalences when referring to their use of *Tinder*, which, the authors argue, may represent a

conflict between the positive (i.e., coping tool) and the negative (i.e., pressure to be available) sides of using *Tinder*. Further research found that users could be using dating applications as a form of avoidance behaviour (i.e., distraction), especially after relationship breakups (McCartney & Hellier, 2021). Therefore, it appears dating applications could have a positive effect on users. However, the effect may not be long-lasting (Langert, 2021). In fact, an interview study in Argentina reported that users of apps such as *Tinder*, *Happn*, and *OKCupid* experienced exhaustion after intensive usage, which led them to take months-long breaks to recover “*the cognitive-physical energy needed for the daily use of these apps*” (Linne, 2020, pp. 24).

Therefore, the present study examines the meaning that dating app users give to their own usage in terms of how usage relates to their emotional experience, how human-machine interaction is perceived by the users, and to fill the gap in knowledge regarding how and/or what aspects of problematic use of dating applications are experienced by the users. Also, contrary to previous research which has majorly focused on *Tinder* and *Grindr*, the present study provides an in-depth insight of users’ experience of using various dating applications exploring differences (if any) in how users perceive different dating apps.

5.2 Methods

5.2.1 Participants

Nine participants who were active dating app users, or had been for the past year prior to being interviewed, were recruited for the purpose of the study utilizing snowball sampling and word of mouth (i.e., participants referred to other dating apps users that might be interested in participating). The researcher contacted all potential participants and explained the requirements

of the research in addition to sending the information sheet. Regarding inclusion criteria, all participants were asked to i) be 18 years old or older, and ii) be a current active dating app user or at least had been an active user for the past 12 months. The sample comprised five females and four males. The age ranged from 25 to 38 years ($M_{age}=27.67$ years; $SD=4.24$). There were five heterosexual participants (two males, three females), two homosexuals (both male), and two bisexuals (both female). All participants were single at the time they were interviewed. Also, all participants used the dating app *Tinder* at the time of the interview or had used it in the past year prior to the interview. Other dating applications that were used are provided in Table 5.1. In terms of origin, more than half of the sample were from Spain ($n=5$). More than half of the sample were UK residents ($n=5$). Participants were informed that they would be interviewed about their dating app usage and their personal experiences, and that the interview would be audio-recorded for the purpose of the study (details of the study were given in written format prior to participation and agreement). Upon agreement, participants signed the consent form. After the interview, a debrief form was given to each of the participants.

Table 5.1. Summary of participants' key characteristics

Name (pseudonym)	Gender	Age	Orientation	Marital		Country of origin/residence
				Status	Apps used	
Sebastian	Male	25	Homosexual	Single	Grindr/Tinder/Scruff	Venezuela/Spain
Maria	Female	25	Heterosexual	Single	Tinder/AdoptaUnTio	Spain
Gloria	Female	25	Bisexual	Single	Tinder/AdoptaUnTio	Spain/UK
Robin	Male	28	Heterosexual	Single	Tinder/Bumble/Dill Mill	India/UK

Simon	Male	26	Homosexual	Single	Tinder/Grindr/Bumble	Spain/UK
Lea	Female	38	Bisexual	Single	Tinder/Her	Switzerland/UK
Serena	Female	30	Heterosexual	Single	Tinder/OkCupid/Bumble	Spain/UK
Peter	Male	25	Heterosexual	Single	Tinder/Badoo	Cyprus/Cyprus
Anna	Female	27	Heterosexual	Single	Tinder/Bumble	Spain

5.2.2 Interviews

Semi-structured interviews in English were carried out for the purpose of the study. The interview followed a schedule that contained open-ended questions focusing on four areas: identity, dating app usage, main structural characteristics of dating applications, and users' emotional experience. The interviews were conducted in person, except for two which were carried out online due to the COVID-19 pandemic. All interviews were audio-recorded and stored on a password-protected database in compliance with the ethical requirements. Also, anonymity was preserved throughout all phases of the study and participants have been given pseudonyms to preserve anonymity. Interviews were transcribed verbatim using *QSR NVivo 12*. The analysis was carried out using interpretative phenomenological analysis (IPA).

5.2.3 Analysis

IPA is a type of qualitative analysis that places emphasis on the meaning that participants give to their own lived experiences. IPA aims to assess participants' experiences from the reflections that

they make of their own experiences. It is the participants' reflections which the researcher assesses to interpret and create meaning from. In this sense, IPA is phenomenological as it attempts to account for individual's own lived experiences rather than objectively frame it from previous theoretical stances (Smith et al., 2009). Therefore, IPA researchers employ a process of double hermeneutics because they are trying to make sense of the participants' own attempt to make sense (Giddens & Bleicher, 1981). As opposed to other qualitative tools, IPA proposes a detailed and thorough analysis of each participant's experience (i.e., idiographic approach), encouraging a small and homogenous sample size in order to establish similarities and divergences from participants' accounts (see Smith et al., 2009). These characteristics of IPA were considered an advantage for the present study because of the depth and richness of the data, as well as the inductive approach which was considered key given the novelty of the research.

IPA proposes a structured analysis procedure that was followed in order to maintain transparency of the analysis (Smith et al., 2009). The proposed analysis procedure encourages researchers to make multiple readings of the transcriptions, take notes, and assess non-verbal accounts (e.g., prosodic features). Once researchers' have familiarized themselves with a given transcription, the transcript is assessed line by line taking descriptive notes (i.e., summary of content across the transcript lines), linguistic notes (i.e., noting semantic and/or language choices), and conceptual notes (i.e., researchers' initial interpretative attempts). Subsequently, researchers convert the notes into emergent themes which turn into the core of the analysis – the analysis at this stage focuses mainly on the emergent themes. The final phase of the analysis consists of establishing connections between emergent themes in clusters of superordinate themes (i.e., themes that put emergent

themes together). Once all transcripts have been analysed, researchers aim to find connections between the sample which results in the final output of the analysis.

The researcher was trained in clinical interviews prior to data collection (i.e., interviews). However, research interviews represented a new setting for the researcher for which theoretical training on how to conduct research interviews was carried out. The researcher had previous interest on the topic of research and was familiarised with some of the dating apps that participants mentioned based on his personal background and previous research (see Chapter 4). A reflexive and systematic stance was adopted to identify and avoid biases throughout the analysis process. To do this, the researcher followed the systematic analysis steps, as proposed in Smith et al. (2009), and collaboratively worked with his research team in the process of theme identification.

5.3 Results and preliminary discussion

Four superordinate themes were found in the analysis, namely objectification process, behaviour maintenance, the conflicted self, and new dating paradigm. The first superordinate theme, *objectification process*, contained three sub-themes (i.e., ‘focus on the physical’, ‘less value’, and ‘non-normative behaviours’). The second superordinate theme, *behaviour maintenance*, had five sub-themes (i.e., ‘intermittent reinforcement pattern’, ‘perception of no influence’, ‘cyclical usage’, ‘intrinsic reinforcers’, and ‘fear of missing out’). *The conflicted self*, the third superordinate theme, contained three sub-themes (i.e., ‘needs frustration’, ‘biases’, and ‘emotional toll’). The final superordinate theme, *new dating paradigm*, had three sub-themes (i.e., ‘online dating dynamic’, ‘change in focus’, and ‘instant needs gratification’). All superordinate themes and their

corresponding sub-themes are shown in Table 5.2, including the number of participants who referred to each of the sub-themes in their narrative.

Table 5.2. Superordinate themes and sub-themes

	Sub-theme	Across sample (1-9)
Objectification process	Focus on the physical	9
	Less valuable	9
	Non-normative behaviours	7
Behaviour maintenance	Intermittent reinforcement pattern	9
	No perception of influence	7
	Cyclical usage	8
	Intrinsic reinforcers	9
	Fear of missing out	5
The conflicted self	Needs frustration	8
	Biases	5
	Emotional toll	7
New dating paradigm	Online dating dynamic	9
	Change in focus	8
	Instant needs gratification	9

5.3.1 *Objectification process*

The objectification process refers to the dynamic by which participants felt that “*you are not a person but a product*” (Sebastian), which was not uncommon across interviews. Peter stated that sometimes dating apps felt “*like a menu in a restaurant and you are trying to see what your appetite drives you to*”. Gloria claimed “*it is just basically like going to the supermarket*”. Objectification theory has been widely studied from the women’s perspective and it states that objectification occurs “when a woman’s sexual parts or functions are separated out from her person, reduced to status of mere instruments” (Bartky, 2015, p. 35). Objectification theorists have related the process of objectification to a series of mental health outcomes, such as depression, anxiety, and eating disorders (Fredrickson & Roberts, 1997; Peat & Muehlenkamp, 2011). Objectification is also linked to self-objectification which refers to the dynamic by which the individual becomes their own critique on physical appearance (Fredrickson, 1997). Drawing upon the previous literature on objectification, it seems that the instrumentalization of the body, or specific parts of it, not only have detrimental effects on the individual’s wellbeing but also appear to exert a burden intra-individually (i.e., negative self-evaluation, physical self-preoccupation). This is not far from what participants expressed in their interviews, where three sub-themes were identified within the objectification process, namely “physical focus”, “less value”, and “non-normative behaviours”.

5.3.1.1 *Focus on the physical*

There seemed to be an agreement across all participants referring to how dating applications are mainly focused on physical appearance. For example, Anna described as “*superficial*” deciding to like or not to like based upon pictures:

*“[...] then you just look for pictures, at the beginning it looks like, and it is, it doesn't look, it is, very superficial, like you only like or dislike somebody by their pictures or their descriptions, and what I'm saying, I do have a type I do have, a physical type, if I say no, I'd be lying. But actually, I'm not liking my type, this last time, and just giving it a little bit of a...^{*12} wider space [laughs].”*

Anna described here how she experienced the decision-making or liking or not as superficial, and also, by her narrative it can be seen that users are primed to go for “their physical types” which would predominately disregard personality qualities of the users. Furthermore, her narrative “*at the beginning it looks like*” could suggest that when she first started using dating apps, she experienced a higher sense of superficiality which could diminish with prolonged usage (i.e., habituation). In this case, Anna said that she was “*giving it a wider space*” which means that she did not restrict herself to what she considers her type, but she had liked other users that may not necessarily qualify as her physical type, therefore being open to explore beyond physical attributes. Furthermore, the extract suggests that Anna’s stepping away from focusing on the physical, or her concept of “*superficiality*”, meant that she could find something more serious: “*I'd think of the future more than I used to the first time that I downloaded it [dating apps] [...], maybe it's time to stop playing games and stop doing the same [thing] with every conversation*”.

¹² Three dots and utterances such as “*ahhh*” have been included in the extracts (when applicable) to facilitate reader understanding. Three dots stand for pause in participant’s rhetoric.

Serena pointed out that *“I think Tinder is the most superficial [dating app] probably in the sense that I don’t think you can answer any questions on your...you know, beliefs or personality, or anything like that”*, which suggests that, in comparison to other dating applications, she perceived Tinder as the *“most superficial”* based on the fact that users are not presented with features (i.e., structural characteristics [SCs]) that transcend the physical focus (i.e., picture-oriented application) *“apart from the bio”* where users can include whatever they feel like, or even leave it empty, unlike other applications (e.g., *Bumble, OKCupid*), which include personality questions on users’ profiles. Maria also referred to *Tinder* in her narrative when she stated:

“Tinder for example, it was very based on few words and...a lot of photographs which is good if you want something more superficial but...ahhh, also not really good at reflecting how people were because there’s always like photos that aren’t really, ahhh real [laughs].”

In the first part of Maria’s narrative, she linked the pictures, *“a lot of photographs”*, to searching for *“something more superficial”* which resembled Anna’s experience. Maria established a relationship between the concept of *“superficiality”* and sex-search (i.e., looking for hook-ups) stating that other users are *“maybe too superficial or too direct towards sex”*, suggesting that the physical focus of dating applications, mainly based on pictures as the users’ main presentation, is perceived as a precursor for sexual interactions. The focus on the physical can direct the users’ attention towards sex-search, even if this was not their primary intention (this is covered more deeply below in the themes *needs frustration* and *instant needs’ gratification*). For instance, Peter describes that exchanging pictures, which is a SC present in some of the dating applications, is *“mostly for sexual purpose, and I think about what I’m seeing, if I like the body [...] I can get*

horny sometimes, that's the goal [laughs]". However, he also stated, *"what I ultimately am looking for is something meaningful like love would be, it's not everything about sex and...I don't want to handle people like they are meat, you know..."* which illustrates how the focus on the physical, by means of picture-based SCs, may influence Peter's motivations towards sexual interactions (i.e., sexting), which, based on his latter statement, is not his primary goal. The final part of Peter's statement (i.e., *"I don't want to handle people like they are meat"*) metaphorically portrays the objectification process. Nevertheless, as discussed previously, objectification processes are linked to self-objectification (Fredrickson, 1997) which suggests that objectification processes that users experience within their dating app usage may be bidirectional (i.e., directed towards others and themselves). In line with this idea, Simon stated:

"I feel...a certain pressure about me because... Well, after sending that picture and if the person likes [it], and as I said I want the best outcome, so I feel insecure. I think [...] you always have a bit [of] insecurity. I send the picture, will this person like it or not [?], should I take a better picture [?], maybe I should... ahhh... I don't know, I should trim my beard first. You know, it's something I wouldn't do, but sometimes, I think, maybe I'm not the best, it's not my best day to take a picture. Also, from the previous days you take the pictures and then you send the pictures you like most, and also maybe you learn [about] the pictures that people like most you tend to send them more to people, so...that's, and then every time you send one...yes, maybe you feel insecure, but...I don't care."*

Even though at the end he was diminishing his emotional experience by stating *"I don't care"*, he clearly described how he questions his own value based on his pictures, how important it is for

* The insertion [?] indicates the participants were making a rhetorical question.

him to portray “*his best*” to other users, and ultimately feeling “*insecure*” when he sent a picture of himself. In relation to self-consciousness regarding physical appearance, Gloria indicated that she was “*being more careful of my looks so if I take pictures, I think ‘Oh try to look nice’ so you can later use it on Tinder*”, which depicted how her self-awareness in regard to physical appearance increased due to her use of *Tinder*. In another statement, she expressed how she felt “*extremely self-conscious all of the sudden [...] because you have to look through all of your pictures and then you realize ‘Oh I look terrible, why do I always [pull] that face when I take a picture’. Ahhh... so it's basically self-hate [laughs] what I feel*” and continued, “*Oh I don't have any good-looking pictures; is it because I'm not good-looking or should I improve my modelling skills[?]....*”. Overall, these statements from Gloria's narrative depicted how the process of self-objectification can evolve from initially being more aware of her physical appearance on pictures to then feeling “*self-conscious*” and questioning her self-concept: “*is it because I'm not good-looking?*”.

In conclusion, focus on the physical refers to the picture-based emphasis found in dating applications, mainly reported on *Tinder*. The fact that users are somehow led to disregard other cues, such as personality descriptions, made them feel that the dynamic of interactions is “*superficial*” and most of the times led to higher sexual intent and/or sexual interactions such as sexting, even if that was not the primary goal of some users. The physical focus created the perception that users were objectifying others, which, in turn, could also promote self-objectification by increasing self-awareness of users' physical appearance, potentially leading to feeling “*insecure*” and questioning their own self-concept. Based on these findings, placing such relevance on physical appearance in dating applications like *Tinder* have the capacity create a

detrimental effect on some users, arguably, leading to lower self-esteem and poorer mental health. However, some studies found that users may experience short-term self-esteem boost (Langert, 2021; Orosz et al., 2018) which, in turn, can potentially reinforce the usage behaviour (see *Behaviour maintenance*).

5.3.1.2 *Less value*

There appeared to be a certain level of difficulty for users to establish a satisfying connection with other users. Irrespective of individual differences and experiences that will be assessed in this section, the analysis of the transcripts showed that the high availability of potential daters and lack of empathic behaviours in the online medium could be the main factors that explain why users deemed other users as “*less valuable*” interfering with their chances of forming more stable, long-lasting, and secure connections. In terms of high availability and less value, Sebastian stated:

“[...] it also gives you this very shallow kind of interactions that people usually have because in the end you’re just one of the many people that are in the app so it doesn’t feel... make you feel like you’re special, or that you’re going to have a special encounter. It makes you feel like you’re one of the many and like I said before, if you’re not what they’re looking for they move to the next, like is a grocery shop.”

Here, Sebastian noted that having many options led him to feel “*less special*” or even further, to anticipate that the encounter (i.e., date) would not be special. Also, he referred to dating apps being a “*grocery shop*”, meaning that users are treated like objects in a supermarket. This experience was similar to what Peter described in his interview:

“I just don’t like when people, you get to contact [...] many people and that thing in some way, I think that each person loses a bit of importance. I mean, that if

there are so many people ready to talk with me out there, I think that it makes us view some of them like less important and [...] I think we shouldn't do that...me, at least me, I don't like that."

In this quote, it can be seen how Peter said that by having a numerous pool of daters he felt that everyone “loses a bit of importance”. Arguably, perceiving others as “less valuable” could lead users to treat others less empathetically. Also, an alternative explanation could be that the online medium may facilitate less empathic behaviours which could, in turn, promote the perception of other users as “less valuable”. In line with this hypothesis, Anna said:

“Sometimes we just don't, and I'm including myself, sometimes we don't take into account that we are talking, even if it's through a screen or a device, we're talking to a real person on the other side and what we say might hurt them or might get to them.”

This quote illustrates how Anna perceived that interacting “through a screen or a device” may facilitate behaviours that could potentially “hurt” others. Even though she did not refer to any specific behaviour or situation, she seemed to indicate that the online medium was the mediating factor between lack of empathic behaviour and seeing others as “less valuable”. Lea, more specifically, referred to the following situation:

“I kind of like the flirty game as well ahhh...in these cases I knew that it was very unlikely that I would meet the person ahhh...because I'm not, I wasn't necessarily interested in this kind of relationship. I remember there was this one particular guy, for instance, with whom it was very [flirty] and we did talk for quite a while on the chat, he wanted to meet and then I didn't, so...well it stopped eventually, I liked the chatting bit.”

This quote suggests that Lea satisfied her needs by flirting with another user. Once her needs were met, she ceased the interaction even though *“he wanted to meet”*. This example portrays how the online medium can potentially enable users to satisfy their own needs via other users, irrespective of the consequences this may have for other users (i.e., less empathic behaviours). Maria also referred to a similar situation whereby *“when I just felt like horny and I wanted to have some sex talks, I just like went on these dating apps and maybe have a little bit of, ahhh... hot conversations with the person maybe... even if I wasn’t fully interested in that person”*. The last part of the quote *“even if I wasn’t fully interested in that person”* illustrates how the other person served for her ulterior motive which was to satisfy her sexual needs. Arguably, if these behaviours and dynamics are continuously engaged in on the online medium (i.e., dating applications) they could result in a learned interaction dynamic, whereby users perceive others as *“less valuable”* or as products in a supermarket as participants proposed. Heino et al. (2010) found that typical structural characteristics of online dating sites may promote the perception of being in a “marketplace”. However, considering Heino et al.’s study was carried out before dating applications became popular, it could be argued that those findings could have been magnified in the present study.

Gloria described online dating as *“inorganic”*, which suggests that she did not perceive the online dating dynamic as natural or genuine as offline dating (i.e., traditional dating). She stated, *“I want something to be more organic because online dating hasn’t felt organic to me [...]. I tend to be quite judgmental after my online dating experience towards people who use online dating apps”*. In her statement, first she emphasized that *“online dating doesn’t feel organic”*, and then she continued saying that she was *“judgmental”* of those who are users. Underlying her *“judgmental”* opinion of other users there could be past experiences that ultimately influenced her point of view.

Gloria's interview suggests that her experience of the objectifying dynamic led her to develop self-defence mechanisms. She also described instances of acting out by trolling other users *"I'll also create Tinder and it's mostly a case of me maybe just trying to mess with people, being kind of the troll [laughs] of the situation."* Trolling is defined as *"an act of intentionally provoking and/or antagonizing users in an online environment that creates an often desirable, sometimes predictable, outcome for the troll"* (Griffiths, 2014, p. 85). Therefore, in the case of Gloria, findings suggest that she treated others as *"less valuable"* because she has felt devalued by others. In line with this finding, Davidson et al., (2015) found that stranger harassment has a direct correlation with body surveillance, and the latter was positively correlated with other-objectification, which could explain that Gloria's initial objectifying experiences could have led her to higher *"self-consciousness"* of her physical self, leading her to behave as a troll.

As stated at the beginning of this sub-theme (i.e., *less value*), forming long-lasting, safe, and secure attachments seemed to be potentially hindered by objectifying others (i.e., perceiving them as *"less valuable"*). In fact, Robin in his interview stated the following:

"Since Christmas I became unemployed. Again, I've been not using it (dating apps) as much. I originally thought I would increase my usage ahhh...but it's kind of become the opposite for me [...]. Again, recently with using the online apps less, I've actually got into more meaningful conversations with people."

He experienced what he described as *"more meaningful conversations"* when his use of dating applications decreased. This quote suggests that being immersed in the use of dating applications may insidiously lead users to behave and/or perceive others (or their interactions) as less valuable resulting in less *"meaningful"* connections.

5.3.1.3 *Non-normative behaviours*

Participants' narratives suggested that there were new behaviours in dating applications which are not found, or at least not to the same extent, in the offline setting (i.e., via face-to-face interaction). Social psychologists define social norms as the *"behaviour form that is shared by members of a recognizable group and that may be considered to be normal for that group"* (Lindgren & Harvey, 1981, p. 536). From the participants' experience, it seemed like specific behaviours taking place within dating applications fell outside of the social norm (i.e., *non-normative behaviours*). Participants narrated situations where they have experienced some level of distress due to non-normative behaviours within dating applications. Sebastian described his experience with non-normative behaviours:

"Many times, when a person that you are not interested in writes you and sends you a naked picture of them or tells you very sexual kind of things that you weren't looking for and nothing in your profile is inviting others to behave like that."

This quote illustrates how a user can feel at liberty to display sexual behaviours (e.g., blunt sexual requests, sexually explicit visual content) irrespective of the other users' expectations and/or stated preferences: *"nothing in your profile is inviting others to behave like that"*. In the case of Maria, she described it in this way:

"I had contact with people that are very hateful when you weren't as direct as them, or maybe you were very honest, ahhh...about you not liking them, or not liking that approach, or, ahhh... they're being very...insisting about sending you pictures, [me] sending them pictures, and...having like a sexual conversation. If not, you were boring and it was very awkward and very, I don't know how to say

it, but very...I didn't really like it. It was really bad [...] Why is this person like hating me or insulting me, or saying that, or slut-shaming me about having sex with other people and not having sex with them."

Maria's quote went further saying that users would direct "hateful" comments to her, they would "slut-shame" her (i.e., stigmatization of a woman's sex life) for having sex with other individuals. Both, Sebastian and Maria, seemed to depict a similar phenomenon within dating applications, which is the facilitation of antisocial behaviours (Duncan & March, 2019; March et al., 2017; Navarro et al., 2020). Arguably, *physical focus* and *less value* phenomena, as objectifying factors (see Bartky, 2015), may facilitate the appearance of non-normative behaviours.

In line with antisocial behaviours, Robin described this as follows: *"I've been stood up which [...] caused me to lack trust in people, because I feel like in person that never really happened to me before"*. He compared his online experience to offline: *"I feel like in person that never really happened"*. By establishing those differences in typical behaviours of in-person dating and dating apps, it can perhaps be assumed that Robin's concept of dating apps was that of a riskier place in emotional terms. Also, Simon described the following situation:

"We were talking, and everything was nice and then there was like an interchange of pictures and in that interchange, I got blocked [...] so I was like "Why? Why do you do that?" I mean, we've been talking for three days and now you're not my friend anymore. So, that's disappointing and makes me feel insecure about myself because...Actually, it is just after sending a picture and you get blocked, that's so...kind of...yes...hurtful."

Again, Simon described a similar situation to that of Robin. In this case, the rejection was preceded by an interchange of pictures and three days of communication which resulted in Simon feeling

“insecure about [him]self” and ultimately *“hurt”*. The statement *“and now you’re not my friend anymore”* suggests that Simon experienced the communication through the dating app as a norm-regulated interaction, meaning that he was expecting offline normative behaviours to be applied in the online context – he could not understand why someone who has been chatting with him for three days would just block him without prior notice; *“Why? Why do you do that?”*. By interacting, Simon experienced some level of connection with the other individual, however, this connection was interrupted after an *“interchange of pictures”* by the other individual blocking Simon. Blocking another user does not allow any of the users to continue chatting or to see each other’s profiles, therefore there are no possibilities of having closure (if needed). The fact that communication can be interrupted abruptly by blocking can be deemed as a non-normative behaviour (i.e., not typical in offline contexts). In that regard, Anna said *“I would change the people’s perspective on the dating apps and the way we treat each other”*, which may refer to the lack of empathy (i.e., non-normative behaviours) that she has experienced with her use of dating applications. Furthermore, Peter stated:

“I like when you respect the other person and you value their feelings, maybe dating applications are giving the idea that that’s not necessary because I can just keep swiping and find someone else in a matter of seconds, you know...”

This quote also referred to a lack of empathy among dating application users. In Peter’s case, he argued that dating applications may be to blame *“giving the idea”* that having empathy-like behaviours are not necessary. Contrary to Peter, Anna blamed users for the lack of empathy that participants experience within dating applications as she asserted that the change needs to come from *“people’s perspective”* and beware of *“the way we treat each other”*.

Nevertheless, irrespective of who or what is to blame, it seemed that experiencing non-normative behaviours (e.g., being sent unsolicited sexual content, online aggression, antisocial interactions) may be *normative* within dating applications which seems to cause a great level of emotional distress in users. However, as with the process of enculturation – process of adopting values, beliefs, and behaviours of a given society that begins in early childhood (American Psychological Association, 2021a), some users may feel more distress as they have been raised in a less technology-led society, and so they may experience the contrast of norms between offline and online contexts more acutely than their younger counterparts. If this was the case, we would expect younger generations (i.e., Generation Z [Gen Z]) to be more adapted to these online norms with less negative emotional response. However, a recent study by Kaviani and Nelson (2020) suggests otherwise, their findings indicate that Gen Z is increasingly focused on sexting, refer to technology as the barrier for intimacy development, and report lower levels of self-esteem. Considering that Gen Z individuals have been in contact with technology from an early age, one would expect that they are more *enculturated* to technology realities, therefore experiencing less difficulties in online dating dynamics. Nevertheless, more research is needed to support these findings and further evaluate potential generational differences in terms of online dating behaviours and the extent of (negative and/or positive) emotional responses.

5.3.2 Behaviour maintenance

Considering the objectification process in dating applications, participants might discontinue their app use and break away from the objectifying dynamic. However, this is not the case. In fact, all participants had been using dating applications for several years, and moreover, they had used

more than one dating application across their usage span (see Table 5.1). Therefore, in terms of behavioural theory, there needs to be at least one reinforcing mechanism to initiate and (more importantly) maintain the behaviour (i.e., dating app usage). The latter, maintenance of behaviour, is assessed in this section. Five sub-themes were identified under this superordinate theme: *Intermittent reinforcement pattern, perception of no influence, cycle usage, intrinsic reinforcers, and fear of missing out (FOMO)*.

5.3.2.1 *Intermittent reinforcement pattern*

Intermittent reinforcement is defined as a type of conditioning schedule where reinforcers occur randomly. This is one of the type of schedules within operant conditioning theory (Skinner, 1965). Findings suggest that participants are exposed to a variable ratio schedule of reinforcement – a type of intermittent reinforcement. A variable ratio schedule is characterized by giving the reward (e.g., a match, number of dates, finding love/sex/affection) randomly or unpredictably after engaging in a variable number of behaviours (e.g., swiping, contacting different users, actively using dating apps). Serena described it in these terms:

“The kind of like reward contingency that you get when you're swiping, and swiping and swiping, and then you swipe right, and the other person swiped right, and you get that “Oh yes! a match” moment [...]. I don't know if, you know, [it is] clinically addictive, but certainly it is motivational.”

Serena uses the term “*reward contingency*”, which refers to the reinforcement schedule (i.e., variable ratio) that dating applications work with. In this case she was referring to *Tinder*. The reinforcer is “*a match*” which is described as “*motivational*”, which ultimately means that the behaviour of swiping is *motivated* (i.e., reinforced), therefore prompting the maintenance of

behaviour. Furthermore, the semantic choice “*motivational*” could denote the addictive potential that swiping in order to get matches can have. In fact, drug addiction literature points out that one of the key factors of addiction is how they work on the motivational centres of the brain (i.e., dopamine neural pathways), wherein highly rewarding stimuli trigger large dopamine release which can (with repeated exposition) disrupt the dopamine system leading to addiction (Di Chiara, 1995; Volkow et al., 2004). Drawing upon these findings, it could be argued that long-term use of dating applications could affect the motivational centre of users resulting in addictive tendencies of use (i.e., problematic usage).

