Swipe for self-esteem decline? The impact of usage, frequency, and type of online dating applications on self-esteem

Lea Marie Faesing

Department of Psychology, University of Twente

Bachelor thesis Positive Psychology & Technology

First supervisor: drs. Tessa Dekkers

Second supervisor: drs. Nils Keesmekers

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SWIPE FOR SELF-ESTEEM DECLINE? THE IMPACT OF USAGE, FREQUENCY, AND TYPE OF ONLINE DATING APPLICATIONS ON SELF-ESTEEM

Abstract

In this study, based on the sociometer theory and the assumption of a great likelihood of social rejection and self-criticism prevalent among online dating applications, the main effect of online dating application usage, online dating application usage frequency, online dating application type and its interaction with frequency and type in relation to self-esteem was examined. In total, 229 participants divided into online dating application users and non-users partook in a cross-sectional online survey. By simple and multiple regression analyses no significant difference between users and non-users, regardless of the impact of frequency, type or the interaction between frequency and type were revealed. However, the analyses conducted in this study highlight the fundamental relevance of online dating application usage in the 21st-century dating life and thereby the need for future research in this field. The current study can be understood as groundwork, which points out directions for supplementary studies including investigation of the continuity of the impact of online dating applications by applying longitudinal study designs to ascertain effects over time, a standardized approach for categorization of past online dating application users, and examination of the interaction of online dating application usage with other variables that influence self-esteem positively or negatively.

Keywords: online dating applications; usage; frequency; type; self-esteem; sociometer theory; social rejection; self-criticism

Introduction

Relevance and prevalence of online dating applications in the 21st-century

"Dating apps as part of our culture" (Bijl, 2019); "How Dating Apps are revolutionizing relationships today" (Hanks, 2019); "How Tinder changed dating for a generation" (Fetters, 2018). These are just a few of the recent newspaper headlines that show how relevant online dating applications have become in today´s modern life. Nowadays meeting a partner is strongly based on online dating and online dating applications, as a survey carried out by the Stanford University illustrates. Between 1995 and 2017 an increase from 2% to 39% was observed for heterosexual U.S. couples that met online and a decrease for various real-life social interactions, including meeting a partner at work, in school/college or through family and friends was identified (Rosenfeld, Thomas, & Hausen, 2019).

The amount of online dating users worldwide demonstrates how many people have experiences with online dating and online dating applications. Statista (n.d.) published a report of users for all countries listed in the Digital Market Outlook, which shows a great upward trend of the number of online dating users for the upcoming years. For 2019, 219.77 million online dating users were listed and for the year 2024, the total number of users is expected to rise to 279.8 million.

The usage of online dating and online dating applications is not confined to a specific user group only, it is prevalent in diverse social groups. For instance, online dating application usage is found in different age groups, among gender and in different income classes. A national survey by the Pew Research Center explains that a wide range of age groups that use online dating sites or mobile applications exists, with a range from 18 to 65 years and older (Smith, 2016). Users of both genders are registered, with 31% female users and 69% male users (Statista, n.d.). Besides, an approximately even distribution between different income class users is shown, with 36% low-income users, 34% medium-income user and 30% high-income users. Hence, online dating and online dating applications appear to play a fundamental role for many individuals in the 21st-century. As many people worldwide, in diverse social groups, make use of online dating applications and clear ascending development of usage for the upcoming years is expected, the question of whether the usage of online dating applications has an impact on users' mental health arises.

Definition of online dating applications

To examine the potential impact of online dating applications on its users a clear scientific definition must be established, which is used throughout this study. In consonance with the definition of Orchard (2019), online dating applications can be defined as mobile software networking sites developed to create connections between individuals who are seeking romantic, casual, or sexual relationships or friendships. Online dating applications present algorithms based on diverse demographical data provided by the users, such as age, gender, sexual preferences and geographical location, to generate potential matches between users. Real-time geo-social data of users are assessed to update users' profiles and present new matches regularly. By generating matches between two users, high accordance between the users' dating profiles is determined, which allows the users to get into contact and interact with a potential partner. Many different online dating applications exist, for example, the most popular online dating applications in the United States in September 2019 by audience size were Tinder, Bumble, POF, Match.com, OKCupid, Grindr, Hinge, Zoosk, MeetMe and Ashley Madison (Statista, n.d.).

The impact of social networking site usage on users

Most previous research investigated the impact of social networking sites on users' mental well-being instead of online dating applications (Strubel & Petrie, 2017). As online dating applications can also be considered social networking sites, with the main difference in intention of dating and finding a potential spouse (Biswadew, 2012; Jones, 2019), the research on social networking sites could be extended towards online dating applications.