In his interview, Simon went deeper into the meaning of a *match* from his own experience: “*You seek this confirmation of yourself through other people and then you use it to get that feeling of happiness every time you talk, when you use the app, or you talk to someone using the app*”. In this case, a match was perceived as “*confirmation of yourself*”, meaning that matches can reinforce the users’ self-esteem (i.e., provide a self-esteem boost). From a mental health perspective, the fact that a self-esteem boost is reliant on other users’ behaviour (i.e., external validation) could promote problematic dynamics, such as “needing” the external validation via dating applications. Also, this would further illustrate how a highly rewarding stimulus could affect motivational pathways which are linked to addiction. The idea of matches as self-esteem boosters was also portrayed by Lea:

“If you need ahhh... reassurance ahhh...or a boost of self-esteem [...], I didn’t mention it, but that’s something I could also feel when people liked me, obviously it boosts my confidence. I don’t have self-esteem problems, I used to long time ago, but I [have] overcome them. But I could see how some people that have low self-esteem could try to get reassurance through these apps and that, I imagine, [it] could lead to an addiction.”

Lea had seen other users trying “*to get reassurance through [dating] apps*”. Having recovered from self-esteem problems, as she stated, she saw patterns of behaviour in other users that she recognized from her own past (i.e., “*self-esteem problems*”).

Other participants portrayed the concept of intermittent reinforcement pattern in a different manner, focusing more on a desired outcome that might come “*at some point*” if they kept making use of dating applications. For instance, Gloria made the following comparison: “*It's like gambling that you wish that maybe at some point you're going to find that person who's like yeah, I wouldn't do this normally, but today I'm bored, so I'm doing this profile and then I'm going to delete it [the] next day*”. She described dating app usage as “*gambling*” which may entailed a meaning of dating apps being potentially addictive. As for gamblers, dating app users have a goal (i.e., “*find that [special] person*”). However, as with gambling, winning seems unlikely, but under a variable ratio schedule, dating app users persist on their usage “*wish[ing] that maybe at some point*” they will get the *big reward*. This is similar to other users’ narratives, such as Sebastian, who said that “*most of the time [it] is the bad feeling from it [dating apps], but sometimes, and that's why you use it, you do get to know someone that is very interesting in many different ways*”. He further stated: “*but the few times that you do actually have a nice, let's say thoughtful conversation, you feel very nice because it's a way of actually meeting someone and I think that many people like me cling to that feeling*”. Again, as with Gloria’s parallel to gambling, Sebastian described how he “*clings to that feeling*”, referring to the wish of finding something (i.e., special person, romantic partner) that he considered as unlikely, based on his statement “*most of the times [it] is the bad feeling from it*”. From these narratives, it seemed like the reinforcer is highly valuable for users. Although the likelihood of receiving the reinforcer is low, they kept maintaining their dating app usage. An

example of this was Peter's experience. He said that *"maybe in two years here [his home country] I've been [on] a date with someone...like five or six times; that's not much, it's not often"*, yet he stated: *"I still do it at least once a day [use dating apps], I will do it out of boredom or I don't know...it's like a routine that at least once a day I will get inside and see what's going on"*. Again, he illustrated how, even though the reinforcer appeared *"not often"*, he still used dating apps *"at least once a day"*. He went further by saying that *"it's like a routine"*, indicating his usage had become part of his daily habits. Arguably, if he used dating applications on a daily basis, there might be other types of reinforcers (apart from going on dates) that contributed to maintaining his behaviour.

To sum up, it appeared that dating applications maintain users' behaviours utilizing a variable ratio conditioning schedule, leading users to keep logging on in the hope of finding what they were looking for, even though they felt that their chances were low. There seemed to be a connection between matches and users' self-esteem boost which is also supported by previous literature (Orosz et al., 2018; Sumter et al., 2017). This connection could have a potential impact on users' wellbeing and mental health (i.e., adapted vs. addictive patterns of use). Further studies may assess how receiving matches (and/or other highly rewarding stimuli within dating applications) could affect the motivational centres of the brain as this may explain potential addictive tendencies of use.

5.3.2.2 No perception of influence

When asked how their dating app usage influenced their daily lives, participants reported *"almost [no]"* influence in their daily lives as a result of their usage. This finding suggests that having low

(or no) perception of influence in their daily life could have an effect on engagement and behaviour maintenance regarding dating application use. Sebastian, for example, stated *“I wouldn’t say it directly affects my daily life because I don’t let other compromises not being done due to dating apps, I usually put [the apps] in second place”*, although he said that *“it takes some of your free time to start talking to people”*. From his quote, it seemed that the influence of dating apps that he identified was related to time-management, whereby he felt that dating apps did not interfere with his daily duties. It seemed like Sebastian, by not considering other type of influence, was involving in some sort of self-defence mechanism not to create inner conflict, or simply, he did not go deeper enough in his answer to consider how dating apps could be influencing his emotions, perceptions, and behaviours towards dating and users. This was a similar perception to Gloria, who stated:

“I try to prioritize my real life, not that online is not real, let's say offline, offline life more than my online life, so I wouldn't be [...] talking to friends and checking my phone [...] I wouldn't be more focused on any dating app rather than just talking to people or working.”

Gloria made a clear distinction between online and offline life. Her narrative also suggested that she prioritized *‘being present’* when she was surrounded by *“friends”*. Yet, as with Sebastian, she was not making any reference to how dating apps influence other aspects of her life. For instance, she asserted that using dating apps had allowed her to overcome social fears by *“meeting new people without fears”*. However, she also stated that dating apps had made her *“feel quite lonely”*. Considering that both statements contained powerful outcomes for Gloria, it is striking how she did not refer to any influence in her life from using dating apps. Lea made the following statement:

“When I was using the app, it hasn’t impacted my daily life, I, I did sometimes use [it], look at the profiles when at work, but then during my cigarette breaks for instance [...] I would be on Tinder rather than on Facebook for instance. So, it hasn’t impacted, hasn’t really impacted ahhh... my daily life, no.”

Lea’s quote depicted ‘substitutive usage’, whereby instead of logging onto social media, she used dating apps. This concept was also mentioned by Gloria in her interview “*[...] instead of checking Facebook or Twitter, I would check Tinder*” Arguably, social media and dating apps share some motivational usage variables such as feeling a sense of connection with others, which drive users of both platforms to substitute their usage of social media for dating apps when they are actively using the latter. In line with this idea, Linne (2020) explored the gamification (i.e., introducing gaming-like structural characteristics) of dating apps and found that some processes typical in social media platforms are also found in dating applications, such as comparison between users, competition, rewarding high levels of interaction, and predominance of visual cues. Nevertheless, this needs to be further explored in order to assess how social media and dating apps share structural characteristics and how that may relate to psychological correlates of usage. In his interview, Peter stated:

“I wouldn’t say that it influences [my life] much, and right now the only way that I can see the influence is a positive one, maybe if you manage to meet someone that would be a positive outcome of using dating apps”

In his quote, as with the rest of the participants, Peter saw no influence in his daily life and even he said that the “*influence is a positive one*”. His interview was carried out during the early stage of lockdown due to the COVID-19 pandemic, which may have influenced his narrative in terms of how he perceived the influence of dating apps in his daily life. Nonetheless, his narrative was

not far from other participants who were interviewed prior to lockdown, which adds more evidence to the perception of the dating apps having no influence on the users' daily lives.

All the presented narratives seemed to have similar connotations, namely that there was no influence on their daily life based on time-investment as a result of dating app usage. There appeared to be agreement between participants, and priority was given to their daily duties and offline reality. However, participants did not mention how dating app usage could have influenced their emotional reality, which was prominent in their narratives and is discussed below (see *emotional toll*). Previous literature suggests that dating app users may find themselves in contradictory narratives due to the conflict between the positive and negative aspects of dating apps (Degen & Kleeberg-Niepage, 2020). Also, as it will be seen in intrinsic reinforcers, users identify gains for using dating apps that could not otherwise happen, therefore, the fact that participants in the present study referred “*no influence*” in their daily lives may entail that their dating app concept is not a dichotomic all-good vs. all-bad.

5.3.2.3 Cyclical usage

Cycle usage refers to the on-and-off pattern of use that dating app users engaged in. In general terms, the participants described that they downloaded one (or more) dating applications, used them for a limited period, uninstalled, and at some point, downloaded them again. Cycle usage appeared to occur over extended periods of time. For example, Anna's experience illustrates how she had been cycling through her dating app use span:

“It was really deceiving, I was like “Oh really, all the dating apps are going to be like this?” So I left it for a while and then downloaded it again. I mean, for me dating applications have been like a circle, because I found a guy that I really

liked, started talking with him and meet with him, started something, and [it was] not what it seemed [laughs], and [then I] download an app, and that's been the circle. It has happened for me like five times or so."

Anna expressed how after a situation that was experienced as deceitful, she stopped using dating apps "for a while", but then resumed her usage. Furthermore, her narrative seemed to suggest that deceitfulness continued, which promoted her on-and-offs cycles. However, perceiving deceitfulness did not prevent her from downloading dating applications again. Anna's narrative suggested that initially she was highly motivated to use dating apps and *potentially* find someone suitable, but in time her motivation decreased as a result of deceit: "not what it seemed" leading to delete dating apps. This idea was also depicted by Gloria:

"Your self-esteem, at least in my case, can be really threatened because you expect someone to match with you and you're like "Oh that was not a match and you're so beautiful and so am I, why didn't we match". Ahhh... but generally, it would be that feeling, those feelings that eventually will diminish until it will be just [...] plain boredom and indifference and hence I will yeah, ahhh... delete my profile. So, it starts from "Oh", being super excited to bored, "out of here [dating apps]"."

In Gloria's quote, there was a clear reference to how her self-esteem was affected by the dating app functioning (i.e., likes and matches) which influenced her decision to stop using them temporarily. Again, there seemed to be a high level of motivation at the start, ranging from "being super excited" to a lack of motivation at the end of the cycle, when she wanted to get "out of here". Gloria made a connection between cycle usage and her emotional experience. She

mentioned apathy, “*boredom*” and “*indifference*”. In addition to Gloria’s narrative, Robin stated the following:

“I was using the apps quite a lot and I think, you know what, this is actually not quite healthy and, and I [am] probably not coming across as my best self [...]. At that point I've been like right out, kind of delete the apps for a little while, gone in a bit of a detox, be happy with myself and then once I'm kind of happy with myself then kind of redownload the apps.”

The term “*detox*” was relevant when referring to Robin’s off-usage period, as well as the link between his emotional experience and usage. Robin seemed to depict compulsive usage of dating applications which felt as not “*healthy*” affecting his own wellbeing because he was not “*coming across as my best self*”. There seemed to be underlying psychological needs (e.g., social relatedness) that he may *need* to fulfil by using dating apps. Instead, he experienced needs’ frustration causing him emotional distress. In fact, the underlying unfulfilled needs would prompt the reinstallation of dating apps once the emotional distress had decreased. As supporting evidence, Lea’s narrative confirmed that every time her needs were covered, she would uninstall the apps: “*It was fulfilling the need that I had of meeting someone, so [there] was no point of keeping the app*”, and then she reinstalled it depending on her needs, “*the break would be more or less long depending on my desire to meet someone*”. Lea’s narrative appeared as *normalized* usage of dating apps. Her narrative lacked emotional distress and it seemed rational. However, Lea’s experience explicitly illustrated how usage cycles can be based on personal needs (e.g., social relatedness needs, validation needs, romantic needs), which suggests that users who experience emotional distress at the end of the cycles may be experiencing high levels of needs frustration, which is externalized in expressed apathy, disappointment, and low mood. Nonetheless, those same unmet

needs appear to be the motivational factors that encourage users to reinstall dating applications and “try again”, ultimately perpetuating their usage.

5.3.2.4 *Intrinsic reinforcers*

Using dating apps appeared to offer unique experiences that otherwise would not happen (i.e., intrinsic reinforcers). They are intrinsic because they were perceived as exclusive of dating applications, and they are reinforcers because they were experienced as positive outcomes as a result of dating app use. For example, Maria expressed how she became more sexually open by using dating applications:

“[Dating apps] had some effect in being more open sexually because I’ve met different people which were more open sexually and that opened me in some kind of way. And...I could speak freer about the things I wanted and the things that I didn’t want and discover other things that, maybe, I didn’t know about. So, in that way, I think that you can meet with people that are very different from you and that is something good. And, maybe you aren’t as open or don’t have as much opportunity with people that you meet in real life.”

Her narrative suggested that she was at ease discussing sex-related topics on dating applications rather than in “real life”, which ultimately led her to “being more open sexually”. Lea, in her interview, also stated how using dating applications allowed her to know herself better in her romantic interactions:

“Online dating has changed ahhh...my life in well, at a very personal level, because it has changed, it has made me realize ahhh...many things about myself and my attitudes with regards to how I approach men and women. How I am attracted by them, and how I consider myself with another person in a

relationship, whether it is a man or a woman. I came to realize that I have completely different attitudes, and that was, among everything, through the dating apps.”

Maria and Lea’s quotes suggested that users experienced less societal constraints within dating applications in regard to sexual and/or romantic interactions facilitating personal discovery (i.e., personal growth), whether for sexual or romantic purposes. Additionally, there were some participants (such as Gloria) who felt that dating applications have helped her being in situations that otherwise would not have taken place:

“I’d say it’s boosted my confidence because ahhh...I’ve put myself in situations where I wouldn’t have been otherwise such as meeting new people without fears because I am extremely introvert [...] Via online dating I have had the chance to introduce myself, so that’s good on the one hand.”

Similarly, Robin said:

“So, you come across people that in a million years, if you don’t have Tinder, you’d never ever hop on to anywhere. So, there was someone I spoke [to] who [...] we would’ve never met in the city centre because we wouldn’t be in the same events. We don’t shop at the same places, even groceries for example, we’re completely different, but the interest that that built was something amazing [...]. It was better than even previous relationships that I’ve had before, so I’m kind of thinking this [opened up] a whole new world for me.”

Dating applications were perceived as a bridge between the individual (i.e., user) and a pool of positive experiences, like the ones presented in the aforementioned quotes. In terms of behaviour maintenance, receiving positive reinforcers will make dating applications appealing to users,

irrespective of the main purpose for which they first downloaded the apps. In a further statement, Robin stated that dating applications served as a form of escape from daily life:

“During stressful periods at work [...] I think I used [dating apps] a lot more. So, using it on breaks, lunches, after work, pretty much every spare time that I had ahhh... On the way to work, on the way home from work, and I think for me it was more of a... I felt quite stressed out and it is just a stress relief and [...] speaking to new people ahhh...It's sometimes quite nice because when you have the same routine [...] you want to break away from [the] routine to try something new.”

Here, dating apps worked as a negative reinforcer (i.e., escape) from his daily routine and stress. More specifically, considering his semantic choices, there appeared to be a novelty factor within dating applications that allowed him to escape from his daily routine and “*stressful periods*”. Similar to Robin, Anna stated that dating apps served as a distraction for her: “*When I've needed distraction and being lonely, I mean not dating anybody, I've also downloaded it just not to think about the things that I'm having around, if I'm having a lot*”. Again, underlying these quotes is escapism (e.g., “*distraction*”, “*break away over routine*”), which served as a negative reinforcer that maintained behaviour by means of mood modification (i.e., reducing negative mood states and/or stress).

In sum, dating applications have created a medium in which users feel freer in comparison to offline contexts, to experiment, explore, and ultimately grow. This may be due to the perceived lack of societal limitations (i.e., moral values, normative behaviours) within the online medium. Consequently, users experience a series of positive outcomes that reinforce a favourable perception of dating applications, arguably, making users more “*attached*” to the apps. Moreover, dating

applications can negatively reinforce usage by means of mood regulation (i.e., via mood modification/escape). Although the goal of dating applications is *dating*, there appear to be further gains that participants' experience with their usage, potentially reinforcing the behaviour-maintenance cycle.

5.3.2.5 *Fear of missing out*

Fear of missing out (FOMO) is a term extensively used in social media research that refers to the “*pervasive apprehension that others might be having rewarding experiences from which one is absent*” (Przybylski et al., 2013, p. 1841). Undoubtedly, dating applications can offer a pool of rewarding experiences to those who are active users (see *intrinsic reinforcers*). Therefore, it was expected that participants would experience, or refer to, instances of FOMO in their interviews. In the case of Sebastian, he felt that he could be missing opportunities with other users who were not completing their profile information:

“[The Grindr dating app] also allows you to have the bare minimum of info, maybe even nothing at all, so like, some a lot of time you get interaction by ghost profiles, people don't have a pic, a name, anything in their profile description, and [...] they start talking to you and you, sometimes, you could miss an opportunity just because the other person didn't have information on.”

In this quote, frustration regarding the use of dating applications from some users in *Grindr* was indicated in the narrative. The semantic choice of “*you could miss an opportunity*” portrays how this frustration may stem from the fear of rejecting someone who could suit his interests. Further analysis would suggest that the fear of rejecting someone could underlie psychological needs that Sebastian was aiming to meet.

Another narrative that depicts FOMO is that of Peter. In his interview he stated that after moving to a different country, *“it was very interesting at first to see all the girls that are out there, and I had no idea of”* when he first downloaded dating applications. Consequently, Peter discovered a pool of opportunities that he was not aware of, and he said: *“I’ve noticed that sometimes [...] I was very interested in swiping left or right. I would do it a lot during the day [...] until no other people are left to swipe”*. His interest in swiping until there are no profiles left alongside his *“curiosity”* suggests that he experienced FOMO resulting in *“excessive and useless”* dating app use. Furthermore, his curiosity could have stemmed from social relatedness frustration as he narrated that he was in a different country, therefore trying to satisfy his needs of social relatedness could have led him to that *“excessive”* use. Alternatively, personality correlates like openness to experience and sociability could also underlie the *“curiosity”* of getting to know all the possibilities that were out there. Another instance of FOMO was described by Simon. In his interview, he stated that he signed up for the premium account on one dating app. When he was asked to further explain his motivations behind that choice, he stated the following:

“So, the first thing, I’m on my first free trial week and so I will, I won’t pay so...that was last week and OK it’s the worst, but it was Saint Valentine’s and I said, today is a good day to do this [laughs], I don’t know. But I think it’s nothing more...[laughs], just that. I mean, I will cancel the subscription in a few days.”

More notably in his non-verbal communication where he started to laugh, there appeared to be some level of distress when asked about this. Also, his narrative suggested that he used a defensive discourse: *“So the first thing...”* and *“I think it’s nothing more”*, which may have stemmed from an inner conflict between his rational judgement and his usage motivated by FOMO, this led him

to state “*OK it’s the worst*” referring to his choice of signing up for a premium account. Again, as with other participants, there seemed to be a connection between underlying needs that were conceptualized as FOMO. Robin described his experience with FOMO in the following way:

“People can text you any time of day...and they can pop up notifications on your phone. So, as soon as you can, right, I need to reply. So, that for me, it’s kind of like you could become glued to the phone for the whole day.”

He explicitly referred to notifications and how these can influence dating app engagement in a way that he could “*become glued to the phone*”. In line with this, Robin’s semantic choice “*glued to the phone*” seemed to suggest that notifications could have had promoted excessive usage. Also, Robin referred to his need of replying as soon as he possibly could, which first, indicated that he could have been fearing to missing opportunities (i.e., FOMO) and second, his underlying needs could have influenced the level of engagement he was having. Arguably, those users who experience higher-level of needs’ frustration would be more engaged to dating applications, and potentially more likely to develop problematic usage.

FOMO can influence users’ behaviour by increasing their usage time. The findings from the participants’ narratives suggest that unfulfilled needs and openness to experience could be two factors that underlie FOMO. Also, the findings suggest that users who increase their usage because of FOMO seemed to experience some level of inner conflict. In fact, previous literature in the SNS field has found a relation between FOMO and lower wellbeing (Przybylski et al., 2013). Further studies found that FOMO mediates between anxiety and depressive symptoms and negative outcomes of smartphone usage (Oberst et al., 2017) claiming that unmet social needs may underlie to psychological distress and FOMO (Wegmann et al., 2017). Therefore, there seems to be an

association between users' needs and FOMO, which can lead to different psychological states of distress (i.e., depression, anxiety) potentially triggered by inner conflict.

5.3.3 The conflicted self

Self in conflict refers to the individual user experiencing some level of inner distress, whether on the cognitive or emotional level. In the interviews, the participants presented their inner conflict in the form of negative thoughts, biases, prejudices, conflicting narratives, and/or negative emotional experiences. Three main sub-themes (i.e., needs frustration, biases, and emotional toll) convey the different inner conflict phenomena that participants experienced as a result of their dating app usage.

5.3.3.1 Needs frustration

Most participants expressed at some point of their interviews that their main goal was to find a partner (“*the one*”). Narratives suggested that participants initially aimed to meet their need of love and belonging as proposed in Maslow’s hierarchy of needs (Maslow, 1943). However, taken from their narratives, their main goal tended to dissipate in time and needs frustration appeared to arise as a result. Also, the findings suggest that participants experienced inner conflict as a consequence of prioritizing short-term needs (i.e., hook-ups) over long-term needs (i.e., love, belonging). When asked about the meaning that dating applications had for him, Robin stated that he wanted to find “*the one*”. However there seemed to be a conflicting narrative that suggested otherwise:

“For me, it's all about kind of meeting the one. But again, I can't really say I feel the same about other people because a lot of people I've spoken to on dating

apps they're like "Oh I'm not looking for anything too serious" for example...They don't seem to be in that kind of mindset. Whereas [...]I don't have the full intention to be meeting the one, but for me it's kind of, it's I want to meet some romantic, and it'd be ideal if it would end up in marriage and things like that."

Here, the conflicting narrative arose from the contrast between wanting to “*meet the one*” and “*not having the full intention to be meeting the one*”, finishing by saying that “*it'd be ideal if it would end up in marriage*”. The existence of this conflicting narrative suggested that Robin was experiencing inner conflict between his long-term goal of “*marriage*” and the perceived intention of others who are “*not looking for anything too serious*”. Additionally, Robin could be experiencing additional inner conflict due to his traditional background as he referred in his interview that “*traditionally my parents would prefer me to marry an Indian girl*” and also referred himself as a “*traditional dater*”. In his interview, he also expressed frustration over the perceived sexual dynamic on dating applications which prioritizes sexual needs over love needs:

"I actually feel I'm the outlier in them [dating apps]. And, the fact that I'm the different one ahhh... which is probably hard to get my head around. Ahhh... because I kind of feel sometimes... why am I so different [?], why am I...You know, not just the same, just want to have sex with the entire continent, like everyone else seems to want to do."

He experienced certain level of inner conflict concerning his own needs that may have arisen from the fact that he perceived normative online behaviour as different from that of his main long-term goal (i.e., marriage). Therefore, he tried to adapt to it. However, it seemed like trying not to be an “*outlier*” resulted in frustration. Similarly, Simon’s priority was to find “*someone special*” but, unlike Robin, he seemed to have adapted to the perceived sexual dynamic:

“I always have the hope to find someone super special, but in reality [...] I just find people that just want fun and that's [fine] for me. [Thinks] But it's true that in my mind...There is always to find this [inaudible] person. I mean, not only one, but one very special and very worthy person. I don't know...I'm always looking for it, but it's quite difficult.”

Even though Simon seemed to have adapted to the sexual dynamic “*that's [fine] for me*”, the analysis suggests that he experienced hopelessness when it came to fulfilling his love needs: “*always looking for it, but it's quite difficult*”. He explained his normal dating app usage: “*I see profiles and [...] they ask you what you are looking for, so usually I say meeting people and a second option I say fun, which I think [is] realistic*”. He described as “*realistic*” the fact that he is looking for “*fun*” – the word fun in dating applications refers to sexual interactions. The semantic choice “*realistic*” suggested that he may have readapted his initial motivations by what seemed like the norm on dating applications (i.e., sexual-led dynamic). Attending to the overall meaning of Simon's quote, there are grounds to suggest that he was experiencing needs' frustration as a result. Lea's narrative portrayed the conflict between motivations, beliefs, and needs:

“I think I want to meet someone [?]...and then it usually stops there, because again. I don't have expectations. Because, usually it's...yes, I don't think it's the way [...] for me to meet the love of my life. But then, that's not necessarily what I'm looking for. And then, I don't exclude this possibility either because you never know...”

In this quote, she started by saying that she “*wants to meet someone*” with a questioning prosody (note the question mark [?]), meaning that she aimed to find someone like “*the love of her life*”. However, she thought that using dating applications was not the way to do so, which suggested

that she was using a platform that she believed would not allow her to attain her goal. Additionally, she then said that meeting someone romantically may not be her goal. However, she did not rule it out “*because you never know...*”. Lea’s narrative fluctuated between what she wanted and what she thought was “*realistic*”, which seemed to be the case for most of the participants.

In sum, the participants’ narratives suggested that their belonging/love needs were the main motivation (initially at least) for using dating applications. However, the online medium appears to have created a culture that potentially distorts users’ intentions, resulting in a conflict between their needs, motivations, and beliefs. The findings suggest that users perceived dating applications as sex-oriented, which can lead, in some cases, to emotions such as frustration and hopelessness for those who aimed to find “*something special*” as a result of their unmet underlying needs. Nevertheless, it is relevant the fact that participants continued to use dating applications even though they perceived them as a medium opposing to their main goal.

5.3.3.2 *Biases*

Participants expressed some cognitive biases when referring to their dating app usage. These cognitive biases were represented by narratives that ranged from stereotypical thinking and prejudice to anticipation. For instance, Sebastian referred to how he anticipated other users to be overtly “*straightforward and sexual*” when they were contacting him:

“Here [...] comes the moment that you feel discouraged or whatever, because you are kind of anticipating for the other person to make one of these very specific, very gross kind of sexual advances on you. So, that’s kind of the train of thought I usually have.”

Sebastian explained that his experience using dating applications had been skewed towards sexual interactions: *“the people who I find the most are people who want to have sex basically”*. On the other hand, Peter said that using dating apps could be *“judged”* by others negatively, deeming him as *“needy”* or that *“people think that is mainly for sex, and maybe you see that someone you know you can feel like they will judge you in a negative way because of the app”*. Consequently, Peter portrayed what seemed to be the general perception of participants concerning dating applications (i.e., dating apps are sex-oriented), which led him to fear being outed or misjudged by others. There seemed to be some degree of truth in his perception of dating applications, which is also supported by previous scientific studies that found a predominant presence of sex-seeking interactions in *Grindr* (Brubaker et al., 2016; Obarska et al., 2020) and *Tinder* (Fansher & Eckinger, 2021). However, as with every stereotype, it came from an oversimplified idea of how something worked – the fact that dating apps seem to be predominantly sex-oriented does not mean that every user is looking for sex. The same study of Fansher and Eckinger (2021) also includes data on long-term relationships that resulted from the use of dating applications. Similarly, Robin feared that he could be outed to his family who come from a traditional background:

“I come from a family background where there is arranged marriages and things like that. There were a few girls that I matched with, and they were like “Oh I know your family” and things like that and [...]it caught me quite nervous because I was like what are you going to say...you know, like it's going to get back home, so that [made me] quite nervous.”

This narrative indicated that Robin’s underlying meaning of dating apps could be somewhat prejudiced, this would explain the fear he expressed of others potentially exposing him to his family *“it’s going to get back home”*; also, it would explain his emotional response *“quite*

nervous” when another user mentioned that she knew his family. Such emotional reactions to using dating apps represent a conflict for the self because, as the participants stated in their narratives, they have been long-term active users of dating applications who navigate through stereotypes and prejudice (albeit of needs’ frustration and objectification processes), which ultimately can be self-directed (e.g., users are *only* looking for sex; people will *judge* me). Gloria also exemplified a similar meaning to her dating app usage and how stereotypical thinking and prejudice interact with her self-concept:

“This again is bias I have towards online dating in the sense of "Oh I'm so shallow" or "OMG I cannot meet people out there" or "These people are not special and I'm special" so “what am I doing here”, I don't want people to know and if people were to find my Tinder profile I'd be like "Oh you know I'm just kidding" [ironic laugh], which is true but also it's kind of the excuse that I would give.”

To protect her self-concept, she felt the need to have an “*excuse*” for why she was on *Tinder* because individuals who use dating apps “*are shallow*” and “*not special*”. Therefore, she needed to distance herself from such stereotypical concepts, as a way to lower the potential inner conflict that using dating applications could elicit.

In sum, users experienced dating applications as a sex-oriented medium. Consequently, they experienced stereotypical thoughts of how interactions would be (e.g., individuals will *only* contact me for sex) which may potentially change their attitude preventing them from connecting with potential dates. The latter could be explained by the self-fulfilling prophecy – the idea or expectation that can bias individuals’ cognition and/or behaviour to align with that idea (American Psychological Association, 2021b). Applying the self-fulfilling prophecy to dating apps would

mean that users' idea or expectation of dating apps being a sex-seeking medium could actually be counterproductive and they could be perpetuating that notion (i.e., dating apps are a sex-seeking medium) with their own cognition and behaviours. Considering that these stereotypical thoughts come from long-term experience, users abided by those ideas which, in some cases, resulted in emotions connected to prejudice, such as shame, anger, disgust, and fear.

5.3.3.3 *Emotional toll*

Participants' experiences extensively contained emotional by-products from their dating app use. The general narrative suggested that they experienced a lack of motivation, apathy, boredom, and exhaustion at some point of their continuous use, which was generally followed by discontinuing their use for some time (see *cyclical usage*). All the emotional responses they experienced resembled the process of burnout, which is defined as a syndrome of emotional exhaustion and cynicism mainly found in working settings where there is interaction between individuals (Maslach & Jackson, 1981). Similar to burnout syndrome, some participants expressed certain levels of exhaustion after a period of continuous usage. They expressed distance between themselves and the dating apps: "*dating apps are sort of something that is apart from my world*", and they also expressed negativism regarding their use of dating apps as it has been discussed in the themes *needs frustration*, *biases*, and *objectification process*.

Simon stated that when other users blocked him, "*I always initially [felt] maybe sadness and then is anger*". The fact that the first emotional reaction of Simon was sadness may indicate that others blocking him could have an underlying negative meaning affecting his self-concept (i.e., they block me because I am not worth it). After sadness, he referred to feelings of "*anger*" which may

entail a further phase whereby self-defence mechanisms turned the meaning of blocking from internal locus of control – sadness (i.e., I am not worth it), to external locus of control – the others are guilty. Peter also referred to “*ceased connections*”, stating that what “*I don’t like is that after a while we completely ceased connection, we stopped talking to each other and that’s a bit inhuman in my point of view*”. Halting the interaction by blocking or just ghosting (i.e., the act of halting communication for the purpose of relationship dissolution [LeFebvre, 2017] was experienced as emotionally disturbing). Considering that this is not uncommon within dating applications, some level of emotional toll would be expected if a user experienced this continuously. For instance, Sebastian described how he needed to take “*breaks*” in order to cope emotionally with his usage:

“After a while of using [dating apps] you get like.... exhausted. You start using it a lot the first few days and then if nothing happens, if you don’t actually meet people, or if the conversation just dies in the middle [...] you start to get wary of using the apps, like you get tired and so...I [have taken] a number of breaks.”

Sebastian claimed to start using dating applications “*a lot*” at first, which suggested that he was highly motivated. However, after a while of using them, he started feeling “*wary*” and “*tired*” which led him to take a break. Likewise, Gloria explained how she cycled between “*excitement*” to “*plain boredom*” as discussed in *cyclical usage*. Therefore, the participants’ narratives suggested that “*at some point I would be you know, kind of tired, or busy or didn’t particularly fancy using them*” as Serena reported, mainly because of a loss of motivation.

Because of the emotional toll that dating app usage can take, some participants stated that they had thoughts of quitting dating apps altogether. In the case of Anna, she stated “*I felt it wasn’t for me [...] I don’t know, I wasn’t really motivated into knowing somebody when I deleted them*”. She

mentioned that instead of using dating apps she would “*get to know [people] in a bar*”. For Robin, he said that he may go back to “*traditional dating*”:

“When I was looking at things recently, I was kind of maybe I should go back to traditional dating and forget dating apps. You know, because there's a lot of hassle to speak to people, to get busted, and then you can't really improve the future.”

This quote suggests that Robin was feeling hopeless regarding dating via dating apps: “*you can't really improve the future*”, which portrayed the high valence of his emotional response (i.e., hopelessness). However, it is not all negative emotions for users. In fact, as discussed in the section on *intrinsic reinforcers*, users perceived themselves gaining experience, new friends, and new experiences, which resulted in positive emotions. Nevertheless, the findings regarding their negative emotional toll are concerning when users cycle between high levels of motivation and feeling “*exhausted*”. The findings suggested that users were highly emotionally invested in their dating app use, but their emotional investment did not meet the expected gains, which resulted in loss of motivation and hopelessness.

5.3.4 New dating paradigm

Individuals can extensively increase their social capital to pursue flirting, courtship, love, and/or fulfilment by using dating apps (Hobbs et al., 2017). Having increased social capital was expressed in the interviews as having “*endless resources*” and “*countless profiles*”, which ultimately meant that there was high availability of potential dates. Compared to traditional offline dating, participants' narratives suggested that there were new behaviours when it came to online dating

(i.e., *online dating dynamic*), that high availability of resources in combination with the high-paced dynamic led to *change in focus*, and the facilitation of *gratification of short-term needs*.

5.3.4.1 *Online dating dynamic*

Online dating behaviours appeared to have been transposed, to a great extent, from offline dating (i.e., breaking the ice, talking, meeting each other, and exchanging numbers). However, unlike offline dating, there seemed to be less (perceived) uncertainty and higher sense of control from the users in how and when they wanted to interact in online dating. In fact, participants stated that dating applications were very well suited “*especially for people that are too busy to go out outside and meet someone*” (Peter). In the case of Serena, she said that “*I don’t like to meet people in that kind of situation [going out], so it [dating apps] allows you to get to know someone in more of a relaxed situation where there’s usually no alcohol involved*”.

In terms of initiating the conversation, participants described a set of steps for online dating. For example, Maria stated that her interactions normally followed a pattern:

“We start speaking about superficial things, or maybe funny things, and there’s one point when they, when I ask, or they ask, what do I want from this. Like, do I want like a sexual relationship only, or something else...And from that, I give my personal number because I hate the messenger in these dating apps [...]and after some talk, depending on how much I like the person I speak more or less, I normally want to meet pretty quickly.”

Maria illustrated in this quote how she (or the other user) broke the ice followed by asking what their goal was. From a psychological perspective, users may need reassurance of what the interaction is going to lead to (i.e., they avoid uncertainty), which is facilitated by the position of

control users have when interacting through their smartphones, as opposed to face-to-face. Gloria said that reducing the uncertainty somehow facilitated the move to the next step, exchanging phone numbers: *“we have discussed the expectations that we had [...]and in those cases we have always tended to exchange phone numbers”*. Simon described what seemed like an orderly way of initiating an interaction with another user:

“So basically, the interaction is small talk first. And then, at some point, it always turns to fun, or what are you interested [in] or what are you looking for and then people say fun, meeting people, something like that. And then...nudes [laughs] or well... sexy pictures of the other person. There is always an interchange and then... it depends. But usually [...] it stops there because we are not interested in each other.”

This quote resembles what Sebastian described as his usual interaction: *“they start just saying ‘hi, how are you’. Start talking about who you are, where you [are] from, what do you do, maybe exchange some pics [pictures] and see each other”*. Simon and Sebastian described their experience on *Grindr* for which the exchange of pictures was part of the interaction process, unlike other dating applications which do not include this structural dating app characteristic, such as *Tinder*. Exchanging pictures was seen as something more intimate that usually happened when a raised level of connection had been established, like Anna stated: *“when I'm exchanging pics with somebody...it's because I've had some kind of confidence with them, like I've got to a point that we're talking a little bit more”*. Another example was Gloria. In the following quote she described how she felt that sending pictures is like *“including”* someone into one's life:

“I have never exchanged pictures, like, I have been sent [pictures] and I have never done it because [...]it was again a case of someone trying to include me in their lives and I was like, I'm not in that state yet.”

In terms of continuing the interaction, many participants moved to other online platforms, such as *Whatsapp* or *Instagram*. For example, Peter described that when he liked someone, he gave his *Instagram* profile:

“I also have the tendency to maybe move to another app, like Instagram [...] when I find myself liking the person a lot... I tend to ask them for their Instagram for example, because that's a way to make sure that you don't lose them, because there are many users that use dating apps for a night, they delete [it] afterwards. And, if I like someone a lot, I wouldn't like to lose them because of that.”

In this quote, Peter described how dating apps can be fast-paced and users that he saw as appealing might *disappear*. Therefore, he chose to move to *Instagram* to avoid “*losing*” potential dates. Similarly, Anna said that she preferred to move to other platforms that are “*part of my world*”:

“I would use other apps to continue the conversation, I would use maybe WhatsApp maybe Instagram because I... I feel it [is] more like mine, because dating apps are sort of something that is apart from my world or from my usual usage.”

Therefore, users seemed to gain more control over their dating interactions when online, which reduced the uncertainty of face-to-face interaction. However, online dating behaviours seemed to have been translated from the offline dynamic, whereby there was an icebreaker, talking, and eventually meeting more and establishing a connection. In the case of online dating behaviours, exchanging pictures and moving to a social media platform appeared to be the steps that followed initial interactions, and these were deemed as more intimate.

5.3.4.2 *Change in focus*

The findings of the present study suggest that participants experienced changes in their attitude towards dating in general, caused by their use of dating applications. Attitudes are defined as the set of beliefs, affect, and behaviour that a given individual has towards another person, object, and/or situation (Breckler, 1984). Participants referred to changes in how they and “others” were dating in the present (i.e., changes in behaviour), how their beliefs regarding dating had been influenced (i.e., changes in cognition), and how they felt about the “new” form of dating (i.e., changes in affect).

It appeared that high availability of resources (i.e., numerous amounts of potential daters) and the fast-paced dynamic generated by dating applications were at the core of the attitudinal change among users. Sebastian highlighted that there was an “*addictive*” factor when users knew that whenever they logged in, they would have numerous resources:

“The addiction component comes from being easy to reach to others and that it is always going to have people in it. Like, it’s a way like you just love to log in to the app, and you know there’s going to be people. So, there’s going to be new people, old people, or whatever [...] It’s a very new problem in society nowadays [...] because they [other users] have it so easy to meet other people, they usually just want one very specific thing or nothing at all. So... the bad thing is that it makes getting to know another person very hard, and also makes you very insecure about talking to someone just to the face [...]. It gives you an easy option in like you stop having those embarrassing moments of like trying to approach [...] this person you’re attracted to or all those embarrassing moments of the first, let’s say interaction [...], but it also gives you this very shallow kind of interactions that people usually have because in the end you’re just one of the many people.”

Sebastian noted different factors of attitudinal change in his quote, namely affect, stating that dating apps were making him more insecure because he was getting used to not having to break the ice *“in person”*, therefore avoiding *“embarrassing moments”*, and so making him less prone to date offline (i.e., behaviour change). He also pointed to cognitive changes referring to how other users had a *“very specific”* idea of what they were looking for, being that *“or nothing at all”* which he asserted *“makes getting to know another person very hard”*. Sebastian’s narrative seemed to address the idea that users were looking for the perfect match and, as a result, getting to know new individuals is becoming increasingly more difficult. This experience was not far from what other participants had described. For instance, Gloria stated that dating apps were *“really fast like, in a matter of five mins you have been shown 50 people”*. Similarly, Robin related the fast-paced dynamic and high availability to how addictive dating app use can become: *“is one person every second almost that you got on the palm of your hand so it can definitely, I think be quite addictive just because there's so much availability kind of there”*. Robin referred to higher engagement with dating apps, which appeared to shift users’ focus towards online dating. As he stated in his interview, when he tried dating apps for the first time, coming *“from traditional dating where you kind of speak to the person, kind of being an excited puppy with all of this kind of availability. It was kind of like “OMG this is really cool”*. In terms of behavioural change, Peter stated that using dating apps had changed his way of dating:

“I think that it has made me...maybe less willing to make some effort, in like I am expecting [dating to be] easier, that things should be easier. And, when the person doesn’t seem that interested, maybe I won’t think that she’s playing hard to get [...]. I will distance myself because I’m expecting that thing to be easier

and doesn't need that much effort [...]. I won't make more effort like maybe I would do in the past, in a different situation."

From a rational perspective, Peter may be cognitively and emotionally efficient, meaning that he did not spend cognitive and emotional resources on daters that may never meet his wishes. However, from a courtship point of view, it seemed like these changes may result in a whole different dynamic of how daters may need to be emotionally available if they do not want to miss out on "dating opportunities" (see *fear of missing out*), arguably favouring fast-paced courtship and rapid relationship-forming. Also, as Simon stated, dating apps could lead users to be more selective: "sometimes people that could be yes, I don't talk to them because there's so many people that I just really pick those that appeal to me the most". In other words, why would someone need to accept something which is good when they can find something easier and better.

In sum, the findings suggest that users experienced changes in the way they perceived other daters, in the way they felt about dating and courtship, and the behavioural strategies they implemented when dating, influenced by their use of dating applications. The design of dating app seemed to perpetuate these changes, whereby high availability of daters and the fast-paced dynamic are the main change-inducing factors.

5.3.4.3 Instant need gratification

As seen in previous themes (i.e., *needs frustration*), participants in the present study asserted that their main goal was to find a partner via dating apps which, arguably, required delaying instant gratification (i.e., hook-ups) in the pursuit of their long-term goal. However, as Simon stated, delaying the long-term goal of finding a partner in favour of short-term gratification (i.e., sex) was

“realistic” on dating applications. The findings suggest that participants responded to short-term needs via dating apps which detracted them from their *original* goal. Gloria described this as being *“lost”*: *“there's a bunch of people who are like me that are just lost, and just want to talk to people either friendship, or relationship or sex”*. The semantic choice *“lost”* may refer to the uncertainties of her own fluctuating needs, meaning that one day she might be feeling more interested in finding a partner and the next day she might be more interested in having sex. Also, Gloria referred to how she attended to her needs of *“being validated”* by using online dating apps and once she was satisfied, she discontinued her dating app usage: *“it would be the case of “Oh I'm feeling lonely, I don't feel pretty, I want to be flattered”. [A] couple of guys say, “Oh how beautiful you are” and like OK [...], bye”*. Also, Maria referred to how needing external validation can be insidiously established in users:

“Truth is dating apps can be dangerous because you get the validation, but also you don't get it. So, it makes you more addicted on like making a good profile or being [on] all the time or checking how many matches did you get, or how many people did you talk to.”

This detracted users from their original goal and placed more emphasis on instant gratification, such as *“the number of received matches”* or *“the amount of people they talked to”*. Anna stated that *“sometimes I just send picture of whatever I'm doing just to have attention [...], yes, I was seeking attention”*, which resembled the narratives of Gloria and Maria. In sum, Gloria conveyed this idea of needs-driven usage by saying that dating apps *“are either a place to find one-night stands, to feel flattered, to talk to people, to find relationships, but again I think it depends on your...environment context at that moment”*.

Apart from external validation, participants presented inconsistencies on their narrative, which suggested that the context (i.e., dating applications) may favour a culture based on short-term gratification over long-term goals. For example, as presented previously in *needs frustration*, Lea stated that she mainly “wants to meet someone”, even though she has “no expectations”. In another quote she stated that “I never really knew what I was looking for, I wasn’t really looking for anything in particular”. Similarly, Robin stated the following:

“I’m mainly looking for something serious, but there have been points where I’ve been like, you know what, I just want to relax and kind of just enjoy having fun and dating. Trying to do the whole kind of thing that everyone else does.”

Even though Robin clearly stated his main motivation was to find “something serious”, he described moments where he had felt the need to “relax” and “enjoy having fun” because he felt this was what “everybody else does”. Again, this seemed to denote the concept of being “realistic” based on the context (i.e., dating apps), but not *realistic* with regards to his main motivations.

To sum up, dating apps seem to have created a culture where users’ dynamics favour short-term gratification which results in users deviating from their *expressed* primary goal. Arguably, hook-ups and looking for a long-term partner do not have to be mutually exclusive. However, the participants’ narratives suggested that they held “looking for fun” (i.e., sex) to a different standard than looking to meet someone “more seriously”. Therefore, the fact that once they started using dating applications, their scope of goals appeared to broaden out, leading them to neglect their main goals suggested that users could be *losing* themselves in an activity and associated culture that reinforces short-term gratification over long-term or delayed rewards.

5.4 General discussion

The present study assessed the experience of use of dating applications in a cross-cultural sample aiming to provide further evidence on the meaning that users create from their own usage, how users experience the structural characteristics of dating applications, and how instances of problematic use of dating applications may be conceptualized in users' experience. As a result of the analysis of nine semi-structured interviews, four superordinate themes emerged, namely objectification process, behaviour maintenance, the conflicted self, and new dating paradigm. Each of the superordinate themes contain subthemes (see Table 5.2) that have been assessed and discussed.

The emergence of objectification processes was expected given the body of research that has reported similar results (Breslow et al., 2020; Heino et al., 2010; Sion, 2019). For instance, the use of metaphors referring to online dating usage, like the one reported in the present study (e.g., “*grocery shopping*”, “*looking at the menu*”), has also been reported in previous studies assessing online dating sites (Heino et al., 2010) and more recently dating applications as well (Brubaker et al., 2016). The use of metaphors seems to arise due to the predominance of visual features (i.e., picture-based profiles) over personality cues in dating applications (i.e., *focus on the physical*), which is experienced as “*shallow*” and “*superficial*”. As a result, users deem others as *less valuable* “*objects*” they can pick out at their convenience. Additionally, some studies argue that implementing gaming-like SCs in dating applications has resulted in emotional distance to potential daters and entertainment motives of usage rather than dating (Carpenter & McEwan, 2016; Krüger & Spilde, 2020), which could increase the notion of *less valuable* others.

Consequently, objectification processes elicit negative outcomes at the individual level and group level.

First, on the individual level, findings in the present study suggest that users experience lower self-esteem, more preoccupation with their on physical appearance, and higher emotional distress when they are actively using dating apps and experience wellbeing improvement when they discontinue their usage for a period of time. Previous literature has found that objectification processes negatively affect mental health (Fredrickson & Roberts, 1997; Peat & Muehlenkamp, 2011), which has been supported by the findings of the present study. On a group level, there seems to be a culture that has arisen from the use of dating applications which promotes specific behaviours that are now established in the day-to-day dating app interactions (e.g., ghosting, non-consensual sexual interactions [*non-normative behaviours*]), which may exacerbate the perception of *less valuable* individuals (Bloom, 2016). In fact, there is a number of these behaviours that have received their own name, such as ghosting, breadcrumbing (i.e., the act of sending flirtatious texts to receive attention and without expending too much effort [Navarro et al., 2020], and sexting, which are not only pop culture nomenclature, but also researched topics in scientific literature (Barrense-Dias et al., 2017; Degen & Kleeberg-Niepage, 2020; Rodríguez-García et al., 2020).

Regarding the emergence of a new culture within dating applications, another superordinate theme emerged, namely *new dating paradigm* which conveys the underlying psychological phenomena that users experience with usage. Overtly, some online behaviours have been adapted from offline contexts (e.g., breaking the ice, continue chatting, gaining confidence), having each one of these behaviours its online counterpart as it was discussed in *online dating dynamics*. For example, users feel that exchanging pictures can happen at a later stage when there is more connection and/or

confidence because it is deemed as more intimate than just chatting. To some extent, the process of individuals adapting their behaviour to a new code system could be similar to the process of enculturation which may be easier if users have a previously known behaviour to refer to.

Furthermore, findings suggest that there are emotional and needs' dynamics underlying that are at the core of the *new dating paradigm*. One of the sub-themes, *instant need gratification*, points out that users are led to gratify their short-term needs (i.e., needs that can change in a short period of time). For instance, participants in the present study indicated that they were mainly looking for a romantic partner, but also many of them referred to having hook-ups or sexual interactions via dating apps. Although having sexual interactions online or offline does not need to be mutually exclusive for finding a long-term partner (Rochat et al., 2019; Wu & Ward, 2020), the narratives of the participants seemed to suggest that they separated those motives as if one who was looking for sex would not be considering something else (i.e., finding a romantic partner). Nevertheless, dating applications seem to have facilitated the short-term culture by which users live by the perception that whatever they feel they need, they can have it instantly and with a few swipes (i.e., *change in focus*). However, when it comes to applying the short-term culture to (online) dating, a fundamental conflict arises which may be the key to virtually most of the themes of the present study: short-term culture hardly works along with forming and/or constructing a long-term partnership or even a secure attachment (Stanley et al., 2010). For dating app users this can be a clash which leads to an emotional response (i.e., *the conflicted self*). As a result, some users cope with this conflict by opening their scope of interests (i.e., adapting their motives to the culture they are experiencing), leaning towards hook-ups, sexual online interactions, and/or online interactions that serve to validate themselves (e.g., flattery) which seem to have a positive short-term effect on

the user (Langert, 2021), but in the longer term some studies suggest that these behaviours (i.e., hookups, sexting, validation seeking) could potentially lead to problematic use of dating apps (Rochat et al., 2019; Obarska et al., 2020).

Moreover, users experience high levels of frustration (i.e., *needs' frustration*) in the long-term which seems to suggest that certain needs are not being met (i.e., love and belonging needs). In addition to frustration, users experience more negative emotional responses (Coduto et al., 2020) as a result of their frustrated needs (i.e., *emotional toll*). In fact, the findings in the present study suggest that due to the high valence of those emotions, users experience a form of burnout syndrome, which leads them to pause their usage for periods of time to heal before resuming their dating app usage (i.e., *cyclical usage*). Previous studies suggest that users invest high levels of energy into their dating app usage, which exacerbates the conflict between the pros and cons of using dating apps, resulting in lower wellbeing, leading to leaving (i.e., deleting) the app for a period of time (Brubaker et al., 2016; Degen & Kleeberg-Niepage, 2020; Linne, 2020).

It seems like the interaction between individual needs, the *new dating paradigm*, and the emotional responses could be at the core of problematic use of dating applications, maintained by behavioural reinforcement patterns implemented in the dating app design (i.e., *intermittent reinforcement pattern*). Previous literature suggests that dating app users who satisfy their needs via their usage are more prone to develop problematic use of dating apps (Altan, 2019). Parallely, findings in the present study suggest that users who experience higher levels of needs may be more likely to have higher engagement (potentially engaging in excessive usage) via *fear of missing out*. Additionally, further claims on addictive patterns were made when *intermittent reinforcement* patterns were assessed, relating the potential effect of “matches” on the motivational centres of the brain (Di

Chiara, 1995; Volkow et al., 2004). Additionally, in a review of neuroimaging techniques used to assess internet and gaming addiction, Kuss and Griffiths (2012) concluded that at a molecular level, lower dopaminergic activity was found in cases of internet addiction. Even though, to the best of our knowledge, there are no neuroimaging studies that have assessed this relation (i.e., effects of matches on the brain centres), there are some cross-sectional studies that could serve as positive evidence for this claim as they relate receiving validation via online mediums to higher engagement (Chen & Kim, 2013; Sumter et al., 2017). Further research may assess how the brain reacts to the exposure of dating app cues, comparing high and low frequency users. Additionally, the act of swiping could be another aspect to assess further by empirical studies on problematic use of dating applications, as this is the behaviour that users need to engage in to get the reinforcer.

Regarding intermittent reinforcement patterns, users are presented with multiple possible reinforcers depending on their interests and/or motives. These reinforcers are highly related to their emotional needs (e.g., social relatedness, need of belonging, sexual desire), which make reinforcers very high in valence, explaining why, even in cases when the reinforcer is not attained, users continue their dating app usage. Also, as has been discussed, reinforcers are offered in a variable ratio schedule, which enhances longer-term behaviour engagement when compared to other fixed ratio schedules (Skinner, 1965). When assessing problematic use of dating apps, it is relevant to further study the effect of reinforcement patterns, implemented in the applications' design (i.e., SCs), on users' behaviour. Previous studies in gaming addiction showed that altering the reinforcement pattern affects gamers' engagement and their emotional response (Chumbley & Griffiths, 2006). Moreover, Griffiths and Wood (2000) found that intermittent reinforcement makes *“people keep responding in the absence of reinforcement hoping that another reward is*

just around the corner” (p. 211), which resembles the findings in the present study where participants stated that they continued using dating apps because “at some point” they might find someone interesting.

In terms of SCs of dating applications, the findings in the present study suggest that picture-based profiles (i.e., *focus on the physical*) and picture predominance (over personality cues) distance users emotionally, which could be at the roots of *objectification processes* (see Chapter 4) and a promoting factor of sex-led interactions. Sex interactions (e.g., sexting, exchange of nudes, hook-ups), even though they can have short-term positive effects on the wellbeing of the users (i.e., self-esteem boost, body satisfaction; Watson et al., 2019; Wu & Ward, 2020), can facilitate classical conditioning of dating app cues to sexual arousal by continuous exposure, which, arguably, can skew users’ behaviour towards sex-searches. Hypothetically, users looking for sex are beneficial to dating app enterprises because they are continuous customers, as opposed to those who find a romantic partner and cease their usage. This explains why certain dating app developers may favour or even design SCs that direct users’ behaviours towards sexual interactions (LeFebvre, 2018; Obarska et al., 2020). Irrespective of the interests of the dating app industry, a previous study found significant differences in sexual impulsivity and negative sexual behaviour when comparing app users and non-app users (Fansher & Eckinger, 2021), which suggests that dating apps can promote such behaviours, although alternatively, it could also be that individuals who score high on sexual impulsivity and negative sexual behaviours are more likely to become dating app users. Research could further assess the relationship between structural designs in dating applications to determine whether dating app design is the cause of increased sexual behaviour.

5.5 Limitations

Even though the rigorous methodological steps for IPA analysis were followed as advised by Smith et al. (2009), the present study is not without limitations. For instance, it is advised that in order to keep the idiographic focus, sample sizes should range between three and six participants (Smith et al., 2009). In cases like the present study, with a sample of nine participants, it is advised to search for patterns and connections between participants, as well as focusing on recurrence of themes (Smith et al., 2009), which was conformed to for the analysis of the interviews. Also, it is advised that samples are homogenous to be able to assess convergence and divergence of the findings (Smith et al., 2009). In the present study, all participants were active dating app users, or had been prior to the study for the last year. However, participants were from different countries and were diverse regarding sexual orientation. In terms of language, all interviews were carried out in English which could have affected the ability of some participants to express themselves whose first language was not English. Nonetheless, all participants were asked to have fluent speaking ability in English in order to be included in the study.

5.6 Conclusion

Using qualitative interviews, the present study examined the experience of dating app users by means of their emotional experience, how they interact within the apps (i.e., structural characteristics), and ultimately how instances of problematic use of dating applications are experienced from the users' perspective. In order to do so, IPA was employed which led to the emergence of four superordinate themes (i.e., objectification process, behaviour maintenance, the conflicted self, and new dating paradigm).

Recently, more research has emerged studying the problematic use of dating applications. However, as a new topic of research, there are many aspects that are still unknown and in need of qualitative approaches in order to understand the complex dynamics that may be taking place. The present study provides novel evidence regarding the use of dating applications from active users' perspectives, as well as evidence of how underlying dynamics of day-to-day usage seem to predispose users to perpetuate their engagement, discussed with evidence from participants' narratives and previous literature. The study's findings indicate the benefit of (i) promoting further research on problematic use of dating applications accounting for individuals' accounts and sociological standpoints, and (ii) helping promote the wellbeing of dating app users by providing empirical evidence to current and/or users and dating applications' enterprises.

CHAPTER 6

Dating app use intensity and wellbeing: The mediating role of smartphone addiction and social media addiction in a cross-cultural sample

Dating applications have become a global phenomenon with more active users every year worldwide. Despite the worldwide popularity of dating apps, evidence on problematic use of online dating is still scarce, and previous studies have not included cross-cultural comparisons assessing wellbeing, media addictions, and online dating use intensity. Therefore, the purpose of the present study was to investigate the relationship between smartphone addiction, social media addiction, wellbeing, and online dating use intensity in a cross-cultural sample. A total of 1,099 active dating apps users participated from the UK, Poland, and Indonesia. Findings indicated that anxiety and relatedness frustration predicted online dating use via smartphone addiction in the whole sample and UK sample. Path analysis found that online dating use was predicted by relatedness frustration in all samples. Results indicated that there are cross-cultural similarities across dating app users suggesting that structural characteristics may influence users' behaviour regardless of their cultural background. These findings shed light on the influence of dating app use on users' wellbeing accounting for cross-cultural similarities and differences. Results are discussed with existing literature and limitation comments have been included. In conclusion, this study provided further evidence on the relation between mental health and dating app use.

6.1 Introduction

Dating applications have become one of the most profitable online markets in today's society (Tankovska, 2021). As a consequence, the dating application market has grown markedly over the

past decade with over 1,500 dating applications currently worldwide (Lin, 2021). However, there are only a few dating applications that are widely used across the world, namely *Tinder*, *Badoo*, and *Grindr* (Tankovska, 2021). As a result, much of the research has solely focused on *Tinder* users (Orosz et al., 2016; Orosz et al., 2018; Sumter et al., 2017; Timmermans & De Caluwé, 2017) and *Grindr* for MSM (i.e., men who have sex with men) (Anderson et al., 2018; Brubaker et al., 2016; Goedel & Duncan, 2015), disregarding other dating applications that may have similar affordances. Furthermore, with increasing accessibility and growing demand of dating applications, more scholars have started to investigate the phenomenon of problematic use of online dating (Altan, 2019; Harren et al., 2021; Obarska et al., 2020; Orosz et al., 2018), which has been conceptualized by utilizing the ‘components model of addiction’ (Griffiths, 2005) comprising six components (i.e., salience, mood modification, tolerance, withdrawal, conflict, and relapse). Relatedly, this model has served as a catalyst for other forms of behavioural addictions and/or problematic behaviours, such as social media use (Andreassen et al., 2012; Luo et al., 2011), smartphone use (Csibi et al., 2018; Kuss et al., 2018), and video gaming (Kuss, 2013; Pontes & Griffiths, 2015).

Considering that the same conceptual model (i.e., addiction components model) has been applied to several media addictions (and problematic behaviours), it is expected that these types of addiction (i.e., media-related addictions) present similarities with regards to their aetiology and maintenance (Yellowlees & Marks, 2007), as well as addiction comorbidity (i.e., individuals addicted to more than one addictive behaviour) (Pallanti et al., 2006), and other mental health diagnoses (e.g., depression, anxiety) (Szczygieł & Podwalski, 2020). In the case of problematic use of online dating, where research is still scarce, Harren et al., (2021) reported significant

comorbidity between problematic online dating and problematic use of social media. Additionally, another study found that higher rates of smartphone addiction were found among users of dating apps (Lee et al., 2016). Considering that social media platforms and online dating services share several similar affordances (see Chapter 2), and smartphones are a necessary tool for users to access dating applications, it is expected that individuals engaged in online dating will have higher rates of smartphone use and social media engagement.

In an attempt to unify media addiction theory, explanatory models, such as the I-PACE model (Brand et al., 2019), explained the development of media addictions by means of psychopathological and biopsychological features, personality traits, social cognitions, and motives of use. For behaviour maintenance, diminished executive function, coping styles, and cognitive biases are considered key factors in conjunction with instrumental conditioning (i.e., reinforcement of the addictive behaviour) (Brand et al., 2016). Relatedly, past online dating research has assessed a number of etiological factors for problematic use (as suggested by the I-PACE model), including personality traits (Blackhart et al., 2014; Sumter & Vandenbosch, 2019; see Chapter 2), motives of use (Corriero & Tong, 2016; Lawson & Leck, 2006; see Chapter 2), social cognitions (i.e., loneliness and social support) (Orosz et al., 2018), and psychopathology (i.e., depression and social anxiety) (Altan, 2019; Coduto et al., 2019; Harren et al., 2021; Rochat et al., 2019).

More specifically, online dating use has been related to higher levels of loneliness and less satisfaction with life when comparing dating app users to non-users of dating apps (Holtzhausen et al., 2020; Obarska et al., 2020). Relatedly, problematic use of online dating has been related to

users aiming to fulfil their needs via online dating (Altan, 2019). Furthermore, loneliness was found to be a significant mediator for problematic use of online dating (Coduto et al., 2019; Orosz et al., 2018). Moreover, previous studies have related worse mental health correlates with online dating use (Holtzhausen et al., 2020; Zervoulis et al., 2020). Additionally, Rochat et al. (2019) in a cluster analysis of different personality and wellbeing correlates found that those users with higher levels of problematic use of online dating are those with anxious attachment, high sexual drive, high sense of urgency, and medium levels of self-esteem. However, there is contrasting evidence that have related online dating use to positive outcomes like increased emotional connectedness (Watson et al., 2019), increased sense of community (Obarska et al., 2020), and higher self-validation (Sumter et al., 2017).

Overall, in spite of the dearth of research on problematic use of online dating in comparison to other media addictions and/or problematic behaviours (e.g., social media use and smartphone use), there are prominent preliminary findings that provide empirical evidence in the study of problematic use of online dating. However, considering that dating applications have become a worldwide phenomenon, there are no studies to date (to the best of our knowledge) that compare cross-cultural samples of dating app users assessing wellbeing, media addiction, and online dating use intensity. Also, considering the presented evidence on media addiction (i.e., smartphone and social media) and the commonalities between them, there is still lack of knowledge on the role that media addiction may play amongst online dating use and users' wellbeing. Therefore, the present study was developed to fill the gaps in knowledge by providing a cross-cultural comparison of users from two different continents (i.e., Asia and Europe), and within Europe, two different countries (i.e., UK and Poland). Furthermore, the present study aims to be one of the first empirical

studies to explore the relation between two media addictions (i.e., smartphone and social media), online dating use, and wellbeing in a cross-cultural sample. Also, the present study aims to provide further evidence to the study of problematic use of online dating by assessing mental health and wellbeing correlates such as self-esteem, anxiety, depression, positive and negative affect, and social relatedness.

To do this, in accordance with previous literature and findings from the IPA study (Chapter 5), the present study examined the relationship between wellbeing and mental health correlates and online dating use intensity (ODUI), as well as the mediating role of social media addiction and smartphone addiction with ODUI and wellbeing/mental health of users. These variables were explored in cross-cultural samples from three different countries (i.e., UK, Poland, and Indonesia) to assess cultural differences and similarities. It was hypothesized that anxiety and depression would be indirectly associated with ODUI via smartphone addiction (H_1) and social media addiction (H_2). It was also hypothesized that self-esteem would be indirectly associated with ODUI via smartphone addiction (H_3) and social media addiction (H_4). Moreover, according to the findings in the IPA study, it was hypothesized that relatedness frustration (H_5) and negative affect (H_6) would be directly associated to ODUI.

6.2 Methods

6.2.1 Design

The study consisted of a cross-sectional online survey with a total of 101 items including validated psychometric scales and sociodemographic items. The survey took approximately 10-15 minutes to complete. In order to be considered eligible for the study, participants were required to be 18

years or age or older and to be current users of at least one online dating application. The survey was completely anonymous. Participants were asked to provide a unique code which would be of use if they wanted to retrieve their response after their participation (up to two weeks after their response was registered), as indicated in the informed consent they were given prior to responding to the survey. As the participants derived from a convenience sample (i.e., university students and participants recruited via snowball sampling), they were given the option to enter a voucher draw of five £50 *Amazon* vouchers. Also, university students were given two credits if they responded to the survey via the research team's departmental research credit system (i.e., a university student platform by which they can gain credits if they participate in research projects). Both types of compensation (i.e., vouchers and research credits) were approved by the research team's university ethics committee.

6.2.2 Participants

A total of 1,686 responses were collected from participants living in the three countries (i.e., UK, Polish, and Indonesian). Participants were recruited by snowball sampling (i.e., social media accounts and University platforms), word of mouth, and *MTurk*. To participate in the study, participants were required to i) be 18 years of age or older, and ii) be a current user of one (or more) dating applications. To comply with inclusion criteria, participants had to respond to the age item and whether they were active users of any dating application. In case they were younger than 18 years and/or responded negatively to being an active dating app user, they were directed to the end of the survey. In total, 1,203 responses were from participants responding to the survey via *MTurk* and snowball sampling (for the UK sample), 291 responses from Indonesia, and 192

responses from Polish participants. After meeting the two aforementioned inclusion criteria, the UK sample was comprised of 627 responses that met the inclusion criteria. After data cleaning, the Indonesian sample comprised 291 participants and the Polish sample comprised 181 participants. In the case of *MTurk* responses, in addition to the inclusion criteria, two items were included in the survey in order to control for quality of the responses (Fleischer et al., 2015; Meade & Craig, 2012). The items indicated the response they had to choose (e.g., “Click on completely disagree”). In the case respondents did not comply with both of these items, their response was discarded. As a result, 400 responses were selected as valid as they complied with inclusion criteria and quality checks. Therefore, the final total sample comprised 1,099 participants, of which 627 were from the UK with ages ranging from 18 to 71 years ($M_{age}=28.9$, $SD=8.8$; 56% males; 76% heterosexuals; 64% singles), 291 Indonesian participants with ages ranging from 18 to 42 ($M_{age}=24.02$ years, $SD=3.87$; 67.4% females; 85.6% heterosexuals; 79.7% singles), and 181 Polish participants with ages ranging from 18 to 49 years ($M_{age}=25.2$, $SD=5.57$ years; 74% females; 77% heterosexuals; 81% singles) (see Table 6.1).

6.2.3 Materials

A self-report online survey hosted on *Qualtrics* was used, including sociodemographic questions and validated psychometric scales (see below for further details). All participants completed the same sociodemographic items and scales in their corresponding language (e.g., Polish participants completed a Polish-version survey). In cases where there was no previous validated version in a given language, back-translation protocol was adopted (Harkness et al., 2004). The adapted versions were sent to the international collaborator who translated the scales into the local language

(i.e., Indonesian or Polish). This translation was then back-translated (i.e., English) by a different bilingual colleague. Following, the English back-translations were sent to the authors who reviewed and made comments on the back-translations, resulting in the final version of the scales. A copy of translations and back-translations can be found in (Appendix VII). Also, for those scales where there was no previous validation in either Polish or Indonesian, confirmatory factor analysis (CFA) was conducted.

6.2.3.1 Sociodemographic data

Participants reported their age, gender, sexual orientation, nationality, country of residence, marital status, occupation, and income range (see Table 6.1).

Table 6.1. Sociodemographic data of all samples

	<i>UK</i> <i>n (percent)</i>	<i>Poland</i> <i>n (percent)</i>	<i>Indonesia</i> <i>n (percent)</i>	Overall χ^2	Effect size ^a
<i>Gender</i>				71.97	.18
Female	276 (44.0)	125 (69.1)	196 (67.4)		
Male	348 (55.5)	47 (26.0)	95 (32.6)		
Other	3 (0.5)	2 (1.0)	0 (0.0)		
Not answered	0 (0.0)	7 (3.9)	0 (0.0)		
<i>Sexual orientation</i>				40.01	.14
Heterosexual	474 (75.6)	139 (76.8)	249 (85.6)		
Homosexual	37 (5.9)	10 (5.5)	12 (4.1)		
Bisexual	112 (17.9)	19 (10.5)	18 (6.2)		
Other	4 (0.6)	6 (3.3)	0 (0.0)		
Not answered	0 (0.0)	7 (3.9)	12 (4.1)		
<i>Marital status</i>				92.34	.21
Single	402 (64.1)	146 (80.7)	232 (79.7)		
In a relationship	96 (15.3)	21 (11.6)	52 (17.9)		

Divorced	15 (2.4)	7 (3.9)	3 (1.0)		
Other (married)	114 (18.2)	0 (0.0)	4 (1.4)		
Not answer	0 (0.0)	7 (3.9)	3 (1.0)		
<i>Occupation</i>				105.82	.22
Student	232 (37.0)	74 (40.9)	136 (46.7)		
Full-time job	283 (45.1)	70 (38.7)	94 (32.3)		
Part-time job	53 (8.5)	2 (1.1)	15 (5.2)		
Freelance	28 (4.5)	11 (6.1)	28 (9.6)		
Unemployed	31 (4.9)	3 (1.7)	18 (6.2)		
Other	0 (0.0)	14 (7.7)	0 (0.0)		
Not answered	0 (0.0)	7 (3.9)	0 (0.0)		
<i>Income</i>				138.21	.25
No income to low	270 (43.1)	44 (24.3)	215 (73.9)		
Lower to medium	141 (22.5)	61 (33.7)	12 (4.1)		
Medium to high	111 (17.7)	31 (17.1)	24 (8.2)		
High	105 (16.7)	38 (21.0)	40 (13.7)		
Not answered	0 (0.0)	7 (3.9)	0 (0.0)		

^aEffect size=Cramer's V

6.2.3.2 Online Dating Intensity Scale

The Online Dating Intensity Scale (ODI; Bloom & Dillman, 2019) was used to assess online dating intensity. ODI is a one-factor scale that comprises five items that are rated on a five-point scale ranging from “strongly disagree” to “strongly agree” (e.g., “Using online dating is part of my everyday activity”) scored from one to five (total score ranges from 5 to 25). Previous studies have found good internal reliability (Bloom & Dillman, 2019). Internal consistency of the scale for the UK sample was high ($\alpha=.84$). According to CFA results for the Indonesian adaptation ($\chi^2/df=4.90$, RMSEA=.11 (CI 90% [.07, .16]), SRMR=.09, CFI=.95, TLI=.90) with acceptable internal consistency ($\alpha=.71$). Although the RMSR value was higher than recommended, according to

combinational rules recommended by Hu and Bentler (1999) the one-factor model was accepted. According to the CFA results for the Polish adaptation ($\chi^2/df=2.27$, RMSEA=.08 (CI 90% [.01, .15]), SRMR=.05, CFI=.99, TLI=.98) with high internal consistency ($\alpha=.83$).

6.2.3.3 Rosenberg Self-Esteem Scale

The Rosenberg Self-Esteem Scale (RSES) (Rosenberg, 1965) was used to assess self-esteem which has been found to be a valid measurement for self-esteem as other studies have demonstrated (Martín-Albo et al., 2007; Tinakon & Nahathai, 2012). The RSES comprises 10 items that are rated on a four-point scale ranging from “strongly disagree” to “strongly agree” (e.g., “*On the whole, I am satisfied with myself*”) scored from one to four (total score ranges from 10 to 40). The internal consistency of the RSES was good for the UK sample ($\alpha=.78$). According to CFA results for the Indonesian adaptation ($\chi^2/df=4.00$, RMSEA=.10 (CI 90% [.08, .12]), SRMR=.07, CFI=.88, TLI=.85) with high internal consistency ($\alpha=.87$). High internal consistency was found in the Polish scale ($\alpha=.91$).

6.2.3.4 Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) was used to assess anxiety and depression levels as a measure of mental health. The HADS comprises 14 items in total (seven items per factor). The items are rated on a four-point scale (ranging from 0 to 3), responses vary from item to item (e.g., “*I still enjoy the things I used to enjoy*”; 0=Definitely as much, 1=Not quite so much, 2=Only a little, and 3=Hardly at all) total score ranges from zero to 42. Previous studies have found good validity and reliability (Bjelland et al., 2002). In the present study, good internal consistency was found in the anxiety ($\alpha=.83$) and depression ($\alpha=.77$) subscales

(in the UK sample). According to CFA results for the Indonesian adaptation ($\chi^2/df=2.19$, RMSEA=.06 (CI 90% [.05, .08]), SRMR=.06, CFI=.90, TLI=.88) with a moderate internal consistency ($\alpha=.62$) for the depression subscale and high internal consistency ($\alpha=.86$) for the anxiety subscale. According to CFA results on the Polish adaptation ($\chi^2/df=1.48$, RMSEA=.05 (CI 90% [.03, .07]), SRMR=.05, CFI=.96, TLI=.95) with a high internal consistency for both subscales (depression, $\alpha=.84$; anxiety, $\alpha=.84$).

6.2.3.5 *Bergen Social Media Addiction Scale*

The Bergen Social Media Addiction Scale (BSMAS) (Andreassen et al., 2016) was used to assess problematic social media use. BSMAS consists of six items on a five-point scale ranging from “very rarely” to “very often” (e.g., “*How often during the last year have you felt an urge to use social media more and more*”) scored from one to five (total score ranges from 6 to 30). The BSMAS is an adaptation of the Bergen Facebook Addiction Scale (BFAS), which has been found to have good internal consistency (Andreassen et al., 2012). In the present study, internal consistency for the UK sample was high ($\alpha=.83$). According to the CFA results for the Indonesian adaptation ($\chi^2/df=4.13$, RMSEA=.10 (CI 90% [.07, .14]), SRMR=.05, CFI=.98, TLI=.97) with high internal consistency ($\alpha=.82$). According to the CFA results for the Polish adaptation ($\chi^2/df=3.19$, RMSEA=.11 (CI 90% [.07, .16]), SRMR=.06, CFI=.98, TLI=.97) with high internal consistency ($\alpha=.84$).

6.2.3.6 *Smartphone Application-Based Addiction Scale*

The Smartphone Application-Based Addiction Scale (SABAS) (Csibi et al., 2018) was used to assess problematic smartphone use. The SABAS comprises six items rated on a six-point scale

ranging from “strongly disagree” to “strongly agree” (e.g., “*My smartphone is the most important thing in my life*”) scored from one to six (total score ranges from 6 to 36). The SABAS has been found to have to good reliability (Csibi et al., 2018), which has also been found in the present study in the UK sample ($\alpha=.84$). According to CFA results for the Indonesian adaptation ($\chi^2/df=2.86$, RMSEA=.08 (CI 90% [.05, .12]), SRMR=.04, CFI=.99, TLI=.99) with high internal consistency ($\alpha=.81$). According to the CFA results for the Polish adaptation ($\chi^2/df=1.61$, RMSEA=.06 (CI 90% [.00, .11]), SRMR=.05, CFI=.99, TLI=.99) with high internal consistency ($\alpha=.81$).

6.2.3.7 *Positive Affect and Negative Affect Schedule*

The Positive Affect and Negative Affect Schedule (PANAS) (Watson et al., 1988) was used to assess levels of positive and negative emotions as a measure of general wellbeing. The PANAS comprises 20 items with two factors (positive affect and negative affect), with 10 items per factor. The items are rated on a five-point scale ranging from “very slightly or not at all” to “extremely” (e.g., “*Interested*”, “*Jittery*”) scored from one to five (total score ranges from 10 to 100). The scale was found to have good validity and reliability measures (Watson et al., 1988). In the present study, the PANAS showed high reliability for both factors, positive affect ($\alpha=.89$) and negative affect ($\alpha=.91$) in the UK sample. According to the CFA results for the Indonesian adaptation ($\chi^2/df=4.63$, RMSEA=.11 (CI 90% [.10, .12]), SRMR=.08, CFI=.93, TLI=.92) with high internal consistency for the positive affect ($\alpha=.87$) and negative affect subscale ($\alpha=.89$). For the Polish sample, high internal consistency for the positive affect subscale ($\alpha=.88$) and very high for the negative affect subscale ($\alpha=.90$).

6.2.3.8 *Basic Psychological Need Satisfaction and Frustration Scale*

The Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS) (Chen et al., 2015) was used to assess needs satisfaction, especially relatedness needs which is one of the subscales of the BPNSFS. The full scale comprises 24 items rated on a five-point scale, ranging from “not true at all” to “completely true” (e.g., “*I feel capable of what I do*”). The BPNSF has six subscales (four items each one) based on three different needs (i.e., autonomy, relatedness, and competence) scored from one to five (total score ranges from 24 to 120). Each of these needs has a subscale for need satisfaction and need frustration (e.g., relatedness satisfaction and relatedness frustration) each subscale total score ranges from four to 20. In the UK sample it was found good reliability of relatedness satisfaction ($\alpha=.86$) and relatedness frustration ($\alpha=.84$). According to the CFA results on the Indonesian adaptation ($\chi^2/df=3.43$, RMSEA=.09 (CI 90% [.07, .11]), SRMR=.06, CFI=.98, TLI=.97) with high internal inconsistency for the relatedness satisfaction subscale ($\alpha=.81$) and relatedness frustration ($\alpha=.82$). For the Polish sample, high internal consistency for the relatedness satisfaction subscale ($\alpha=.85$) and acceptable for the relatedness frustration subscale ($\alpha=.76$).

6.2.4 Statistical analysis

Analysis was carried out in RStudio (version 1.2.1335) and IBM® SPSS® (version 26). At first, descriptive statistics were analysed in each sample (i.e., UK, Polish, and Indonesian) (Table 6.2), then Pearson’s correlations were applied to assess correlations between all variables in the study (Tables 6.2) for the entire sample. In order to test for the theoretical model, path analysis was used and mediation analysis was calculated via the bootstrapping method with 5000 bootstrap samples and 95% bias-corrected confidence intervals (CI). All individual paths and mediational paths that included zero within their CI were deemed as not significant. Therefore, only paths that were

significant at a p -value of .05 or lower ($p \leq .05$) (Schneider & Darcy, 1984) and whose CI did not include zero were considered significant. The total sample's data fitted the model ($N=1,099$) and grouped (i.e., UK, Poland, and Indonesia) in order to carry out multiple group and total sample analysis to assess cross-cultural differences and similarities. In order to assess goodness of fit, fit indices criteria by Hu and Bentler (1999) were used.

Additionally, one-way ANOVA was carried out to test for significant differences between countries for predictor and outcome variables. In order to control for specific differences across samples (i.e., which specific samples differed in any given variable) post-hoc tests were carried out. In case the homogeneity of the variance assumption was met, Bonferroni test was carried out. In case the assumption of homogeneity of the variance was not met, then Games-Howell test was carried out.

6.3 Results

The hypothesized model (Figure 6.1) included wellbeing variables (i.e., self-esteem, depression, anxiety, relatedness needs, and affect) as predictor variables, and smartphone and social media addiction as mediating variables of online dating use intensity (outcome variable). The total sample ($N=1,099$) model was found to have a good fit to the data ($\chi^2/df=4.25$, RMSEA=.05 (CI 90% [.03, .08]), SRMR=.01, CFI=.99, TLI=.93). The total mediation model (i.e., including indirect and direct paths) was found to be significant ($\beta=.24$, $p<.001$). The total indirect paths between wellbeing (i.e., self-esteem, anxiety, depression, and relatedness frustration) and ODUI mediated by smartphone addiction and social media addiction were found significant ($\beta=.18$, $p<.001$). Specifically, it was found that the paths between anxiety and ODUI ($\beta=.05$, $p<.001$), and

relatedness frustration and ODUI ($\beta=.08, p<.001$), both mediated by smartphone addiction were significant. Furthermore, relatedness frustration was found to be a direct predictor of ODUI ($\beta=.06, p<.001$). The total model explained 17% of the variance of ODUI, 19% of the variance of social media addiction, and 20% of the variance of smartphone addiction.

Table 6.2. Correlation matrix and descriptive statistics all sample

	1	2	3	4	5	6	7	8	9	10
1. ODI	-									
2. SE	-.18** *	-								
3. ANX	.13***	-.46** *	-							
4. DEP	.13***	-.47** *	.60***	-						
5. PA	.08**	.25***	-.29** *	-.39** *	-					
6. NA	.08**	-.28** *	.62***	.44***	-.23** *	-				
7. SMA	.30***	-.22** *	.36***	.24***	-.04	.28***	-			
8. SA	.38***	-.28** *	.34***	.24***	.00	.28***	.65***	-		
9. RS	-.06*	.40***	-.34** *	-.48** *	.31***	-.31** *	-.08**	-.10** *	-	
10. RF	.25***	-.43** *	.46***	.49***	-.19** *	.45***	.32***	.36***	-.51** *	-
Mean	11.49	26.06	8.66	5.75	31.98	22.50	16.37	19.48	15.05	9.39
SD	4.21	5.73	4.21	3.52	7.63	8.81	5.23	6.36	4.45	3.98
Score ranges	5-25	10-40	0-20	0-18	10-50	10-50	6-30	6-36	4-20	4-20

ODI, online dating intensity; *SE*, self-esteem *ANX*, anxiety; *DEP*, depression; *NA*, negative affect; *PA*, positive affect; *SA*, smartphone addiction; *SMA*, social media addiction; *RS*, relatedness satisfaction; *RF*, relatedness frustration; * $p<.05$; ** $p<.01$; *** $p<.001$

The between samples model was found to have good fit to the data ($\chi^2/df=2.16$, RMSEA=.06 (CI 90% [.03, .08]), SRMR=.02, CFI=.99, TLI=.93). The total mediation model (i.e., including indirect and direct paths) was found to be significant in all samples (UK sample [$\beta=.32, p<.001$], Polish

sample [$\beta=.11, p<.01$], and Indonesian sample [$\beta=.23, p<.001$]). Furthermore, the direct relationship between relatedness frustration and online dating use intensity was significant across all samples (UK sample [$\beta=.13, p<.01$], Polish sample [$\beta=.26, p<.01$], and Indonesian sample [$\beta=.17, p<.05$]). The total indirect paths between wellbeing (i.e., self-esteem, anxiety, depression, and relatedness frustration) and ODUI mediated by smartphone addiction and social media addiction were found significant in the UK sample ($\beta=.21, p<.001$) and Indonesian sample ($\beta=.15, p<.01$), but not in the Polish sample. The model explained 19% of the ODUI in the UK sample, 18% in the Polish sample, and 11% in the Indonesian sample. All significant paths are shown for each of the samples in Figures 6.2-6.5.

Figure 6.1. Hypothesized model

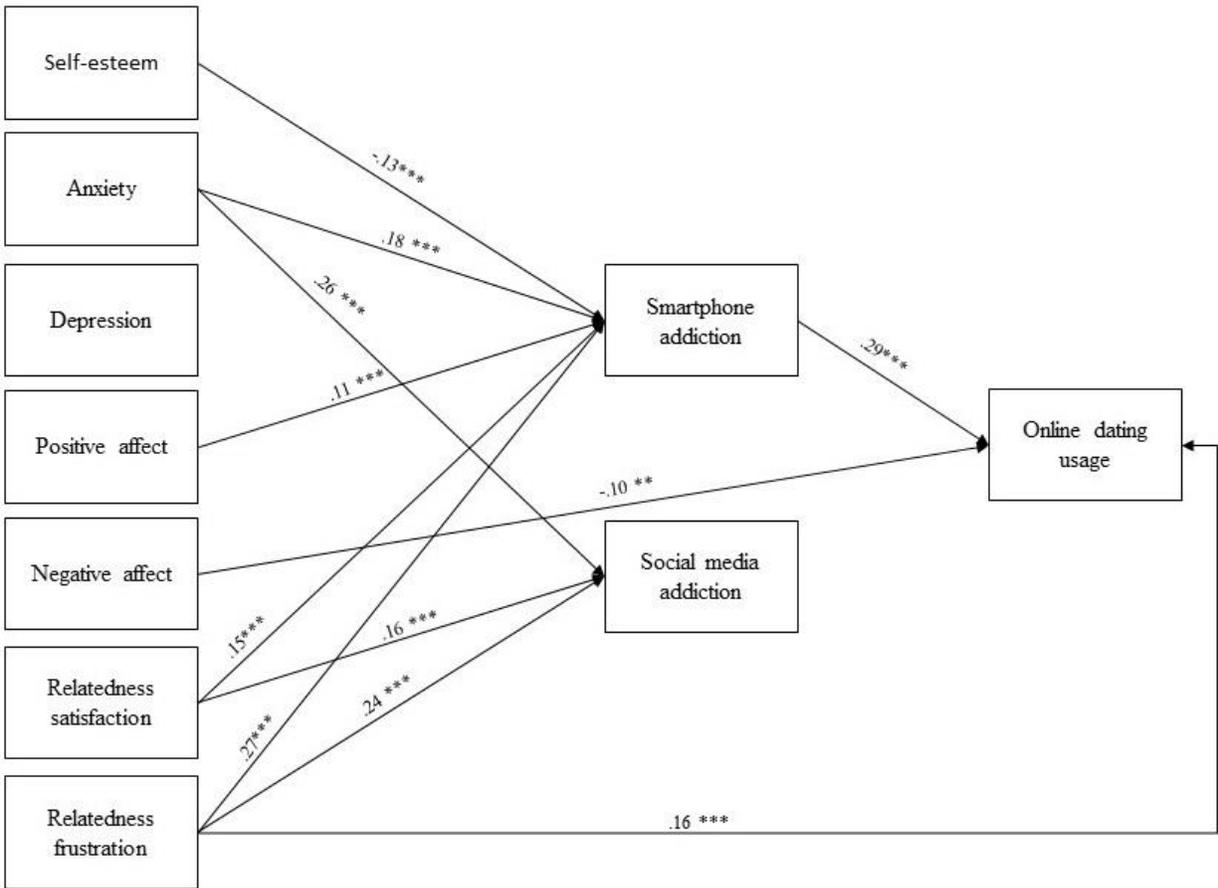
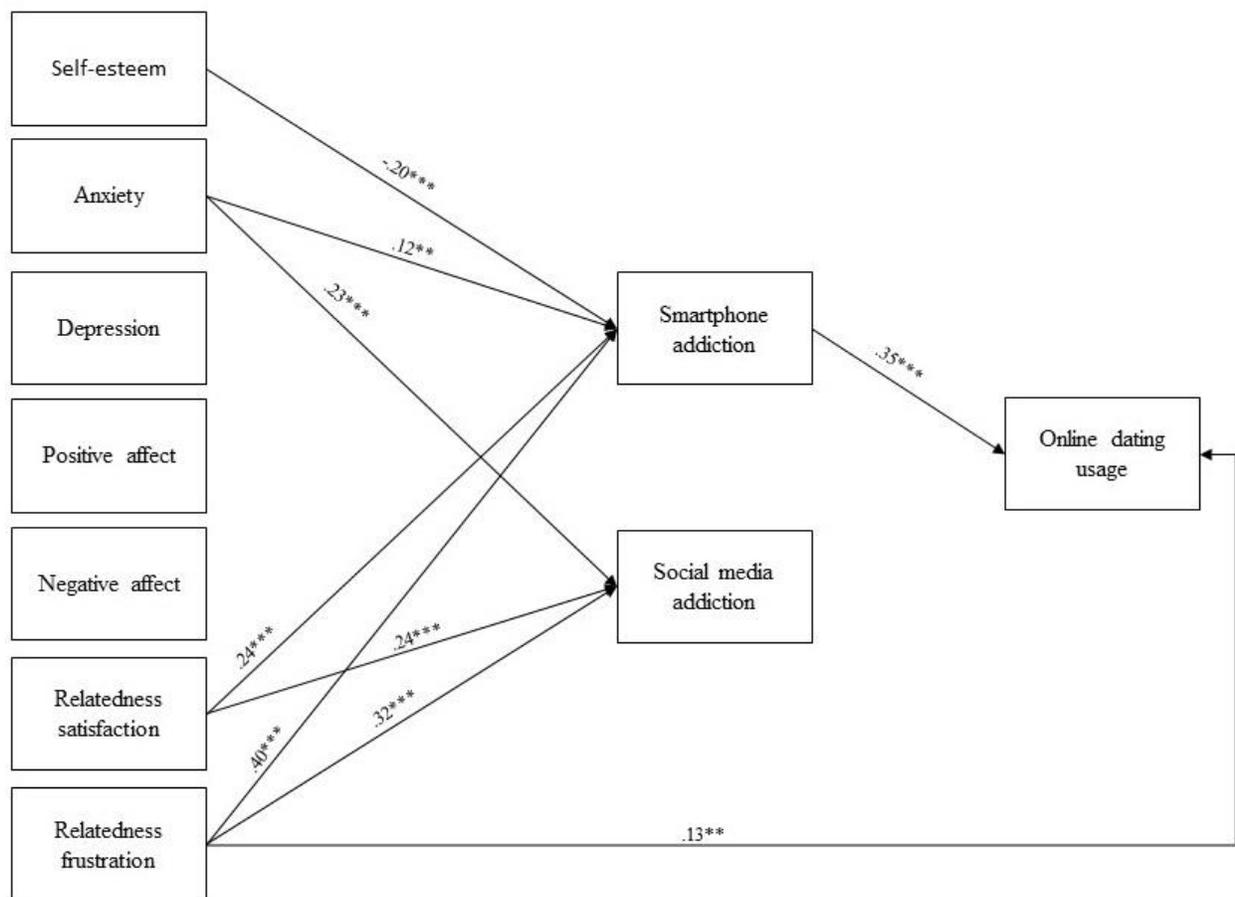


Figure 6.2. Path analysis (All sample) with significant standardized coefficients

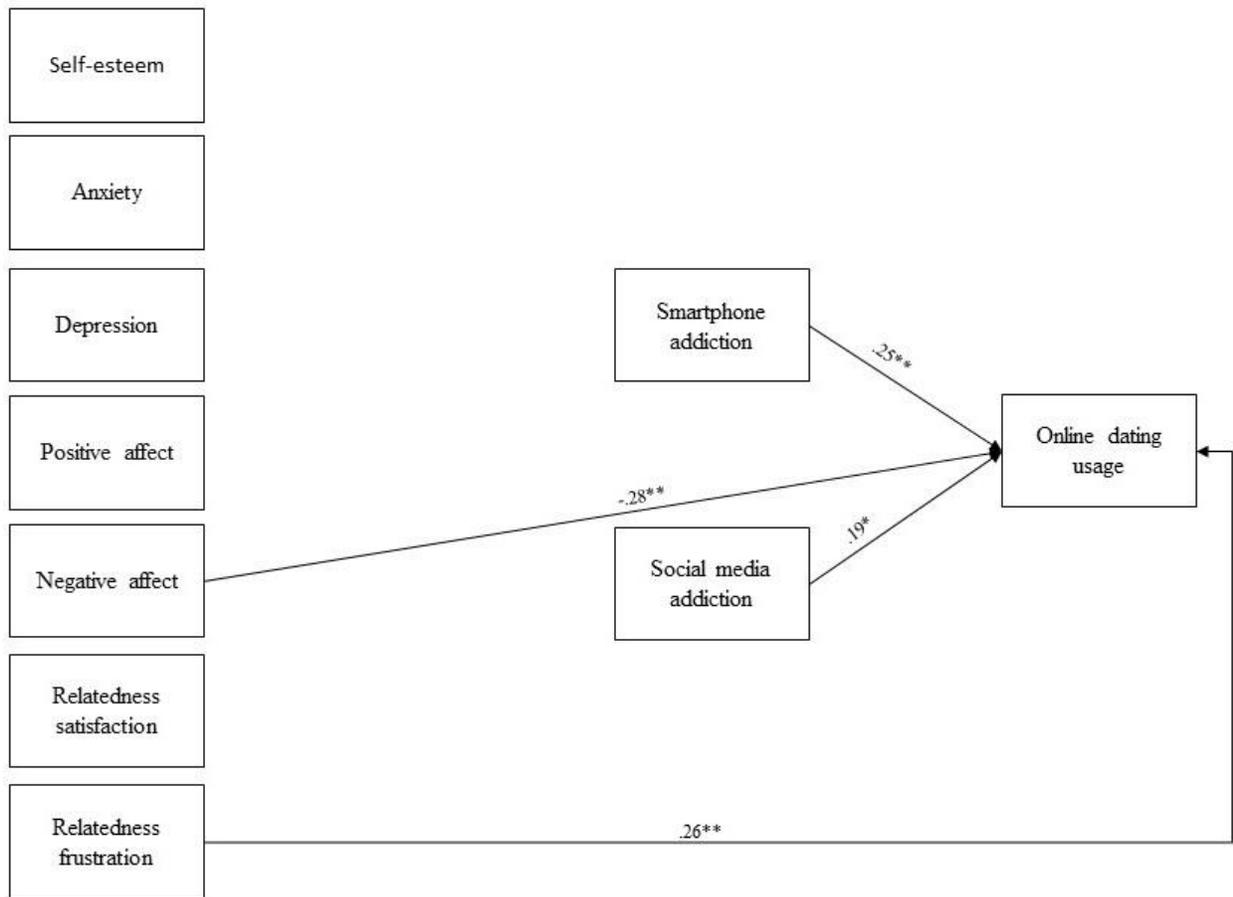
Correlations between exogenous variables have not been depicted and insignificant path paths coefficients have not been included for clarity; $**p < .01$; $***p < .001$

Figure 6.3. Path analysis (UK sample) with significant standardized coefficients



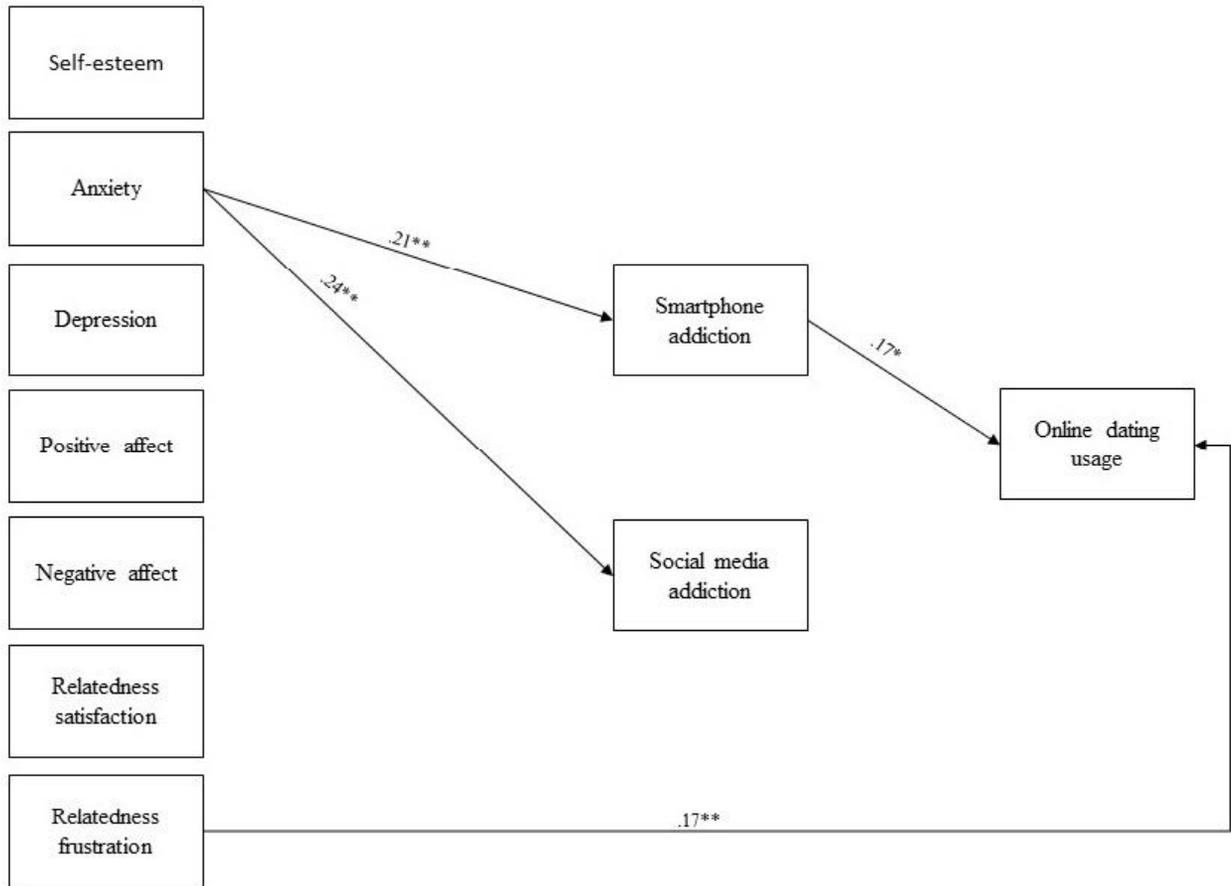
Correlations between exogenous variables have not been depicted and insignificant path paths coefficients have not been included for clarity; * $p < .05$; ** $p < .01$; *** $p < .001$

Figure 6.4. Path analysis (Polish sample) with significant standardized coefficients



Correlations between exogenous variables have not been depicted and insignificant path paths coefficients have not been included for clarity; * $p < .05$; ** $p < .01$; *** $p < .001$

Figure 6.5. Path analysis (Indonesian sample) with significant standardized coefficients



Correlations between exogenous variables have not been depicted and insignificant path coefficients have not been included for clarity; * $p < .05$; ** $p < .01$; *** $p < .001$

In terms of individual paths, UK sample showed that smartphone addiction is predicted by self-esteem ($\beta = -.20$, $p < .001$), anxiety ($\beta = .12$, $p < .01$), relatedness satisfaction ($\beta = .24$, $p < .001$), and relatedness frustration ($\beta = .40$, $p < .001$). Social media addiction was predicted by anxiety ($\beta = .23$, $p < .001$), relatedness satisfaction ($\beta = .24$, $p < .001$), and relatedness frustration ($\beta = .32$, $p < .001$). ODUI was found to be predicted by smartphone addiction ($\beta = .35$, $p < .001$) and relatedness frustration ($\beta = .13$, $p < .01$). Additionally, mediation analysis showed that ODUI was predicted by relatedness frustration mediated by smartphone addiction ($\beta = .14$, $p < .001$) in the UK sample. For the Polish sample, ODUI was found to be predicted by smartphone addiction ($\beta = .25$, $p < .01$),

negative affect ($\beta=-.28, p<.01$), social media addiction ($\beta=.19, p<.05$) and relatedness frustration ($\beta=.26, p<.01$). For the Indonesian sample, anxiety was found to be a significant predictor of smartphone addiction ($\beta=.21, p<.01$) and social media addiction ($\beta=.24, p<.01$). ODUI was predicted by relatedness frustration ($\beta=.17, p<.01$) and smartphone addiction ($\beta=.17, p<.05$) for the Indonesian sample. For all sample, smartphone addiction was predicted by self-esteem ($\beta=-.13, p<.001$), anxiety ($\beta=.18, p<.001$), positive affect ($\beta=.11, p<.001$), relatedness satisfaction ($\beta=.15, p<.001$), and relatedness frustration ($\beta=.27, p<.001$); social media addiction was predicted by anxiety ($\beta=.26, p<.001$), relatedness satisfaction ($\beta=.16, p<.001$), and relatedness frustration ($\beta=.24, p<.001$); ODUI was predicted by smartphone addiction ($\beta=.29, p<.001$), relatedness frustration ($\beta=.16, p<.001$), and negative affect ($\beta=-.10, p<.01$). See Table 6.3 for path estimates, standard error, and z-values.

Table 6.3. Estimates with bias-corrected *CI*, standard error, and Z-values

	<i>b</i> [95% <i>CI</i>]	<i>SE</i>	Z-value
<i>All sample</i>			
SE → SA	-.15*** [-.23, -.07]	.04	-4.04
Anx → SA	.27*** [.14, .39]	.06	4.45
PA → SA	.09*** [.04, .14]	.03	3.67
RS → SA	.27*** [.14, .40]	.06	4.49
RF → SA	.43*** [.30, .56]	.06	7.59
Anx → SMA	.32*** [.21, .42]	.05	6.35
RS → SMA	.24*** [.13, .34]	.05	4.69
RF → SMA	.32*** [.21, .42]	.05	6.76
SA → ODUI	.19*** [.14, .25]	.02	7.91
RF → ODUI	.17*** [.10, .23]	.03	4.91
NA → ODUI	-.05** [-.08, -.02]	.02	-3.04
Anx → SA → ODUI	.05*** [.03, .08]	.01	3.76
RF → SA → ODUI	.08*** [.06, .12]	.02	4.92

UK

SE → SA	-.25*** [-.36, -.14]	.06	-4.33
Anx → SA	.19** [.05, .33]	.07	2.65
Anx → SMA	.29*** [.16, .42]	.07	4.40
RS → SA	.45*** [.30, .60]	.08	6.00
RS → SMA	.36*** [.23, .50]	.07	5.40
RF → ODUI	.14** [.05, .23]	.05	2.97
RF → SA	.64*** [.49, .77]	.07	8.94
RF → SMA	.42*** [.29, .54]	.06	6.58
SA → ODUI	.24*** [.16, .31]	.04	6.22
Anx → SA → ODUI	.05* [.01, .09]	.02	2.36
RF → SA → ODUI	.15*** [.10, .21]	.03	5.24
<hr/>			
Poland			
NA → ODUI	-.14** [-.23, -.06]	.04	-3.21
RF → ODUI	.28** [.10, .46]	.09	3.01
SA → ODUI	.22** [.05, .40]	.09	2.52
SMA → ODUI	.15* [.01, .28]	.07	2.19
<hr/>			
Indonesia			
Anx → SA	.29** [.04, .52]	.12	2.32
Anx → SMA	.30** [.07, .51]	.11	2.62
RF → ODUI	.15** [.02, .28]	.07	2.32
SA → ODUI	.11* [.02, .20]	.05	2.35

SE, self-esteem; *SA*, smartphone addiction; *Anx*, anxiety; *SMA*, social media addiction; *PA*, positive affect; *NA*, negative affect; *RS*, relatedness satisfaction; *RF*, relatedness frustration; *ODUI*, online dating use intensity; For clarity only significant paths have been included; * $p < .05$; ** $p < .01$; *** $p < .001$

Figure 6.6. ANOVA study variables, significance level, and partial eta-squared

Variable	Df	F-test	Sig.	η^2
ODI	2	7.387	.001	.01
SE	2	48.282	.000	.08
ANX	2	1.763	.172	-
DEP	2	4.190	.015	.01
PA	2	3.801	.023	.01
NA	2	45.471	.000	.08
SM	2	6.705	.001	.01
SABAS	2	57.179	.000	.10
RS	2	7.389	.001	.01
RF	2	.154	.857	-

ODI, online dating intensity; *SE*, self-esteem *ANX*, anxiety; *DEP*, depression; *NA*, negative affect; *PA*, positive affect; *SA*, smartphone addiction; *SMA*, social media addiction; *RS*, relatedness satisfaction; *RF*, relatedness frustration; *df*, degrees of freedom; *Sig.*, significance; η^2 , partial eta-squared.

In terms of differences across samples, one-way ANOVA found that samples significantly differed in all variables, except for anxiety and relatedness frustration as it is shown in Figure 6.6. Those with the highest effect size were self-esteem ($\eta^2=.08$, $p<.001$), negative affect ($\eta^2=.08$, $p<.001$), and smartphone addiction ($\eta^2=.10$, $p<.001$) which are within the range of moderate effect size (Lenhard & Lenhard, 2016). Specific differences across countries are shown in Figure 6.7.

Figure 6.7. Differences on variables across samples and significance level

Variables	Countries	Differed significantly (Yes/No)	Sig.
ODI	Indonesia - Poland	Yes	.013
	Indonesia - UK	No	.524
	UK - Poland	Yes	.001

SE	Indonesia - Poland	No	.922
	Indonesia - UK	Yes	<.001
	UK - Poland	Yes	<.001
DEP	Indonesia - Poland	No	.337
	Indonesia - UK	Yes	.004
	UK - Poland	No	.784
PA	Indonesia - Poland	Yes	.018
	Indonesia - UK	No	.079
	UK - Poland	No	.444
NA	Indonesia - Poland	No	.101
	Indonesia - UK	Yes	<.001
	UK - Poland	Yes	<.001
SM	Indonesia - Poland	Yes	.001
	Indonesia - UK	No	.232
	UK - Poland	Yes	.027
SABAS	Indonesia - Poland	Yes	.011
	Indonesia - UK	No	.789
	UK - Poland	Yes	.001
RS	Indonesia - Poland	Yes	.011
	Indonesia - UK	No	1.00
	UK - Poland	Yes	<.001

ODI, online dating intensity; *SE*, self-esteem; *DEP*, depression; *NA*, negative affect; *PA*, positive affect; *SA*, smartphone addiction; *SMA*, social media addiction; *RS*, relatedness satisfaction; *Sig*, significance.

6.4 Discussion

The present study investigated the relationships between wellbeing measures (i.e., self-esteem, positive affect, and relatedness satisfaction) and negative mental health measures (i.e., anxiety, depression, negative affect, and relatedness frustration) with ODUI. It also investigated the

relationships between social media addiction, smartphone addiction, and ODUI, including the mediating roles of smartphone and social media addiction between wellbeing and ODUI. To do this, a cross-cultural sample was used to assess similarities and differences across the three different countries (i.e., UK, Poland, and Indonesia).

According to the path analysis, relatedness frustration predicted ODUI via smartphone addiction in the UK sample, therefore H_1 was supported. However, this relationship was not found in either the Polish or Indonesian sample. Nevertheless, the full sample analysis revealed that ODUI was predicted by both anxiety and relatedness frustration via smartphone addictions. H_1 is supported by previous research that found that users with lower levels of mental health were prone to higher levels of problematic online dating use (Lenton-Brym et al., 2021; Rochat et al., 2019), although ODUI did not explicitly assess problematic use but assessed the intensity of online dating use. In line with this result, previous studies found that users who are involved in more activities via their smartphones are more likely to be users of online dating (Alvídrez & Rojas-Solís, 2017; Chan, 2017; Holtzhausen et al., 2020; Kang & Hoffman, 2011). Regarding the Indonesian sample, smartphone addiction was predicted by anxiety and ODUI was significantly predicted by smartphone addiction, similar to the Polish sample in which ODUI was predicted by smartphone addiction.

The indirect path (i.e., relatedness frustration to ODUI mediated by smartphone addiction) was not significant in either the Polish or the Indonesian sample (i.e., within-samples analysis). However, when analysed as one sample, both anxiety and relatedness frustration predict ODUI via smartphone addiction. Additionally, the Indonesian sample had significant paths from anxiety to smartphone addiction which suggests that anxiety predicts higher rates of smartphone addiction.

Furthermore, smartphone addiction predicted higher levels of ODUI among Indonesian participants and Polish participants. These results suggest more similarities than differences between samples. Considering two of them were from Europe (i.e., UK and Poland) and one from Asia (i.e., Indonesia), higher divergence might be expected between European and Asian countries which seem not to be as clear in the present study. There appeared to be similar trends of use between European countries and Indonesia. The current most popular dating apps are the same across the three sample countries (i.e., *Tinder* and *Badoo*) (Cidac, 2021), although there are local apps that are popular within European countries (e.g., *Happy Pancake* in Sweden and Finland, *Lovoo* in German-speaking countries) (Cidac, 2021). However, considering the results from the present study and the majority trend towards the same dating apps across the studied samples, one tentative explanation is that built-in structural characteristics in dating apps may account for the similarities between samples, although this disregards the cultural divides between Eastern and Western cultures (Himawan et al., 2021). Yet, not denying the differences of dating norms between more collectivist countries (i.e., Asian countries) and individualist countries (i.e., Western countries), it seems like dating apps are intensifying an individual-centred and faster-paced dating in Asian communities (Cheh, 2017) as opposed to prioritizing family and/or larger society's needs (Blair & Madigan, 2016). Arguably, structural characteristics might influence users' behaviour, irrespective of their cultural background, which would suggest that their design may target basic cognitive/behavioural mechanisms (see Chapter 4) that are unaffected by cultural phenomena.

Regarding H_2 , no indirect effect was found between negative mental health and ODUI mediated by social media addiction, therefore H_2 was not supported by the mediation analysis. However, according to path analysis, there were significant positive relationships between anxiety and social

media addiction in the UK sample, Indonesian sample, and all samples together. Regarding social media addiction and ODUI, the only significant path was found among Polish participants. Considering that numerous studies associating mental health problems with higher engagement (and addiction) of social networking sites (D'Arienzo et al., 2019; González-Nuevo et al., 2021; Kuss & Griffiths, 2011, 2017), and the convergence between social media and online dating use (Harren et al., 2021; Holtzhausen et al., 2020; Linne, 2020), it was expected that there would be a mediation effect between those variables. Arguably, social media engagement may be affected by higher engagement in online dating considering both services provide users with similar short-term outcomes (i.e., self-esteem boost, need of belonging/connection, social interaction) (Linne, 2020). This phenomenon (i.e., lower social media engagement due to higher online dating use) was coined *substitute usage* in the IPA study (see Chapter 5).

In the cases of H_3 and H_4 , no significant indirect relationship between self-esteem and ODUI was found to be significant, therefore neither H_3 nor H_4 were supported. However, in the UK sample and all sample, lower levels of self-esteem predicted smartphone addiction, and smartphone addiction predicted ODUI. In the case of the Polish and Indonesian participants, no significant paths were found between self-esteem and the mediator variables (i.e., smartphone and social media addiction). Although the study of self-esteem in relation to problematic use of social media has been extensively supported (e.g., Andreassen et al., 2017; Malik & Khan, 2015; Wang et al., 2012), self-esteem as an indicator of online dating usage may not be as informative (Gatter & Hodkinson, 2016). Contrary to this, other studies have found significant differences regarding self-esteem among online dating users when compared to non-users (Strubel & Petrie, 2017), and self-esteem enhancement by means of hook-up facilitation (Orosz et al., 2018; Zervoulis et al., 2020).

However, a tentative explanation for the mixed findings in relation to self-esteem and online dating use is that there is a positive short-term outcome (i.e., higher self-esteem) when users experience the rewarding effects of their use. Nonetheless, this positive relationship may change over periods of prolonged usage (Strubel & Petrie, 2017) as a result of burnout and needs frustration (see IPA study in Chapter 5).

For H_5 , there was a significant direct effect of relatedness frustration on ODUI in UK participants, Polish participants, and Indonesian participants, as well as in all sample model. Therefore, H_5 was supported across all samples, which means that ODUI was predicted by relatedness frustration (Coduto et al., 2019; Orosz et al., 2018). The latter finding is supported by the results in the IPA study, where findings suggested that users who experienced lack of social and/or romantic needs turned to online dating in order to satisfy that need. Nevertheless, as it was also pointed out in the IPA study, users tend not to fulfil their relatedness needs and experience feelings of frustration and loneliness (Albury et al., 2020; Altan, 2019; Zervoulis et al., 2020). As argued in the IPA chapter, users may first consider online dating platforms to satisfy their relatedness needs before face-to-face interaction where rejection is feared most (see Chapter 5). Therefore, increasing needs frustration, is further supported by findings in the present study. In all samples, there was a positive relationship between relatedness frustration and ODUI, which may also provide cross-cultural evidence to the relationship between needs-driven usage and problematic online dating use (Altan, 2019; Chen & Kim, 2013; Obarska et al., 2020; Orosz et al., 2018).

Regarding H_6 , results from the path analysis showed a significant effect between negative affect and ODUI in the Polish sample and all sample model, which suggests that ODUI was predicted by lower levels of negative affect. H_6 was not supported because the effect was expected to be positive

(i.e., participants would present higher levels of negative effect when scoring higher on ODUI). A possible explanation for this finding could be that users experience a short-term reward from their usage (Langert, 2021; Watson et al., 2019), which may be expressed in better mood. However, considering that participants with higher levels of ODUI expressed higher levels of relatedness frustration, the short-term reward may result in lower levels of wellbeing in the longer term (Langert, 2021). Previous literature has found users experience higher levels of wellbeing when using online dating services (Degen & Kleeberg-Niepage, 2020; Taylor et al., 2017; White Hughto et al., 2017; Zervoulis et al., 2020). Therefore, online dating outcomes can vary depending on a myriad of factors (e.g., motives, personality traits, and psychological correlates) (see Chapter 2) and time (i.e., short-term vs. long-term effects). Future studies with a longitudinal approach could empirically assess the effect of continued online dating use on users' wellbeing delimiting short-term and long-term effects.

6.5 Limitations

Although the present study had a moderately large sample size ($N=1,099$), the sub-samples differed considerably in size, which may have affected the power of the findings. In terms of sample limitations, an *MTurk* sample was included in the total UK sample, and some scholars claim that *MTurk* data can be of lower quality for various reasons, such as the use of bots (i.e., computer software automatically completing surveys) or fraudulent responses (Chmielewski & Kucker, 2020; Dennis et al., 2020). However, quality checks were carried out which have been indicated as an effective measure that increases the quality of the data (Chmielewski & Kucker, 2020). Some of the scales used in the study were not previously validated in Polish or Indonesian. For those cases, translation and back-translation was carried out. Additionally, those non-validated

scales were evaluated via confirmatory factor analysis to assess the quality of their psychometric properties. In terms of the design, the findings from the present study cannot infer causality due to the cross-sectional nature of the data collected. Also, the samples were non-representative, and data were collected via self-reports online. Therefore, it is suggested that future studies use methodologies that overcome such limitations (e.g., longitudinal studies, experiments).

6.6 Conclusions

The present study assessed the relationships between wellbeing and intensity of online dating use in cross-cultural samples of dating app users. Overall, the study draws on previous literature that studied the relationships between mental health and wellbeing correlates and online dating use. Furthermore, to the best of the present authors' knowledge, the present study is the first to provide a cross-cultural comparison of online dating users from three different countries which may enhance the limited generalizability of the findings. Also, the present study provides quantitative support to the findings from previous chapters (i.e., the IPA study and the taxonomy of structural characteristics [Chapter 5 and 4, respectively]), adding further knowledge to the study of problematic online dating use. Additionally, the present study in conjunction with the previous empirical chapters may (i) promote further research in the field of online dating, and problematic online dating in particular, (ii) provide new evidence to further comprehend the underlying dynamics of psychological phenomena and online dating usage, and (iii) encourage further research with a cross-cultural design.

CHAPTER 7

Dating app use and wellbeing: An application-based study employing ecological momentary assessment and objective measures of use.

Smartphones are part of individuals' daily lifestyle as are smartphone applications such as dating apps. Previous evidence suggests that high engagement in dating applications can be detrimental for users' wellbeing. However, much of the published research has relied on cross-sectional studies and self-report measures. Therefore, the present study investigated the relationship between dating app users' wellbeing and objective measures of their use during a one-week period. To do this, the present study employed a newly developed application, *DiaryMood* and utilized ecological momentary assessment (EMA). A convenience sample of 22 online dating app users participated in the present study. Findings from a three-level multilevel analysis indicated that higher dating apps use time predicted craving among dating app users, and notifications led to improved mood and higher self-esteem. The results are discussed in relation to previous media and online dating studies. To conclude, the present study sets a precedent with the use of EMA within the scope of online dating research which may promote further studies adopting this methodology.

7.1 Introduction

A total of 83.96% of the world population (6.64 billion individuals) owns a smartphone (O'Dea, 2022). Consequently, many computer-based services (e.g., gaming, social media, online dating) have become ubiquitous due to the appearance of smartphone-based applications. However, having constant access can lead to potentially negative consequences. For instance, higher availability has been related to problematic use of social media networks (Kuss & Griffiths, 2017)

and dating applications (Jung et al., 2014). Furthermore, Jung et al. (2019) reported that online dating users' behaviour changed when shifting from computer-based online dating to smartphone-based dating, resulting in higher engagement of using dating applications. Problematic use of online dating has been previously characterized (Orosz et al., 2018) based on the components model of addiction (Griffiths, 2005), which comprises six components (i.e., salience, mood modification, tolerance, conflict, withdrawal, and relapse). Although problematic use of online dating does not currently constitute a mental disorder diagnosis in any of the diagnostic manuals, there is empirical evidence that relates problematic use of online dating to lower psychological wellbeing and depression (Altan, 2019; Holtzhausen et al., 2020) as well as lower levels of self-esteem and body satisfaction (Strubel & Petrie, 2017).

Relatedly, loneliness and/or relatedness needs have been raised by previous studies as predictors of higher dating app engagement and problematic use (Coduto et al., 2019; Orosz et al., 2018). Also, previous findings reported that needs-driven use is a significant predictor for higher dating app use (Coduto et al., 2019; Rochat et al., 2019). More specifically, users reported that receiving matches and likes from other users was perceived as a form of (short-term) gratification (i.e., self-esteem boost). Similarly, receiving smartphone notifications has been associated with emotional states of the users (Kanjo et al., 2017). For instance, receiving numerous notifications has been found to relate to negative emotional states – lower mood. However if those notifications came from social networking sites, users felt socially connected and positive emotional state (i.e., better mood) (González-Nuevo et al., 2021; Pielot et al., 2014). Nevertheless, the number of notifications received can have an effect on users' wellbeing, irrespective of the notification source (i.e., social or not), as high numbers of notifications can lead users to feel overloaded and experience decreased

wellbeing (Chai et al., 2019), causing fatigue and self-esteem deterioration (Choi & Lim, 2016; Maier et al., 2012). Notifications can trigger fear of missing out (FOMO) (Alutaybi et al., 2019), which has been defined as the “*pervasive apprehension that others might be having rewarding experiences from which one is absent*” (Przybylski et al., 2013, p. 1841). Previous research has reported that FOMO is a significant predictor for maintenance of dating app usage behaviour (Nieuwenhuis, 2020; Portolan & McAlister, 2022), in line with previous research that found FOMO to be a predictor of social media addiction and lower wellbeing (Kuss & Griffiths, 2017). Dating app users have identified feelings of FOMO when not active on the apps, and FOMO was also found to be influenced by structural characteristics of dating apps (Nieuwenhuis, 2020). Furthermore, FOMO can lead smartphone users to increased feelings of craving (De-Sola et al., 2017) and repeatedly check their screens not to miss out on messages (Alutaybi et al., 2019), which in turn can facilitate constant screen checking becoming a habit (Van Deursen et al., 2015).

In line with this, the Interaction Person-Affect-Cognition-Execution (I-PACE) model (Brand et al., 2019) posits that individuals with a tendency to online addictions behave predominantly by impulse/reaction in response to internal/external stimuli (i.e., triggers) , which inhibits self-regulatory control over urges. Consequently, screen-checking behaviour could become conditioned as a coping mechanism to overcome negative emotional states.

Most of past research on online addictions, and more specifically problematic use of online dating, has relied on self-report methodologies. For instance, in a review of the published studies in social psychology in the year 2018, it was reported that 68% of the published studies relied exclusively on self-report measures (Sassenberg & Ditrich, 2019). This could present a problem given that self-report data have been found to lack accuracy when participants report their own use of social

media (Araujo et al., 2017; Scharkow, 2016), which can lead to over- and underreporting of findings (Boase & Ling, 2013). Conversely, ecological momentary assessment (EMA) is a sampling technique that collects real-time data in participants' natural setting, decreasing recall bias and promoting ecological validity (Stone & Shiffman, 1994). Contrary to self-report scales that aim to obtain an overall estimate of a given construct, EMA is able to register those changes in participants' behaviour and/or general wellbeing throughout the study period (Bentley et al., 2019). Additionally, given the widespread use of smartphones, carrying out EMA studies is easier than before when participants needed to carry additional items to log their behaviour (e.g., paper and pencil) (Bentley et al., 2019). It is now possible for participants can log onto their smartphones and register their responses in real time. Moreover, the use of smartphones to carry out such studies allows the possibility of "passive monitoring", which refers to that data collected (e.g., screen time, number of screen unlocks) automatically without the need for participants' recall (Kleiman & Nock, 2017).

Therefore, previous findings in media addictions and dating app research highlight relations between number of notifications and users' wellbeing (i.e., mood and self-esteem), frequent checking of smartphones with the development of habitual usage and increased feelings of craving, as well as high-frequency dating app use with lower mental health and general wellbeing. The present study investigated the relationship between wellbeing measures such as self-esteem, mood, and craving, and objective measures of dating app use (i.e., usage time, number of notifications, number of launches). To do this, a newly developed smartphone application was employed to collect real time data from participants (i.e., wellbeing measures and objective measures of use). It was hypothesized that higher usage time on dating apps would lead to lower mood (H_1) and self-

esteem (H_2) and higher craving to be on an online dating app (H_3). It was also hypothesized that notifications would lead to higher craving to be on an online dating app (H_4), increased mood (H_5) and increased self-esteem (H_6). Finally, it was hypothesized that number of launches (i.e., screen unlocks) would lead to decreased mood (H_7) and decreased self-esteem (H_8) and higher craving to be on an online dating app (H_9).

7.2 Methods

7.2.1 Design

The study consisted of real time self-reported repeated measures collected using a newly developed app (i.e., *DiaryMood*) in which participants responded to questions regarding the following areas three times a day: (i) mood, (ii) self-esteem, and (iii) craving, (i.e., in the morning, afternoon, and evening). Also, participants included their daily use of dating applications, the number of launches (i.e., number of times participants opened the application), and the number of notifications received by dating applications. Participants were advised to set alarms on their smartphones to complete questions during each measurement timepoint. Additionally, calendar reminders were also scheduled through the email participants used to express their interest in taking part in the study to ensure completion of the measures. In order to participate, participants were required to be at least 18 years old and be current users of at least one online dating application. The study required participants to record each of the measures for seven consecutive days (i.e., one full week) and it required a few seconds to respond to each measure across the three timepoints (~20 seconds). Although participants needed to be contacted via email to participate in the study, the data from participants were anonymised so that their emails were

not included/associated with their data. To do this, once participants stated their interest in participating, they were given a unique code and password for their access to the app. Once they launched the application (i.e., signed-in) they were asked to create a unique code that only they knew in case a participant wanted to remove their data from the study and to keep complete anonymity, as stated in the ethical approval for the study. In order to increase participation, the study offered a compensation of £20 *Amazon* vouchers, approved by the research team's university ethics committee. Participants received an information form and consent form after stating their interest in participating. Once they had signed the consent form, they were sent the link to download *DiaryMood* onto their smartphones. Once the study finished, participants were given a debrief form and the link to their compensation.

7.2.2 Participants

A total of 22 participants took part in the study ($M_{age}=24.82$ years, $SD=4.36$). Participants were recruited through social media networks (e.g., *Facebook*, *Instagram*) where the study was posted. Further participants were recruited through the university's research credit participation system. Participation was voluntary and participants contacted the first author to express their interest in taking part in the study. In order to be eligible for the study, participants needed to (i) be at least 18 years old, (ii) current dating app users, and (iii) *Android* users. Further details on participants' socio-demographics can be found in Table 7.1.

Table 7.1. Demographics of total sample $N=22$

	<i>n</i> (%)
<i>Age</i> (mean, <i>SD</i>)	24.82 (4.36)
<i>Gender</i>	
Female	16 (72.7)
Male	6 (27.3)
<i>Sexual orientation</i>	
Heterosexual	14 (63.6)
Homosexual	3 (13.6)
Bisexual	5 (22.7)
<i>Marital status</i>	
Single	21 (95.5)
In a relationship	1 (4.5)
<i>Occupation</i>	
Student	12 (54.5)
Full-time job	6 (27.3)
Part-time job	2 (9.1)
Freelance	2 (9.1)

7.2.3 Materials

To collect the data, an *Android*-based application *DiaryMood* was developed to include the measures for the present study. *DiaryMood* included sociodemographic items (i.e., age, gender, sexual orientation, nationality, and occupation). Regarding the measures, *DiaryMood* included three items concerning mood, self-esteem, and craving. Each of the items was presented on a single screen where participants needed to tap on one of the options and press ‘continue’ afterwards. For mood, participants responded to the following item: “*Rate your mood*” on a Likert scale ranging

from 1 (*extremely unhappy*) to 5 (*extremely happy*) (Fordyce, 1988). For self-esteem, the item read “Rate your self-esteem: I have high self-esteem” from 1 (*not very true of me*) to 5 (*very true of me*) (Richard W. Robins et al., 2001). For craving, the item read “How much would you like to be on your dating app right now?” on a scale from 1 (*not at all*) to 5 (*very much*) (Stieger & Lewetz, 2018). For the objective measures, participants logged their responses on a tab that read “Log your stats of use”. When clicking on the tab, participants were presented with three boxes that included their daily use of dating applications, total use time (in minutes), number of notifications, and number of launches. To access the objective measures, participants were asked to collect data from the wellbeing section on *Android* smartphones. For a visual example of *DiaryMood* see Figures 7.1-7.2.

Figure 7.1. MoodDiary mood item

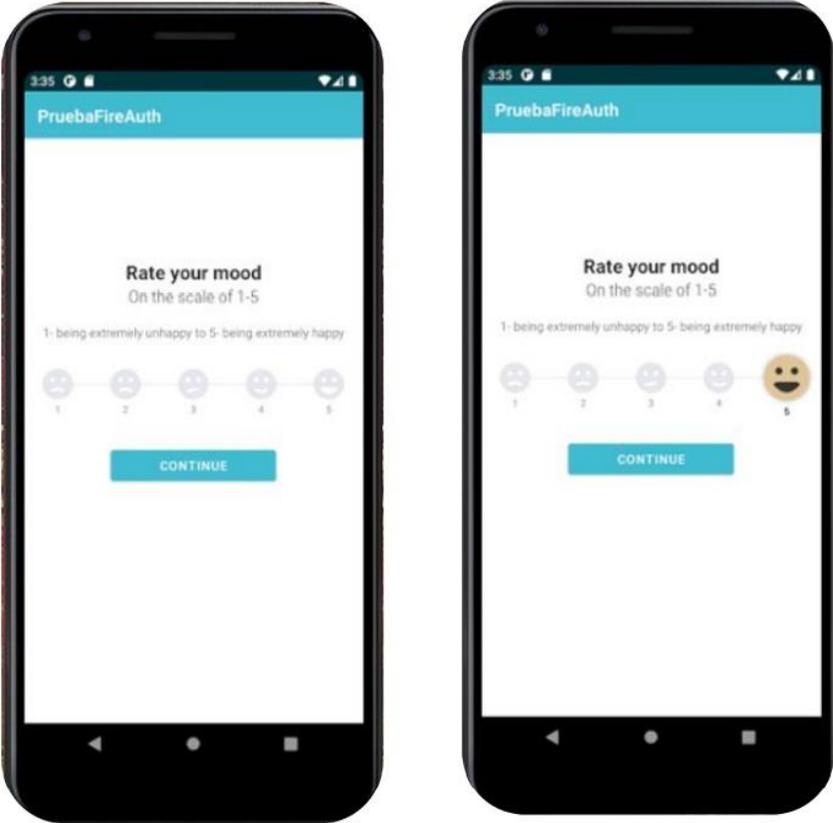
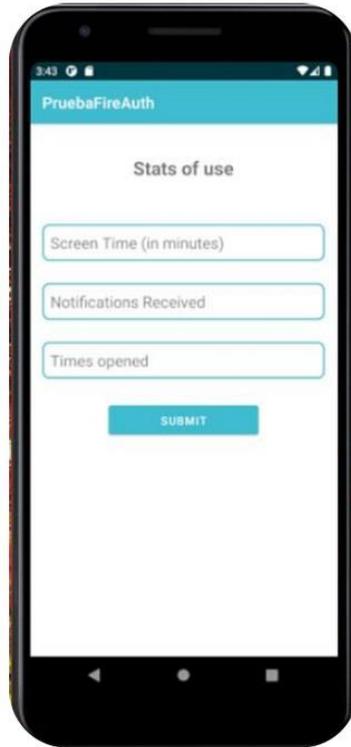


Figure 7.2. *MoodDiary* objective measures

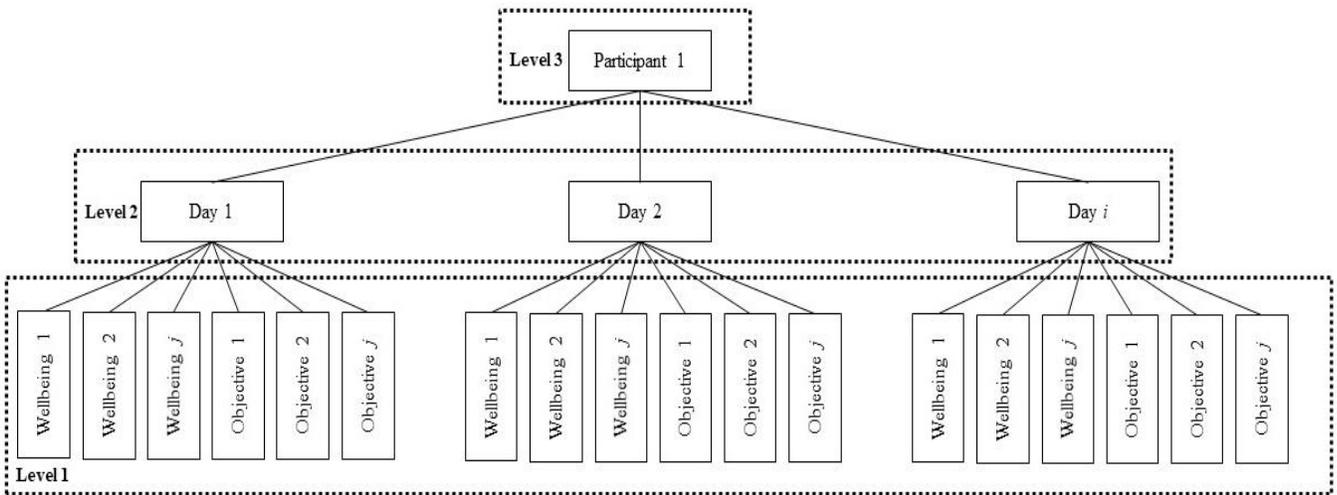


7.2.4 *Statistical analysis*

Analysis was carried out in *RStudio* (version 1.2.1335). First, descriptive statistics were analysed in regard to sample demographics, means, and standard deviations of the study variables (Table 7.2). Subsequently, Pearson's correlations were calculated to assess the correlations between the variables of the study (Table 7.3). The data were ordered so every participant's data started on a Monday and ended on a Sunday to control for possible patterns of usage/wellbeing based on the day of the week (see Figures 7.4-7.7). Multilevel analysis was performed to assess the relationships between wellbeing variables (i.e., outcome variables) and objective measures (i.e., predictive variables). To do this, the three daily measures (Level 1) were nested within days (Level 2) within participants (Level 3). An example of this three-level model is shown in Figure 7.3. Further

analyses were carried out to obtain standardized estimates and 95% confidence intervals with ‘effectsize’ package (Ben-Shachar et al., 2020). As expected in an EMA study (Wen et al., 2017), there were missing datapoints which appeared to be missing at random (MAR). Therefore, treatment of missing data was handled by the default option of the ‘lmer’ function from the ‘lm4’ package (Bates et al., 2015), which excludes rows containing missing datapoints as according to Snijders & Bosker (1999) this does not lead to biased estimates if the condition of MAR is met.

Figure 7.3. Hierarchical structure of the three-level model



7.3 Results

Results suggest that mood and self-esteem levels across the study week remained stable within a medium-high range ($M_{\text{mood}}=3.39$, $SD_{\text{mood}}=0.95$; $M_{\text{self-esteem}}=3.39$, $SD_{\text{self-esteem}}=1.12$) with a small divergence during the weekend when mood was slightly higher than self-esteem (see Fig. 7.4 and Table 7.2 for descriptive statistics). In the case of craving, participants were within the medium range (i.e., 2-2.5; see Fig. 7.4, with Wednesday the only day that craving levels surpassed the medium point ($M_{\text{craving-Wednesday}}=2.59$). Usage was highest at the start of the week, whilst differences

were not statistically significant. Tuesday’s average use was 41.68 minutes (the highest during the week). The second highest day of use was Thursday with an average of 35.59 minutes, followed by Saturday with 33.18 minutes (see Fig. 7.5). Regarding number of notifications, Tuesday was the day with the highest number of dating app notifications received with an average of 58.62, followed by Saturday with 48.36 average notifications (see Fig. 7.7). In the case of number of launches, Saturday was the day with the highest number of average launches of dating applications with 32.27, and the second highest day was Tuesday with 25.58 launches (see Fig. 7.6). The intraclass correlation coefficients (ICCs) suggest that the 55% of the variance in launch averages was explained by between-participant variation. Therefore, 45% corresponds to within-participant variation, indicating that the difference is higher between participants’ numbers of launches than the differences in launches within participants. In the case of craving, 18% of the variance was attributed to between-participant variance and 82% to within-participant variance, indicating that each participant’s level of craving differed across the week more than the difference found between each other’s levels of craving (see Table 7.2).

Table 7.2. Descriptive statistics

	Mean	<i>SD</i>	ICC
Mood	3.39	0.95	.36
Self-esteem	3.39	1.12	.47
Craving	2.42	1.11	.18
Usage (in minutes)	28.04	31.37	.40
Notifications	25.42	67.35	.34
Launches	18.79	25.36	.55

SD, standard deviation; *ICC*, interclass correlation coefficient

Associations between variables are shown in Table 7.3. Mood and self-esteem were more strongly correlated ($r=.77, p<.001$) than self-esteem and usage ($r=.12, p<.05$), and mood and launches ($r=.12, p<.05$). Also, objective measures (i.e., usage, launches, and notifications) showed strong correlations with each other: notifications and launches ($r=.66, p<.001$), notifications and usage ($r=.75, p<.001$), and usage and launches ($r=.72, p<.001$).

Table 7.3. Correlation matrix of study variables

	Mood	Self-esteem	Craving	Usage	Notifications	Launches
Mood	-					
Self-esteem	.77***	-				
Craving	.07	.14**	-			
Usage	.08	.12*	.20***	-		
Notifications	.15**	.16**	.14**	.75***	-	
Launches	.12*	.16**	.15**	.72***	.66***	-

* $p < .05$; ** $p < .01$; *** $p < .001$

Figure 7.4. Mood, self-esteem, and craving across the week

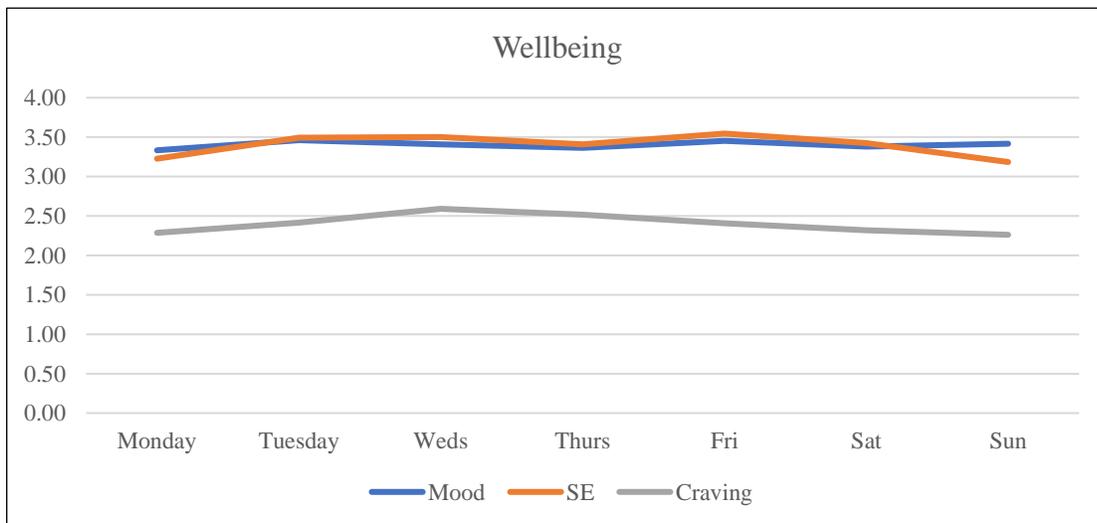


Figure 7.5. Use time across the week

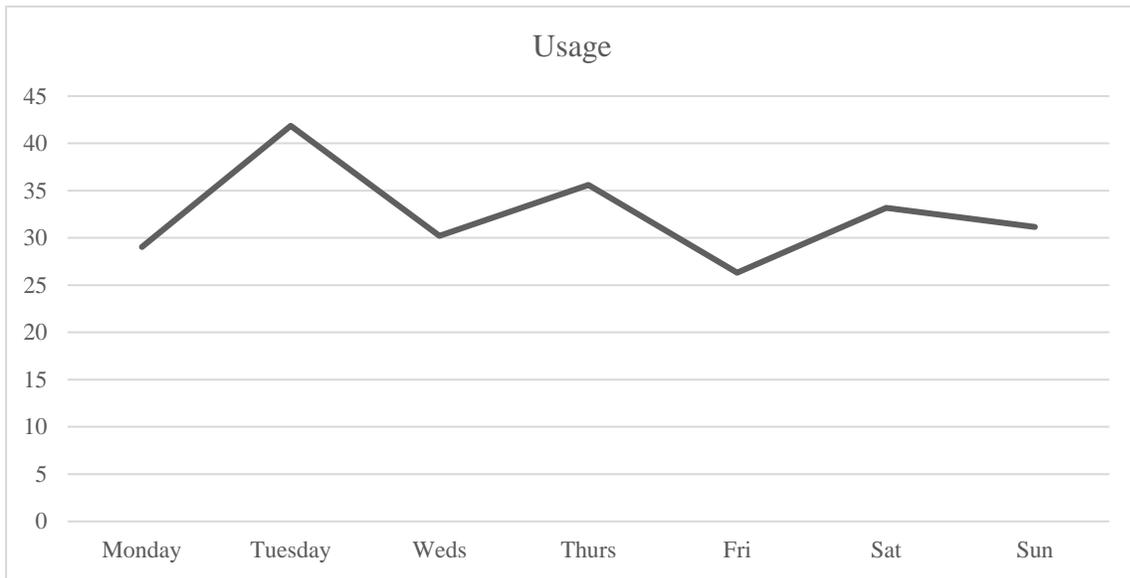


Figure 7.6. Number of launches across the week

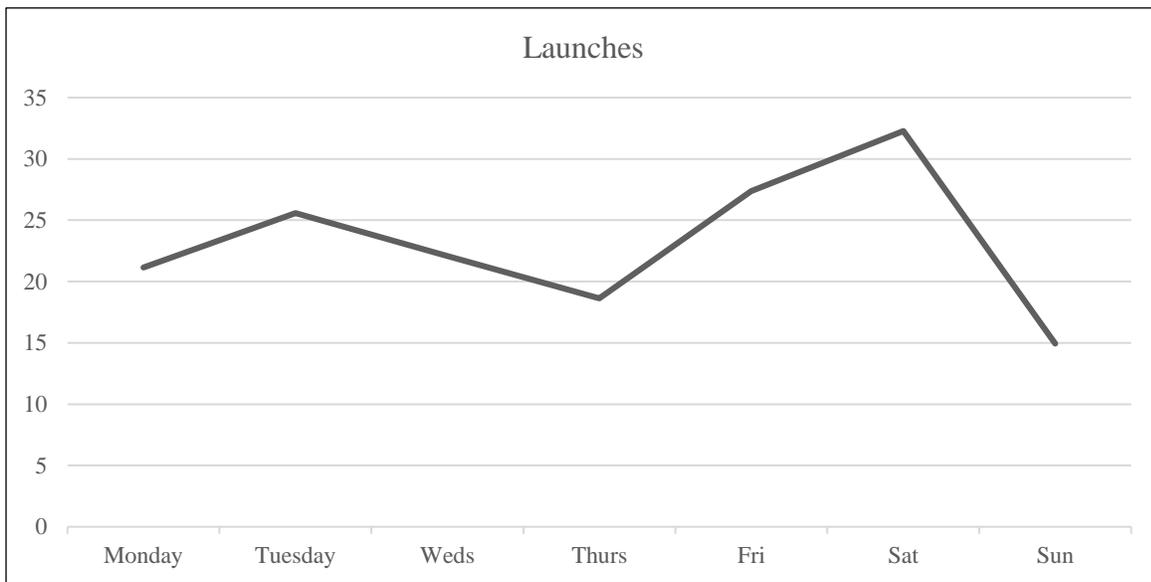
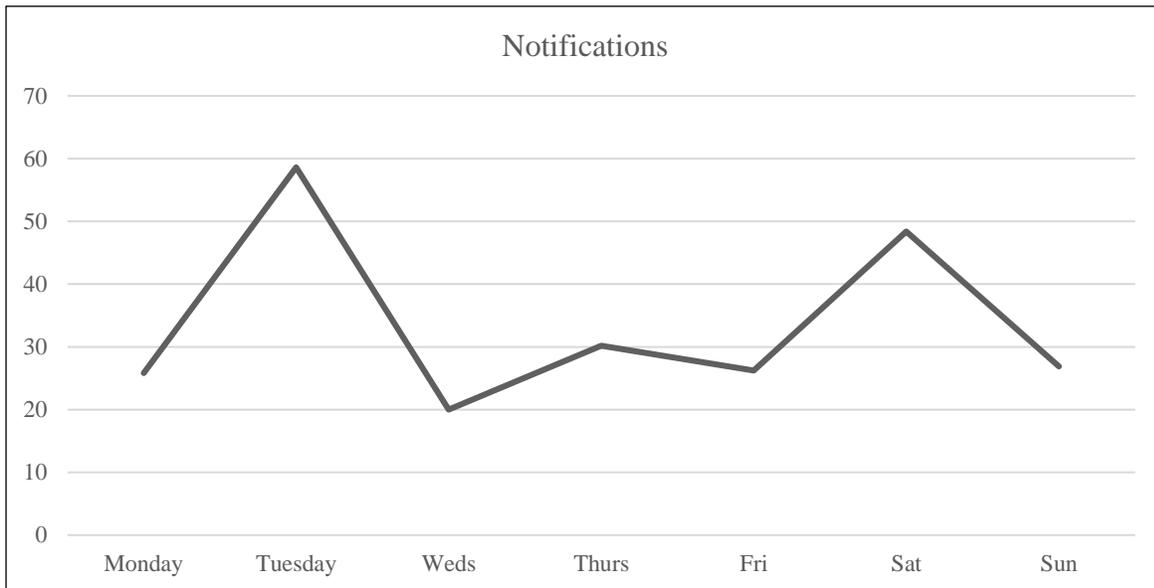


Figure 7.7. Number of dating apps' notifications across the week



Three models, one for each outcome variable (i.e., mood, self-esteem, and craving) were tested. Each of the models was compared against alternative models in terms of their fit indexes (i.e., AIC, BIC, and deviance). The resulting models and their fit indexes are presented in Table 7.4. The model fit for mood as the outcome variable (i.e., Model 1) with random intercept and random slopes was found to have the best fit (AIC=851.3, BIC=892.7, Deviance=829.3). For self-esteem as the outcome variable (Model 2), random intercept and random slopes were found to have the best fit (AIC=921.2, BIC=962.5, Deviance=899.2). For the model fit with craving as the outcome variable, random intercept and random slopes were found to have the best fit (AIC=935.6, BIC=976.9, Deviance=913.6). Reaching the level of statistical significance, it was found that for every unit increase in notifications, participants' mood increased by 0.14 ($\beta=.14$, $p=.014$). In the case of self-esteem, for every unit increase of notifications, self-esteem increased by 0.23 ($\beta=.23$,

$p=.006$). For craving, it was found that for every unit increase of usage, craving increased by 0.19 ($\beta=.19, p=.044$). Further results from the three models are presented in Table 7.5-7.7.

Table 7.4. Model fit statistics

	AIC	BIC	Deviance	LogLik
Model 1 (Mood)	851.3	892.7	829.3	-414.7
Model 2 (Self-esteem)	921.2	962.5	899.2	-449.6
Model 3 (Craving)	935.6	976.9	913.6	-456.8

AIC, Akaike information criterion; *BIC*, Bayesian information criterion; *LogLik*, Log-likelihood

Table 7.5. Mood as outcome (Model 1)

	b	SE	β	<i>p</i> -value	Standardised 95% CI
Intercept	3.35	.10	.00	<.001***	[.00, .00]
Usage	-.001	.003	-.05	.548	[-.23, .12]
Launches	.0004	.003	.01	.905	[-.16, .18]
Notifications	.003	.001	.21	.014*	[.05, .38]
Random effects	Variance	<i>SD</i>			
Participants: Day (Intercept)	.43	.66			
Day (Intercept)	.00	.00			
Residual	.54	.73			

b, coefficient estimate; *SE*, standard error; β , standardized correlation coefficient; *CI*, confidence interval; *SD*, standard deviation. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 7.6. Self-esteem as outcome (Model 2)

	b	SE	β	<i>p</i> -value	Standardised 95% CI
Intercept	3.37	.11	.00	<.001***	[.00, .00]

Usage	-.003	.003	-.08	.328	[-.24, .08]
Launches	.001	.004	.03	.716	[-.13, .19]
Notifications	.004	.001	.23	.006**	[.08, .39]
Random effects	Variance	SD			
Participants: Day (Intercept)	.86	.93			
Day (Intercept)	.0002	.01			
Residual	.568	.75			

b, coefficient estimate; *SE*, standard error; β , standardized correlation coefficient; *CI*, confidence interval; *SD*, standard deviation. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 7.7. Craving as outcome (Model 3)

	<i>b</i>	<i>SE</i>	β	<i>p</i> -value	Standardised 95% <i>CI</i>
Intercept	2.34	.10	.00	.000***	[.00, .00]
Usage	.01	.003	.19	.044*	[.01, .38]
Launches	-.001	.003	-.03	.730	[-.19, .13]
Notifications	.0001	.001	.01	.894	[-.18, .20]
Random effects	Variance	SD			
Participants: Day (Intercept)	.21	.45			
Day (Intercept)	.00	.01			
Residual	.93	.96			

b, coefficient estimate; *SE*, standard error; β , standardized correlation coefficient; *CI*, confidence interval; *SD*, standard deviation. * $p < .05$; ** $p < .01$; *** $p < .001$

7.4 Discussion

The present study investigated the relationships between objective measures of dating app use (i.e., use time, number of launches, and number of notifications) and users' wellbeing (i.e., mood, self-esteem, and craving) during a one-week period. To do this, a smartphone-based application for

Android phones (i.e., *DiaryMood*) was developed. The study collected the data in participants' natural settings and registered 12 daily responses per participant in real time, based on the principles of EMA (Stone & Shiffman, 1994).

According to the MLM results, no significant effect was found for the time spent on dating applications (i.e., use time) on mood and self-esteem. Therefore, neither H_1 nor H_2 were supported. Contrary to this, other studies have found lower scores on wellbeing measures (i.e., depression and anxiety) in relation to higher use of online dating apps (Brubaker et al., 2016; Holtzhausen et al., 2020; Langert, 2021), and lower self-esteem when comparing users and non-users of the dating application *Tinder* (Strubel & Petrie, 2017). Nevertheless, these studies measured online dating use by frequency of log-ins which may lead to different results in comparison to actual time spent using the app, as used in the present study. Conversely, other scholars have found positive outcomes in terms of users' wellbeing and dating app use. For example, Watson et al. (2019) reported that dating app users felt emotional connectedness as a result of their use, which is in line with findings that claim that users experienced increased wellbeing when they received matches or met new individuals on dating apps (Sumter et al., 2017).

In relation to craving and use time, a significant association was found. Therefore, H_3 was supported. More specifically, higher dating app use time predicted higher levels of craving. Related to this finding, Hormes et al. (2014) reported that users addicted to social media (according to modified alcohol dependence criteria from the DSM-IV-TR [American Psychiatric Association, 2000], in which craving is included as a criterion) used Facebook substantially more than initially intended and yet experienced high levels of craving for Facebook. Additionally, craving to use dating apps may be another step to provide evidence regarding problematic use of dating apps,

given that craving has been identified as a key construct in the pathophysiology of behavioural addictions in the DSM-5 (Di Nicola et al., 2015). Furthermore, cue-induced craving has been found to predict internet-communication disorder (Wegmann et al., 2018). Considering that smartphones can be a craving-inducing cue (Oulasvirta et al., 2012) for dating applications and their constant presence in the daily lives of users, it is likely that the association cycle between habitual behaviours, and cognitive and emotional responses becomes stronger (Brand et al., 2019).

In the case of notifications and craving, no significant relationship was found in the MLM analysis. Therefore, H_4 could not be supported by the MLM. Previous literature has suggested that notifications can act as reminders of activity and increase feelings of FOMO (Alutaybi et al., 2019). Receiving notifications of messages, matches, or likes can act as cues inducing craving for dating app use (Wegmann et al., 2018). Moreover, some studies have found that social-based notifications lead to positive emotional states (Kanjo et al., 2017; Pielot et al., 2014), which is in line with H_5 and H_6 indicating that notifications would be associated with better mood and self-esteem, supported by the findings in the MLM analysis. According to these findings, dating app users experience a positive outcome when they receive dating app notifications, which is line with previous findings, where participants reported using dating applications to fulfil their short-term needs (Altan, 2019; Chen & Kim, 2013; Langert, 2021). Furthermore, in previous research, relatedness frustration significantly predicted higher online dating intensity. Considering these findings, experiencing better mood and self-esteem when receiving notifications may be explained by the expectation of users of dating apps meeting their needs. Arguably, if a given user's goal is to receive social and/or romantic attention from other users, receiving message notifications can be considered the signal of accomplishment of such a goal, leading to positive emotional states.

Another explanation may be that notifications could have been conditioned to positive outcomes such as need gratification (i.e., classical conditioning). Further studies may also assess the interaction between types of notifications (e.g., matches vs. automatic-generated notifications) and users' wellbeing.

For number of launches, there were no significant findings in the MLM analysis with either mood (H_7) and self-esteem (H_8), or craving (H_9). Oulasvirta et al. (2012) reported that habitual checking of the smartphone was not considered negatively by users. In fact, users reported positive outcomes from repetitive checking, such as time-killing and entertainment. For instance, the highest number of launches throughout the week happened on Saturday, which may have facilitated users meeting in person and potentially improving their wellbeing. In the case of craving, launching dating applications could lead to cue-reactivity and increased feelings of craving as studies in cybersex addiction have shown (Lai et al., 2013; Snagowski & Brand, 2015). Nevertheless, the relationships between number of launches and wellbeing measures were not supported in the present study. Therefore, future studies may further assess the frequency of checking dating applications and subjective feelings of wellbeing.

7.5 Limitations

The present study is not without limitations. First, the sample size ($N=22$) may have reduced statistical power to find significant effects. Second, the sample was collected via convenience sampling, therefore the findings cannot be generalized to the general population of online dating users (Andrade, 2021). Third, in order to facilitate data collection, participants were not given specific time(s) for when to fill in their responses, although they were advised to respond in the

morning when they wake up, afternoon (12:00-13:00), and evening (from 20:00 to their bedtime), and set smartphone alarms with the advised times. Fourth, for ten participants, English was not their mother tongue, and although they were informed and assisted with the language barrier (if needed), some responses might have been biased or misrepresented. All in all, the present study provides novel evidence in the field of online dating, and it is innovative in (i) the use of a smartphone-based application to carry out data collection within the scope of online dating research, and (ii) the use of EMA methodology to include objective measures of dating app use.

7.6 Conclusions

The present study assessed the relationships between objective measures of dating app use (i.e., use time, notifications, and launches) and users' wellbeing. Participants responded to daily questions for seven days utilizing the *DiaryMood* app, which was designed for the purpose of the present study. Overall, the present study provides new evidence in the study of problematic dating app use. More specifically, findings from this study highlight the relevance of dating app notifications in relation to users' wellbeing. Also, the finding that increased time spent on dating app predicts craving for dating app use provides preliminary evidence for further study of potential addiction to dating applications. Moreover, the present study represents, to the best of the present authors' knowledge, the first study to employ ecological momentary assessment within the field of problematic use of online dating and provides new evidence on the addictive dynamics that may underlie problematic use of dating applications. It is believed that findings of the present study (i) will promote further research employing objective methods, (ii) provide evidence that apps like *DiaryMood* are advantageous tools to carry out empirical studies on online addictions, and (iii) provide further evidence in the study and conceptualization of problematic use of online dating.

CHAPTER 8

GENERAL DISCUSSION

This thesis aimed to assess the unique experience of use and problematic use of dating app users, the user-machine interaction between structural characteristics (SCs) of dating applications and dating app users, and the relationship of mental health and dating app use. The unique contribution to knowledge from the present research thesis is the creation of a taxonomy of SCs of dating applications that highlighted how structural characteristics contribute to the development and maintenance of usage behaviour. Another contribution to knowledge from this thesis is the findings that support a significant direct relation between needs frustration and higher engagement in dating apps. Moreover, another unique contribution of the thesis is the cross-cultural comparison of a sample comprising of active dating app users from three different countries (i.e., UK, Poland, and Indonesia). Additionally, this thesis is, to the best of the researcher's knowledge, the first to employ a smartphone-based study with objective measures of dating app use which represents a unique contribution to knowledge and a potential precursor for further studies using the same approach. Past research has indicated that the ubiquity of platforms like social networking sites and online dating sites, can lead to higher engagement and problematic use (Jung et al., 2014; Jung et al., 2019; Kuss & Griffiths, 2011, 2017). Also, previous research has supported that problematic use of smartphones, social networking sites, and online dating can lead to negative outcomes in terms of mental wellbeing (González-Nuevo et al., 2021; Holtzhausen et al., 2020; Obarska et al., 2020; Zervoulis et al., 2020). Therefore, this thesis assessed the problematic use of dating applications drawing from the components model of behavioural addictions (Griffiths, 2005) and the Interaction of Person-Affect-Cognition-Execution (I-PACE) model (Brand et al., 2019).

The systematic review presented in Chapter 2 aimed to (i) review the past research assessing the use of online dating and problematic use of online dating, and (ii) review past literature that studied psychological correlates that may serve as foundational findings for the study of problematic use of online dating. To do this, an extensive literature search was carried out in *Web of Science* and *PsycINFO* databases based on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement (PRISMA). From the search, 43 studies that met the inclusion criteria were selected. Results suggested that (i) there are personality correlates (i.e., sensation-seeking, sexual-permissiveness, and neuroticism) that are correlated to higher use of online dating, (ii) online dating is perceived as riskier in comparison to offline dating (i.e., traditional dating), (iii) online dating users behave more impulsively in comparison to non-users, (iv) there is preliminary evidence supporting the relation between online dating use and drug use, and (v) problematic use of Tinder is related to users looking for a self-esteem boost and sex (i.e., hookups). Therefore, this systematic review provided a synthesis of findings in relation to online dating that served as a foundation to design and carry out the empirical studies that are presented in this thesis.

In Chapter 4, the first empirical chapter is presented which aimed to assess (i) the in-built SCs of dating applications from the moment they are first launched until users interact with each other, (ii) similarities and differences across SCs from a sample of dating applications, (iii) how SCs may promote the creation of habit and other behaviours (e.g., hookups). To do that, a sample of nine dating applications was selected, downloaded by the researcher, and assessed throughout a two-week period. The results from this ethnographic study yielded the formation of the first taxonomy of SCs of a sample of dating applications. The taxonomy contained a total of 49 SCs and was divided into four main taxonomical categories, namely (i) *profile formation*, (ii) *communication*

medium, (iii) *behaviour modification*, and (iv) *habit creation*. Among *profile formation* SCs, three subcategories were found: *user-based* (i.e., SCs that users can freely modify or skip), *app-based* (i.e., SCs that are immutable), and *combination-based* (SCs that are in between *user-based* and *app-based*). Among *behaviour modification* SCs, four subcategories were found: *match-making* (i.e., SCs that intervene in the process of matching), *interaction booster* (i.e., SCs that promote interaction between users), *hooks* (i.e., SCs that target users to purchase premium subscriptions), and *exclusive designs* (i.e., SCs that differentiate a dating application from other apps). For *habit formation* SCs, two subcategories were found: *activity notifications* (i.e., SCs that notify users of activity within the dating application) and *application-automated notifications* (i.e., SCs that are automatically sent to users encouraging engagement). Findings from this study suggest that *habit creation* SCs promote development and maintenance of use behaviour via fear of missing out (FOMO). Furthermore, SCs like *sharing pictures*, *sharing exact location*, and *location-based display* were found to facilitate and promote sex-search behaviour among dating app users.

The second empirical study, presented in Chapter 5, aimed to explore the unique experience of dating app users by investigating (i) dating app users' emotional experience in relation to their dating app use, (ii) how SCs may influence dating app users' behaviour, and (iii) aspects of problematic use of dating apps that may be experienced by dating app users. The study employed interpretative phenomenological analysis (IPA) to evaluate the nine interviews that were carried out. As a result, four superordinate themes emerged, namely *objectification process*, *behaviour maintenance*, *the conflicted self*, and *new dating paradigm*. The first superordinate theme, *objectification process*, provided evidence that users experienced social and/or romantic dynamics within the dating apps as objectifying. Dating app design brings physical appearance to the

forefront, consequently making dating app users highly concerned about choosing their profile pictures. Parallely, picture-based profiles are perceived as intrinsically objectifying by users and lead to interactions that are mainly focused on sexual interactions rather than knowing the person and forming a deep connection which, in most cases, is the main motive dating app users downloaded a dating application. As a result, *the conflicted self* superordinate theme provided evidence of users feeling exhausted after a period of dating app use, which led them to delete the applications for some time, and redownload after a period of ‘detox’ (i.e., cyclical usage).

In terms of the emotional experience of dating app users, relatedness and romantic needs seem to be the main motive to use dating apps. However, users feel that their needs were not being met the way they expected, leading to *needs frustration*. Yet, *behaviour maintenance* showed that users return to dating apps even if they had halted their use due to negative emotional experiences. For instance, users experienced that dating apps provided interaction opportunities that otherwise would not happen, as well as opportunities of receiving external validation from other users which served as self-esteem boosters (i.e., *intrinsic reinforcers*). Also, dating apps are designed to reinforce usage behaviour in an intermittent pattern (i.e., *intermittent reinforcement pattern*), which has been shown to provide higher level of engagement. Moreover, users feared that they could miss an opportunity of meeting someone ‘special’ if they were off the apps for a long time (i.e., *fear of missing out*). Finally, the last superordinate theme, *new dating paradigm*, provided evidence that users experienced a shift in their dating behaviour as a result of their dating app use. Users felt that the fast-paced and high availability of resources on dating apps led them to invest less of their energy in any given person (i.e., *change in focus*) as opposed to what (they felt) would happen in offline dating. Yet, typical offline social behaviours (e.g., ice-breakers, stepwise

disclosure of personal events) seem to be present within the *online dating dynamic*. However, dating app users appeared to be ‘losing themselves’ in the dynamic of *instant need gratification* by favouring short-term rewarding interactions (e.g., sexting, hook-ups) over long-term goals (e.g., finding a long-term partner).

Taken together, findings from Chapter 4 and 5 converge in that they suggest FOMO promotes usage and higher levels of engagement (i.e., *maintenance of behaviour*). Also, findings converge because users in the IPA study (Chapter 5) identified a culture within dating applications that promotes sex-search and sexting, which coincides with one of the findings in Chapter 4 wherein SCs like *sharing pictures*, *sharing exact location*, and *location-based display* were found to promote sexual interactions. Furthermore, users experienced that the sex-search culture within dating apps was partly related to the *focus on the physical*, suggesting that SCs like profile pictures have a relevant role in the development and maintenance of sex-search culture. Further convergence between findings of Chapters 4 and 5 indicates that SCs including *habit creation*, and SCs involved in the match-making process (i.e., *swiping*, *scrolling*, *tapping*) can promote behaviour maintenance via *intermittent reinforcement patterns*. Therefore, considering findings from Chapters 4 and 5, it was hypothesized that higher-engaged dating app users may experience worse mental health than those users who have a more controlled and/or reduced use. Moreover, given the short-term reinforcers that users reported in Chapter 5, it was hypothesized that certain aspects of dating applications (i.e., receiving messages and likes) would result in short-lived positive outcomes.

The second half of the empirical studies (Chapter 6 and 7) was designed to validate findings and test the hypothesis that arose from the first half of the thesis (Chapters 4 and 5). As such, Chapter

6 aimed to investigate (i) the relation between users' wellbeing and online dating use intensity, (ii) the mediating role of smartphone addiction and social media addiction between wellbeing and online dating use, all of which were assessed in a cross-cultural sample providing a cross-cultural comparison. To do this, the study used a path analysis and mediation analysis. Findings from this study showed that smartphone addiction mediated the relationship between anxiety and online dating use intensity, as well as the relation between relatedness frustration and online dating use intensity. Furthermore, it was found that relatedness frustration was a significant predictor of online dating use intensity in the three cross-cultural samples, which means that users experiencing needs frustration tend to use online dating more intensively. This finding somewhat converges with findings from Chapter 5 that provided evidence on users experiencing needs frustration. Although in Chapter 5 needs frustration seems to appear as a result of the use of dating applications, some users reported that they redownloaded the apps (i.e., *cyclical usage*) because they wanted to meet their social/romantic needs. Moreover, users reported that dating applications served to boost their self-esteem (i.e., external validation) and meet their short-term needs (see *instant needs gratification* in Chapter 5), which converges with findings from Chapter 6.

In the final empirical chapter, Chapter 7, the aim was to investigate the relation between wellbeing and craving, and objective measures of use including time spent on online dating, number of received notification, and number of launches (of dating apps). To do this, a smartphone application was developed, *DiaryMood*, in order to collect data across a seven-day period employing ecological momentary assessment (EMA). Findings from Chapter 7 indicated that users experienced improved wellbeing (i.e., mood and self-esteem) when receiving dating app notifications. Also, results from multilevel analysis indicated that users who spent increased

amounts of time on using dating apps experienced increased feelings of craving for dating app use. Taken together, Chapter 6 reported that negative affect was negatively correlated with online dating use intensity, suggesting that dating app users experience positive outcomes out of their use, although in Chapter 6 it was not specified what (within dating applications) could lead to a positive outcome. Therefore, the findings presented in Chapter 7 enriches this finding, specifying that notifications are one factor within dating applications that provide a positive outcome to dating app users. Furthermore, it was reported in Chapter 5 that users experienced a self-esteem boost and external validation from their interaction within dating applications, which may provide a deeper insight to those findings from Chapter 6 and 7 (i.e., increased wellbeing) suggesting that notifications could be acting as self-validation and social attention (i.e., social relatedness needs).

Taken together, findings from the empirical chapters indicate that FOMO is a key factor that app developers use to promote engagement and development of dating app usage behaviour. As a result, FOMO is instilled in dating app users who feel that they may lose their chance of finding love or hook-ups if they are not using the app. Furthermore, psychological needs (i.e., social relatedness needs, love/romantic needs) may interplay with FOMO leading users to engage more intensively with dating applications to meet their needs. However, users seem not be meeting their needs by using dating applications, at least up to extent they were expecting to, consequently exacerbating their needs frustration. In turn, users are further engaged to compensate for those unmet needs, up to the point where those unmet needs develop into emotional exhaustion and energy depletion, which leads users to take a break from their usage. Moreover, dating app users are experiencing a change in dating behaviour due to the subculture within dating apps that favours short-term rewards (i.e., self-esteem boosts, hook-ups) over long-term goals (i.e., long-term

partnership). Consequently, users experience an increased sense of wellbeing in the short-term (i.e., improved mood and self-esteem); however, this short-term focus may perpetuate needs frustration in the long-term, potentially leading to problematic use of dating applications. Additionally, SCs facilitate habit creation via intermittent reinforcement patterns, and instil automatic behaviours, such as swiping, scrolling, and tapping, which can increase the onset of problematic use of dating applications.

Nevertheless, there are positive outcomes that arise from dating app use. In fact, findings from this thesis indicate that users may find that dating apps provide a context to interact with other users that otherwise could never happen. Relatedly, previous research has found that users within the LGBT community experience a sense of belonging within dating apps (Watson et al., 2019), which may be explained by the fact that society is guided by a heteronormative bias. Therefore, dating apps may pave the way to create subcultures where minorities can interact with each other without normative societal constraints. However, this may generate an overreliance on dating apps to interact within members of minorities potentially, leading to dating app dependence.

8.1 Contributions to knowledge

There are a number of contributions to knowledge in the thesis. The unique contributions are outlined and detailed below:

8.1.1 The first taxonomy of dating app structural characteristics

Presented in Chapter 4, this empirical study presented the first taxonomy of structural characteristics in a sample of nine dating applications. Findings indicated that SCs can influence users' behaviour. Furthermore, the creation of a SCs taxonomy may shed light on how dating

application developers may intend to influence dating app users' engagement. As a result, the presented SCs taxonomy may promote further research assessing more specifically the potential outcomes of one (or multiple) SCs. Also, the present taxonomy (of dating applications) may promote further studies aiming to generate updated and/or improved versions of the taxonomy. This may encourage other researchers to elaborate on these findings and generating new empirical findings on new dating applications or updated versions of the ones studied in this thesis.

8.1.2 Cross-cultural comparison of dating app users

The empirical study contained in Chapter 5 is the first study to compare a cross-cultural sample of active dating app users from three different countries – UK, Poland, and Indonesia. Carrying out cross-cultural comparisons provides opportunities to generalize findings within a study field across different populations and evaluate the interaction between culture and behaviour (Bodas & Ollendick, 2005), in this case dating app use and mental health. Moreover, this study provided evidence that relatedness frustration leads to higher dating app engagement across all three samples, which highlights that certain dynamics within dating applications are shared across cultures. This finding provides empirical evidence of dating app use and shared psychological outcomes (i.e., relatedness frustration) among different cultures which may encourage further research assessing similarities and differences in psychological outcomes in dating app use. Furthermore, this finding may further point out the relevance of dating apps design regarding behavioural outcomes in users.

8.1.3 Ecological momentary assessment of dating app use

The last empirical study in Chapter 7 provided the first ecological momentary assessment (EMA) study within the field of problematic use of dating apps. The study also employed the newly developed *DiaryMood* app to collect data from participants across one week. Using EMA in the study of dating app use and problematic dating app use provides a further methodological layer to confirm findings from previous chapters within this thesis. Furthermore, this study provided evidence on the feasibility of carrying out smartphone-based studies, encouraging other scholars to employ EMA methodology in their assessment of online dating (in addition to cross-sectional studies).

8.2 Commentary on methodologies used

The thesis employed a sequential mixed-methods approach, integrating qualitative methodologies in the first half of the thesis (Chapter 4 and 5) and quantitative methods in the second half (Chapter 6 and 7). As discussed in Chapter 3, qualitative methods have several strengths compared to quantitative methods. For instance, using qualitative methodology allowed the researcher to explore new phenomena due to its inductive approach. Moreover, findings from qualitative approaches provided further insight into the research topic, and in-depth understanding of the dynamics that may underlie a certain phenomenon. For instance, ethnography considers a researcher's engagement with the study subject paramount for the understanding of the social reality. One of the key outcomes of ethnography resides in its rich descriptions guided by established theories, consequently leading the researcher to deeply explore social phenomena grounded in pre-existing knowledge (Ejimabo, 2015). Accordingly, Chapter 4 explored and

provided rich descriptions of 49 structural characteristics of dating applications, based on grounded psychology theories (e.g., behaviourism). Nonetheless, findings from Chapter 4 were further explored via interviews with active dating app users (Chapter 5). As such, the aim was to gain further insight into the phenomenology pertaining to dating app use and understand the unique experiences of dating app users (i.e., idiographic approach). Therefore, semi-structured interviews were carried out with open-ended questions to dive into the aims of the study. Interview studies are advantageous in that they provide high flexibility in the extent of participants' responses. Moreover, there is flexibility for the researcher to interject in case the participant needs clarification (Adhabi & Anozie, 2017). Also, interviews allow researchers to gather large amounts of data (Opdenakker, 2006), which provides richness in the consequent findings.

However, qualitative techniques come with some disadvantages. For instance, interview studies are costly and time-consuming (Adhabi & Anozie, 2017). Furthermore, from the participant's point of view, interviews require higher levels of commitment which may decrease participation rates. Another disadvantage from qualitative methodologies is researcher bias which has led to criticism claiming that qualitative studies lack validity and reliability (Rolfe, 2006). As a consequence, qualitative findings are difficult to extrapolate to the general population (Sarantakos, 2005). Conversely, the disadvantages from qualitative methods are the advantages in quantitative methodologies. For example, self-report studies are highly efficient and inexpensive, meaning that researchers can access large sets of data from large samples in short periods of time (Paulhus & Vazire, 2007). Nonetheless, self-report measures have been found to facilitate overreporting and underreporting of experiences and symptoms (Boase & Ling, 2013). However, self-report measures can help minimize response inaccuracy when studies involve socially sensitive

phenomena (Lelkes et al., 2012) including mental health correlates and use of dating applications, as was the case for the study presented in Chapter 6.

Following on from quantitative methods, the thesis employed EMA via a smartphone-based study. The study relied on the app *DiaryMood* for participants to log their wellbeing and dating app use via objective measures. Therefore, the study partly relied on self-report data regarding participants' wellbeing and feelings of craving. As such, participant biases may have affected the report of wellbeing items (Araujo et al., 2017). However, EMA's advantage over traditional self-report studies (i.e., paper-based or computer-based surveys) is that it collects real-time data from participants' natural context, and it provides multiple measures of one single variable which captures the changing dynamics of the self-report variables (Shiffman et al., 2008) such as the ones assessed in Chapter 7 (i.e., mood, self-esteem, and craving). In relation to response compliance, EMA studies tend to have a considerable percentage of missing datapoints (Wen et al., 2017). Nonetheless, the researcher employed calendar reminders and advised participants to set smartphone alarms to increase response compliance. Additionally, prior to starting the study, participants were trained on using the *DiaryMood* app, the amount of responses that were to be given and at what times (i.e., morning, afternoon, and evening), which has been shown to be key in response compliance in EMA designs (Degroote et al., 2020).

The same training procedure was followed for the objective measures. Participants were asked to log their objective measures on *DiaryMood*. For this reason, participants received a link to a step-by-step video that guided where and how to access objective measures from their *Android* smartphones. Objective measures were asked to be logged by participants given that *DiaryMood* was not able to automatically register them, as opposed to 'passive monitoring'. Although passive

monitoring is advantageous in that there are no missing datapoints (i.e., the app registers all the data in the background), the use of passive monitoring can considerably increase smartphone battery use, which could have been a potential drawback for participants and participation rate. The use of objective measures is methodologically advantageous because it does not rely on participant recall (Kleiman & Nock, 2017). Therefore, participant biases such as underreporting and/or overreporting are overcome.

Overall, the thesis integrated various research methodologies in the realm of pragmatism. Following a sequential mixed-methods approach that first explored and inductively gained in-depth understanding of the use of dating apps which facilitated the formulation of hypotheses that were then tested from a positivist standpoint. Although there is ongoing debate regarding the epistemological and ontological discrepancies that arise from using mixed-methods research, there are scholars who support mixed-methods as the third paradigm (in addition to positivism and constructivism) (Doyle et al., 2016; Johnson & Onwuegbuzie, 2004). On the one hand, Guba (1987) claims that unifying both paradigms (i.e., positivism and constructivism) is not possible. On the other hand, Howe (1988) responded that it is not only possible, but encouraged to respond to complex social phenomena. For instance, mixed-methods research is advantageous in addressing different research questions from different perspectives, which allows researchers to obtain stronger conclusions and more complete knowledge (Cronholm & Hjalmarsson, 2011; Kelly & Cordeiro, 2020) via triangulation, completeness (i.e., more detailed depiction of the research topic), and counterbalancing weaknesses from each research paradigm (Doyle et al., 2016). In line with this, the thesis adopted a pragmatic standpoint that allowed delving into the social realities of dating app users, providing insight and rich in-depth findings, which were then

numerically tested. Therefore, in line with the mixed-methods advantages, the thesis has attained findings that are triangulated and present a more complete depiction of the use of dating apps and problematic use of dating applications.

8.3 Limitations and future directions

In this brief section, some of the limitations and prospects for future research will be outlined, in addition to the limitations and future directions presented in each of the Chapters. Firstly, measures of dating app use are different in both quantitative chapters (i.e., Chapters 6 and 7). While Chapter 6 utilized a pre-validated short scale (i.e., Online Dating Intensity Scale, ODI; Bloom & Dillman, 2019), Chapter 7 recorded use of dating apps via objective measures provided by participants' smartphones. Although both measures explored similar facets of dating app use (i.e., level of engagement), they are conceptually different and, therefore, conclusions derived from the convergence of both studies are to be taken with caution. In this sense, future research within the field of problematic use of dating apps could benefit from unifying measures attempting to assess the same concepts. For instance, further studies may consider implementing passive monitoring or collecting objective use measures, which would be cross-culturally valid and further facilitate comparison among studies.

Secondly, expertise of the interviewer is pointed out as a key factor for drawing good-quality conclusions in interview studies. In this case, although the researcher did not have experience carrying out interviews for research purposes, the researcher possessed previous experience in clinical interview settings, which may have been of assistance to provide a good rapport with the interviewees, employing appropriate listening techniques, and exercise insightful interjections.

Moreover, the procedure of IPA is systematic and encourages to follow a series of analytical steps (Smith et al., 2009) that make it more reliable and easier for novice researchers than other qualitative techniques.

Thirdly, a significant part of the thesis relies on self-report measures. As it has been discussed previously in this Chapter, self-report measures can be misleading due to participant bias. Furthermore, the cross-sectional part of the thesis must be taken with caution as it does not infer causality between the studied variables. However, it provides insightful associations between variables. Accordingly, further studies with similar measures with a longitudinal design are encouraged to confirm findings and establish directionality and causality of the variables.

Future studies could further assess the outcomes of problematic use of dating apps. In the thesis, variables such as FOMO, mental health correlates, other media addictions, and craving have been assessed. However, further conceptualization of problematic use of dating apps may be needed to investigate outcomes that may derive from problematic use. For instance, future studies may further assess the relation between smartphone addiction and online dating use intensity as it was found to be significant in this research thesis (see Chapter 6). Also, considering the similarities across social networking sites and dating apps, future studies may assess more deeply the concept of ‘substitutive usage’ (see Chapter 5).

8.4 Implications

The thesis has prevention, research, and corporate implications. Regarding prevention, the research presented provides evidence on how human-machine interactions can influence behaviours not only at the individual level, but also at the group level (i.e., *new dating paradigm*). Moreover,

findings from this research provide further evidence on the conceptualization of problematic use of dating apps. At the individual level, findings from this thesis may help prevent current and/or prospective dating app users from developing usage patterns that may lead to problematic use. Educational workshops based on the findings of this research may educate prospective dating apps users on how to use dating applications in a controlled manner to achieve their initial motives of use. Additionally, prevention programs may avoid users falling into the dynamic/subculture created within dating applications, therefore preventing the appearance of burnout symptoms and needs' frustration. However, if prevention fails to prevent dating apps users to develop negative mental health outcomes, the findings from this research may help practitioners guide users out of the negative cycle by working on unmet needs that may underlie problematic use of dating apps (i.e., social skills, self-esteem techniques).

At the group level, findings point out that within dating apps (i) there are certain behaviours that are becoming normative (i.e., ghosting, breadcrumbing), and (ii) there is a subculture that seeks to commodify users' needs. In this sense, findings from this research may serve for creating campaigns and publications on popular outlets which may increase social awareness on negative behaviours that have become normalized on dating applications. Therefore, preventing further perpetuation of those individual and social dynamics may increase general wellbeing and empathic interactions within dating applications.

In terms of research implications, this research thesis has presented further evidence on the conceptualization and dynamics that underlie problematic use of dating apps. Moreover, the systematic review presented in Chapter 2 (Bonilla-Zorita et al., 2021) was the first systematic review that assessed past research in relation to problematic use of online dating, providing a guide

for researchers within the field of online dating to pursue further studies investigating problematic use of online dating and/or dating apps. Furthermore, this thesis has presented a cross-cultural comparison of active dating app users which may serve as a catalyst for further cross-cultural comparisons enabling generalizing the initial findings presented in this thesis and other studies. The development of the first taxonomy of SCs of dating apps represents another guide for future research. Further taxonomies are encouraged to be developed due to rapid changes in dating app designs and appearance of new dating apps. Also, the use of smartphone-based EMA and objective measures of dating app use has research implications in that they provide evidence of the benefits of this methodology over studies relying solely upon cross-sectional design and self-report measures. On the whole, this thesis presented novel evidence within the field of online dating and problematic use of dating apps that paves the way for new avenues of research that are highly unexplored.

Regarding corporate implications, this thesis provided findings that indicate how the design of dating applications influences dating app users' wellbeing and engagement. Although it is yet debatable if the subculture within dating applications has emerged exclusively due to dating app design, findings from this thesis point out that SCs can increase user engagement and sex-search behaviours. Therefore, specific features and how those are in-built within dating applications are ultimately relevant for users' wellbeing. In terms of engagement in dating apps, the researcher understands that dating app enterprises seek to provide a product that is highly engaging to the users. However, as it has happened with other highly engaging services, such as *Instagram*, which has added features including "Your activity", which tracks use time, dating apps could implement similar measures. For instance, based on the findings from this thesis, features including good

practice guidelines and those that use tracking would be encouraged for dating applications. Also, findings from this research may encourage dating apps enterprises to include structural characteristics that decrease the objectifying effect (i.e., picture-based) and allow a more in-depth focus on personality characteristics. For instance, the researcher proposes structural characteristics that allow dating app users to meet virtually (i.e., video dating) and restrict the number of likes/matches.

8.5 Final remarks

This doctoral thesis has outlined some of the psychological and social implications of dating app use. More specifically, this research project has provided cross-cultural evidence of the human-machine interaction in the realm of problematic use of dating apps. Also, it has assessed the unique experiences of dating app users and outcomes at the social level. It has investigated the relation of other media addiction, mental health, and the intensity of dating app use in a cross-cultural sample, in addition to the relation of user wellbeing and objective dating app use. In sum, findings from this thesis support that the design of dating applications can facilitate problematic use of dating applications resulting in short-term wellbeing gains that turn to negative outcomes when a need-driven use pattern is established. Finally, findings support that there are social consequences deriving from long-term continuous use of dating applications.

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APPENDICES

Appendix I

Declaration of Collaborative Work

The systematic review presented in Chapter 2 has been published in a peer-reviewed journal:

Bonilla-Zorita, G., Griffiths, M. D., & Kuss, D. J. (2021). Online Dating and Problematic Use: A Systematic Review. *International Journal of Mental Health and Addiction*, 19(6), 2245–2278. <https://doi.org/10.1007/s11469-020-00318-9>

Contribution of first author (G. Bonilla-Zorita) to the systematic review:

- Initiation and development of the key ideas
- Literature search and collection
- Literature organisation
- Literature analysis
- Write-up of the manuscript
- Implementation of co-authors' feedback

Contribution of first author (G. Bonilla-Zorita) to the empirical chapters:

- Initiation of research
- Development of key ideas
- Development of interview schedule/online survey/ assistance in app development
- Participant recruitment
- Data collection and cleaning
- Data analysis
- Write-up
- Implementation of co-authors' feedback

Declaration of Co-Authors Contribution:

The content of the chapters presented in the thesis reflect the original and independent work completed by the first author (G. Bonilla-Zorita). Input from the additional co-authors was provided in the form of general feedback / guidance and manuscript edits in line with the normal working expectations of a PhD Student – Supervisor relationship. No original content in the thesis or accompanying journal articles was produced by any co-authors listed.

Appendix II

Ethical approval

The doctoral project received ethical approval on November 11th 2019

Reference code: No. 2019/234

Final amended version was received on February 15th 2021

Reference code: No. 2021/50

Appendix III

Interview schedule

Identity

Firstly, I would like to start getting to know you a little bit. So, if it is fine with you I am going to start asking you some questions about yourself as this will help me to understand you better...

- How would you describe yourself as a person?
- Could you tell me a brief story about your offline and online dating life?
- How do you think online dating has changed you as a person?

Use

Now I will proceed to ask you about your dating apps use. Remember there is not right or wrong answer and I am solely interested in your own experience, therefore feel free to expand your answers. Also, bear in mind that this is a judgement-free space and any information that you give will be treated anonymously.

- Could you tell me a brief story of your dating apps usage from when you started using them?
- If you have had any breaks in your use of dating apps, could you tell me what motivated those interruptions?
- Could you tell me about your current use of dating apps?
- Could you describe in your own words how dating apps work?
- What do you think while using them?
- How does your usage influence your everyday life?
- How has your life changed since you started using dating apps?
- If you had to describe what dating apps mean for you, what would you say?
- How would you improve dating apps?

Structural characteristics

Following, I want to know about your interaction with the app(s). Again, feel free to expand your answer as far as you want

- Could you tell me about your interaction with other users through the application?
- Could you compare for me the different features of applications you have used?
Could you tell me what do you like/dislike of them?
- What do you feel when filtering profiles? Chatting? Changing/exchanging pictures?
- What do you think when filtering profiles? Chatting? Changing/exchanging pictures?
- Do you think dating apps can be addictive?
- In your opinion, how can dating apps be addictive?

Emotional experience and positive/negative aspects

This interview is almost over, and now I would like to know about your feelings regarding the use of dating apps. Here so far, we have talked about a few things regarding your use of dating apps, and so I hope you are feeling comfortable; in case that you do not want to answer any of the questions or you feel uneasy you can tell me so we can skip some question(s) or terminate the interview. Having that in mind...

- Could you tell me about positive and negative experiences you have encountered in the context of dating apps
- Could you describe for me experiences in which you have felt distressed/uneasy due to the use of dating apps?
- Could you describe briefly the best experience you recall from using dating apps?
- Could you describe briefly the worst experience you recall from using dating apps?

Appendix IV

Example of themes with excerpts

Superordinate theme: objectification process

Physical focus

Sebastian: *things are usually associated with gay community, like knowing what's your body type (muscular man, average kind of body type)*

Maria: *a lot of photographs which is good if you want something more superficial*

Gloria: *maybe they're like the most interesting person on Earth but because the first thing at least Tinder shows you is the picture*

Robin: *there's kind of so many profiles on it generally you just swipe on first look.*

Simon: *even if you want just to have sex and that's fine, and I won't shame on that but the fact that people have to say their weight or their height it's not the best // I feel...a certain pressure about me because well after sending that picture and if the person likes*

Lea: *I feel and think that I'm quite shallow but then that's the idea of DA, because you base your first like, your swiping will depend on whether you like the picture or not*

Serena: *I think tinder is the most superficial one probably in the sense that I don't think you can answer any questions your...you know beliefs or personality or anything like that*

Anna: *it is, very superficial, like you only like or dislike somebody by their pictures or their descriptions*

Peter: *you're trying to see what your appetite drives you to, you know, what will you choose for tonight*

Less valuable

Sebastian: *in the end you're just one of the many people that are in the app*

Maria: maybe less complications about friends of friends, or exes// hot conversations with the person maybe... even if I wasn't fully interested in that person

Gloria: I want something to be more organic because online dating hasn't felt organic to me

Robin: recently with using the online apps less I've actually got into more meaningful conversations with people

Simon: you see so many people it's like, well maybe if you are ignored by one person then you have more so it's not as, I don't see pressure of being rejected as it was in person life

Lea: I remember there was this one particular guy for instance with whom it was very flirting and we did talk for quite a while on the chat, he wanted to meet and then I didn't

Serena: I wait for a few days because a lot of people start by talking and...but then just after like a day or two it will cool down and they won't really talk or I won't feel like talking because maybe I don't find them particularly engaging

Anna: sometimes we don't take into account that we are talking, even if it's through a screen or a device, we're talking to a real person

Peter: in some way I think that each person loses a bit of importance, I mean that if there are so many people ready to talk with me out there, I think that it makes us view some of them like less important

Non-normative behaviours

Sebastian: tells you very sexual kind of things that you weren't looking for and nothing in your profile or any of it inviting others to behave like that

Maria: I had contact with people that are very hateful when you weren't as direct as them

Gloria: I would create a profile for a week I'll talk to people and then I would ghost everyone and stop using it

Robin: *we then arranged a date somewhere in town and a couple of times you know they actually haven't turned up [...], because I feel like in person that never really happened to me before*

Simon: *"Why? why do you do that?" I mean, we've been talking for three days and now you're not my friend anymore. So that's disappointing and makes me feel insecure for myself*

Anna: *I would change the people's perspective on the DA and the way we treat each other*

Peter: *I like when you respect the other person and you value their feelings, maybe DA are giving the idea that that's not necessary cause I can just keep swiping and find someone else in a matter of seconds you know...*

Appendix VI

Scales from survey study (Chapter 6)

Online dating intensity scale

In this study, online dating refers to any website or telephone application that you use to meet potential romantic partners for a date, sexual encounter, or long-term intimate relationship.

Instructions: If you currently use a dating service, think about your typical use of your online dating account(s) in an average week. If you do **NOT** currently use online dating services, please answer the following items in regard to your typical use in an

Strongly Disagree
Disagree
Neither Agree nor Disagree
Agree
Strongly Agree

- | | | | | | |
|--|---|---|---|---|---|
| 1. Using online dating services is part of my everyday activity. | 1 | 2 | 3 | 4 | 5 |
| 2. I feel out of touch when I haven't logged into my online dating account for a week. | 1 | 2 | 3 | 4 | 5 |
| 3. I would miss online dating if I had to suddenly stop using online dating services. | 1 | 2 | 3 | 4 | 5 |

Please select the response that best describes your previous or current use of online dating services...

4) **On average, how many times per day do you log on to your online dating service?**

- One time or less per day
- 2 times per day
- 3 times per day
- 4 times per day
- 5 or more times per day

5) **On average, estimate how much time do you spend per day using online dating services (e.g., browsing, messaging, editing your profile)**

- Less than 0.5 hours per day
- 0.5 to 1 hour per day
- 1 to 1.5 hours per day
- 1.5 to 2 hours per day
- More than 2 hours per day

Rosenberg Self-Esteem Scale

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. On the whole, I am satisfied with myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. At times I think I am no good at all.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I feel that I have a number of good qualities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I am able to do things as well as most other people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I feel I do not have much to be proud of.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I certainly feel useless at times.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I feel that I'm a person of worth, at least on an equal plane with others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I wish I could have more respect for myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. All in all, I am inclined to feel that I am a failure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I take a positive attitude toward myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Hospital Anxiety and Depression Scale (HADS)

D	A		D	A	
		I feel tense or 'wound up':			I feel as if I am slowed down:
	3	Most of the time	3		Nearly all the time
	2	A lot of the time	2		Very often
	1	From time to time, occasionally	1		Sometimes
	0	Not at all	0		Not at all
		I still enjoy the things I used to enjoy:			I get a sort of frightened feeling like 'butterflies' in the stomach:
0		Definitely as much		0	Not at all
1		Not quite so much		1	Occasionally
2		Only a little		2	Quite Often
3		Hardly at all		3	Very Often
		I get a sort of frightened feeling as if something awful is about to happen:			I have lost interest in my appearance:
	3	Very definitely and quite badly	3		Definitely
	2	Yes, but not too badly	2		I don't take as much care as I should
	1	A little, but it doesn't worry me	1		I may not take quite as much care
	0	Not at all	0		I take just as much care as ever
		I can laugh and see the funny side of things:			I feel restless as I have to be on the move:
0		As much as I always could		3	Very much indeed
1		Not quite so much now		2	Quite a lot
2		Definitely not so much now		1	Not very much
3		Not at all		0	Not at all
		Worrying thoughts go through my mind:			I look forward with enjoyment to things:
	3	A great deal of the time	0		As much as I ever did
	2	A lot of the time	1		Rather less than I used to
	1	From time to time, but not too often	2		Definitely less than I used to
	0	Only occasionally	3		Hardly at all
		I feel cheerful:			I get sudden feelings of panic:
3		Not at all		3	Very often indeed
2		Not often		2	Quite often
1		Sometimes		1	Not very often
0		Most of the time		0	Not at all
		I can sit at ease and feel relaxed:			I can enjoy a good book or radio or TV program:
	0	Definitely	0		Often
	1	Usually	1		Sometimes
	2	Not Often	2		Not often
	3	Not at all	3		Very seldom

Appendix 1

Smartphone Application-Based Addiction Scale (SABAS)

Please indicate the extent to which you agree or disagree with the statements below in relation to your smartphone use habits.

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
My smartphone is the most important thing in my life.	1	2	3	4	5	6
Conflicts have arisen between me and my family (or friends) because of my smartphone use.	1	2	3	4	5	6
Preoccupying myself with my smartphone is a way of changing my mood (I get a buzz, or I can escape or get away, if I need to).	1	2	3	4	5	6
Over time, I fiddle around more and more with my smartphone.	1	2	3	4	5	6
If I cannot use or access my smartphone when I feel like, I feel sad, moody, or irritable.	1	2	3	4	5	6
If I try to cut the time I use my smartphone, I manage to do so for a while, but then I end up using it as much or more than before.	1	2	3	4	5	6

The total score is calculated by adding the individual scores (1-6) of each item (providing a minimum score of 6, and a maximum score of 36)

Bergen Social Networking Addiction Scale (BSNAS)

How often during the last year have you...

Very rarely	Rarely	Sometimes	Often	Very often
..spent a lot of time thinking about social media or planned use of social media? ¹	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
..felt an urge to use social media more and more? ²	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
..used social media in order to forget about personal problems? ³	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
..tried to cut down on the use of social media without success? ⁴	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
..become restless or troubled if you have been prohibited from using social media? ⁵	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
..used social media so much that it has had a negative impact on your job/studies? ⁶	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix

The PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent [INSERT APPROPRIATE TIME INSTRUCTIONS HERE]. Use the following scale to record your answers.

1 very slightly or not at all	2 a little	3 moderately	4 quite a bit	5 extremely
	<input type="checkbox"/> interested		<input type="checkbox"/> irritable	
	<input type="checkbox"/> distressed		<input type="checkbox"/> alert	
	<input type="checkbox"/> excited		<input type="checkbox"/> ashamed	
	<input type="checkbox"/> upset		<input type="checkbox"/> inspired	
	<input type="checkbox"/> strong		<input type="checkbox"/> nervous	
	<input type="checkbox"/> guilty		<input type="checkbox"/> determined	
	<input type="checkbox"/> scared		<input type="checkbox"/> attentive	
	<input type="checkbox"/> hostile		<input type="checkbox"/> jittery	
	<input type="checkbox"/> enthusiastic		<input type="checkbox"/> active	
	<input type="checkbox"/> proud		<input type="checkbox"/> afraid	

We have used PANAS with the following time instructions:

Moment	(you feel this way right now, that is, at the present moment)
Today	(you have felt this way today)
Past few days	(you have felt this way during the past few days)
Week	(you have felt this way during the past week)
Past few weeks	(you have felt this way during the past few weeks)
Year	(you have felt this way during the past year)
General	(you generally feel this way, that is, how you feel on the average)

Basic Psychological Need Satisfaction and Frustration Scale (BPNSNF)

	1	2	3	4	5	
	Not true at all				Completely true	
1.	I feel a sense of choice and freedom in the things I undertake.	1	2	3	4	5
2.	Most of the things I do feel like “I have to”.	1	2	3	4	5
3.	I feel that the people I care about also care about me.	1	2	3	4	5
4.	I feel excluded from the group I want to belong to.	1	2	3	4	5
5.	I feel confident that I can do things well.	1	2	3	4	5
6.	I have serious doubts about whether I can do things well.	1	2	3	4	5
7.	I feel that my decisions reflect what I really want.	1	2	3	4	5
8.	I feel forced to do many things I wouldn’t choose to do.	1	2	3	4	5
9.	I feel connected with people who care for me, and for whom I care.	1	2	3	4	5
10.	I feel that people who are important to me are cold and distant towards me.	1	2	3	4	5
11.	I feel capable at what I do.	1	2	3	4	5
12.	I feel disappointed with many of my performances.	1	2	3	4	5
13.	I feel my choices express who I really am.	1	2	3	4	5
14.	I feel pressured to do too many things.	1	2	3	4	5
15.	I feel close and connected with other people who are important to me.	1	2	3	4	5
16.	I have the impression that people I spend time with dislike me.	1	2	3	4	5
17.	I feel competent to achieve my goals.	1	2	3	4	5

- | | | | | | |
|--|---|---|---|---|---|
| 18. I feel insecure about my abilities. | 1 | 2 | 3 | 4 | 5 |
| 19. I feel I have been doing what really interests me. | 1 | 2 | 3 | 4 | 5 |
| 20. My daily activities feel like a chain of obligations. | 1 | 2 | 3 | 4 | 5 |
| 21. I experience a warm feeling with the people I spend time with. | 1 | 2 | 3 | 4 | 5 |
| 22. I feel the relationships I have are just superficial. | 1 | 2 | 3 | 4 | 5 |
| 23. I feel I can successfully complete difficult tasks. | 1 | 2 | 3 | 4 | 5 |
| 24. I feel like a failure because of the mistakes I make. | 1 | 2 | 3 | 4 | 5 |

Appendix VII

Example translation and back translation

Original scale	Translation to Indonesian	Back-translation by independent translator
<p>Smartphone Application-Based Addiction Scale (SABAS)</p> <p>Please indicate the extent to which you agree or disagree with the statements below in relation to your smartphone use habits.</p> <p>1=Strongly Disagree 2=Disagree 3=Slightly Disagree 4=Slightly Agree 5=Agree 6=Strongly Agree</p> <ol style="list-style-type: none"> 1) My smartphone is the most important thing in my life 2) Conflicts have arisen between me and my family (or friends) because of my smartphone use 3) Preoccupying myself with my smartphone is a way of changing my mood (I get a buzz, or I can escape or get away, if I need to) 4) Over time, I fiddle around more and more with my smartphone 5) If I cannot use or access my smartphone when I feel like, I feel sad, moody, or irritable 6) If I try to cut the time I use my smartphone, I manage to do so for a while, but then I end up using it as much or more than before 	<p>Smartphone Application-Based Addiction Scale (SABAS)</p> <p>Harap tunjukkan sejauh mana Anda setuju atau tidak setuju dengan pernyataan di bawah ini yang terkait dengan kebiasaan Anda menggunakan ponsel cerdas.</p> <p>1=Sangat Tidak Setuju 2=Tidak Setuju 3=Sedikit Tidak Setuju 4=Sedikit Setuju 5=Setuju 6=Sangat Setuju</p> <ol style="list-style-type: none"> 1) Ponsel cerdas saya adalah hal terpenting dalam hidup saya 2) Konflik telah muncul antara saya dan keluarga (atau teman) karena penggunaan ponsel cerdas saya 3) Menyibukkan diri dengan ponsel cerdas saya adalah cara untuk mengubah suasana hati (saya dapat mengobrol, atau saya dapat melarikan diri atau pergi, jika perlu) 4) Seiring waktu, saya semakin sering bermain-main dengan ponsel cerdas saya 5) Jika saya tidak dapat menggunakan atau mengakses ponsel cerdas ketika saya menginginkannya maka saya merasa sedih, murung, atau mudah tersinggung 6) Jika saya mencoba untuk memotong waktu menggunakan ponsel cerdas, maka saya berhasil melakukannya untuk sementara waktu, tetapi akhirnya saya menggunakannya sebanyak atau lebih dari sebelumnya 	<p>Smartphone Application-Based Addiction Scale (SABAS)</p> <p>Please indicate to what extent you agree or disagree with the following statements related to your habit in using a smartphone.</p> <p>1=Strongly disagree 2=Disagree 3=Somewhat disagree 4=Somewhat agree 5=Agree 6=Strongly agree</p> <ol style="list-style-type: none"> 1) My smartphone is the most important thing in my life 2) Conflicts have emerged between me and family (or friends) because of my use of smartphones 3) Keeping myself busy with my smartphone is a way to change my mood (I can chat, or I can escape or leave, if necessary) 4) Overtime, I have been playing around with smartphone more often 5) If I do not use or access my smartphone when I want to, I feel sad, gloomy, or irritable 6) If I try to cut down the duration of using a smartphone, I will manage to do it for a while, but eventually I will use it as much as before or more.
<p>Bergen Social Networking Addiction Scale (BSNAS) (Andreassen et al., 2012)</p>		

<p>Instruction: Below you find some questions about your relationship to and use of social media (Facebook, Twitter, Instagram and the like). Choose the response alternative for each question that best describes you. Very rarely/ Rarely/ Sometimes/ Often/ Very often How often during the last year have you...</p> <ol style="list-style-type: none"> 1. ..spent a lot of time thinking about social media or planned use of social media? 2. ..felt an urge to use social media more and more? 3. ..used social media in order to forget about personal problems? 4. ..tried to cut down on the use of social media without success? 5. ..become restless or troubled if you have been prohibited from using social media? 6. ..used social media so much that it has had a negative impact on your job/studies? 	<p>Petunjuk: Di bawah ini terdapat beberapa pertanyaan tentang hubungan Anda dengan media sosial dan penggunaannya (Facebook, Twitter, Instagram, dan sejenisnya). Pilih alternatif jawaban untuk setiap pertanyaan yang paling menggambarkan Anda. Sangat Jarang/ Jarang/ Kadang-kadang/ Sering/ Sangat sering</p> <p>Seberapa sering selama setahun terakhir ini Anda ...</p> <ol style="list-style-type: none"> 1. .. menghabiskan banyak waktu memikirkan tentang media sosial atau penggunaan media sosial yang direncanakan? 2. .. merasakan dorongan untuk semakin sering menggunakan media sosial? 3. ..menggunakan media sosial untuk melupakan masalah pribadi? 4. .. Mencoba mengurangi penggunaan media sosial namun tanpa hasil? 5. .. menjadi resah atau bermasalah jika Anda dilarang menggunakan media sosial? 6. .. terlalu sering menggunakan media sosial sehingga berdampak negatif pada pekerjaan / studi Anda? 	<p>Instruction: Below is some statements concerning your relations with social media and its use (Facebook, Twitter, Instagram, etc.). Choose a response alternative for each statement that best describes you. Very rarely/ Rarely/ Sometimes/ Often/ Very often</p> <p>How often over the last year have you ...</p> <ol style="list-style-type: none"> 1. .. spent much time thinking about social media or planned use of social media? 2. .. felt the urge to use social media more often? 3. .. used social media to forget personal problems? 4. .. tried to reduce social media use but without success? 5. .. become restless or troubled if you are prohibited to use social media? 6. .. used social media too often so that it negatively impacts your job/study?
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Appendix VIII

DiaryMood items

DiaryMood	DiaryMood
<p>How much would you like to be on your dating app of use right now? On the scale of 1-5 1- not at all to 5- very much</p> <p><input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5</p> <p>SUBMIT</p>	<p>Rate your mood On the scale of 1-5 1- being extremely unhappy to 5- being extremely happy</p> <p><input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input checked="" type="radio"/> 4 <input type="radio"/> 5</p> <p>CONTINUE</p>
DiaryMood	DiaryMood
<p>Rate your self-esteem On the scale of 1-5 I have high self esteem</p> <p>Not Very true of me <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 Very true of me</p> <p>CONTINUE</p>	<p>Stats of use</p> <p>Screen Time (in minutes)</p> <p>Notifications Received</p> <p>Times opened</p> <p>SUBMIT</p>