For instance, the frequent use (daily use of more than two hours) of social networking sites is found to be associated with lower levels of mental well-being among children and adolescents (Sampasa-Kanyinga & Lewis, 2015). Children and adolescents who make frequent use of social networking sites indicate lower self-rated mental well-being and an increased chance of psychological distress and suicidal thoughts, as well as increased need for mental health services. The study of Fox and Moreland (2015) confirms that the usage of social networking sites, especially Facebook, can trigger various minor and major negative emotions. Different stressors are identified such as pressure to log in regularly due to the fear of missing out or privacy issues due to Facebook's settings and set-up, which lead among other outcomes to constant social comparison with other users, that ultimately provokes feelings like jealously and anxiety. Blomfield Neira and Barber (2013) report similar negative impact, as increased frequency usage of social networking sites and investment in social networking sites among

adolescent is linked to lower self-esteem and higher levels of a depressed mood. Accordingly, negative correlations between the usage of social networking sites and the user's mental well-being are shown. Since online dating applications are defined as social networking sites with differences in usage intentions (Biswadew, 2012; Jones, 2019), the question of a correlation between online dating application usage and users' mental well-being emerges.

The impact of online dating application usage on mental well-being

Only limited research exists that investigates the correlation between online dating application usage and mental well-being. Recently the research of Strubel and Petrie (2017) has reported lower levels of psychological well-being in Tinder users than in non-users. Tinder is a location-based, free of charge dating application, which was first released in 2012 with estimated 50 million users (Rönnestad, 2017; Strubel & Petrie, 2017). The dating platform presents users a choice of co-users based on individual set criteria, including physical distance (0-160 km), age-interval and sexual orientation. The users get the chance to evaluate other co-users profiles and decide by "swiping right" to like or by "swiping left" to reject the co-user. If two users both "swipe right", this is defined as a match between these two users and it allows the users to get in contact with each other. The results of Strubel and Petrie (2017) indicate that Tinder usage compared to non-usage leads specifically to body image concerns, including less face and body satisfaction, higher levels of internalization, comparison of physical look and body-shaming and lower levels in body surveillance. Further, a significantly lower self-esteem score in male Tinder users is observed contrasted to both male and female non-users. Strubel and Petrie (2017) conclude that the online dating application Tinder can be classified as a platform for physical appearance pressure, which can result in negative evaluations of the personal perception of one's worthiness in comparison to other users.

The results of further studies confirm the negative impact of online dating applications on mental well-being. A myriad of negative outcomes is associated with online dating applications. A correlation with the usage of multiple online dating applications and objectification, internalization, body surveillance and lower levels in body satisfaction and self-esteem (Breslow et al., 2020); a link between sexting and substance use (Benotsch, Snipes, Martin, & Bull, 2013) and decline in marriage, which is associated with higher levels in mental health and greater happiness (Waite & Lehrer, 2003) have been described.

By implication, the usage of online dating applications is expected to harm users' mental well-being, as negative impacts of the usage of online dating applications on different constructs

of psychological functioning were found. In this study, the central focus is the mental well-being construct self-esteem.

The impact of online dating application usage on self-esteem

Self-esteem is considered an essential construct of mental well-being, which contributes to developing and maintaining psychological functioning (Zeigler-Hill, 2011). The level of self-esteem, low or high self-esteem, has a significant influence on different areas of life. For instance, low levels of self-esteem are correlated with diverse mental disorders, such as depression, eating disorders and dependence behavioural patterns. Furthermore, the level of self-esteem is defined in 24 diagnostic contexts as a criterion for psychopathologies (O'Brien, Bartoletti, & Leitzel, 2006) and the study of Donnellan, Trzesniewski, Robins, Moffitt, and Caspi (2005) illustrates that a robust relation between low self-esteem and externalizing problems, such as aggression, antisocial behaviour, and delinquency exists.

In conformity with the evolutionary psychological perspective, specifically, the sociometer theory developed by Leary (2012), self-esteem is a psychological measurement device of the degree to which individuals perceive that they are interpersonally valued and accepted by other individuals. According to the sociometer theory, self-esteem is defined as the result of a measurement process that monitors and responds to social and relational acceptance and rejection. Based on the sociometer theory individuals do not need self-esteem for its own sake but rather individuals' goals are to enhance and ensure their interpersonal value and acceptance by enhancing their self-esteem. Therefore, if an individual experiences great acceptance, the individual feels socially and interpersonally valued and this results in high levels of self-esteem. In turn, if an individual experiences recurring rejection, the individual does not feel socially and relationally accepted, which leads to low levels of self-esteem.

Online dating applications expose users frequently to rejection. In line with the study of Tyson, Perta, Haddadi, and Seto (2016) around 50% of the matches on the dating application Tinder do not interact back, which results in constant rejection. Besides, a phenomenon called ghosting, which is defined as an abrupt break-up of a developing relationship without explanation, is highly prevalent among online dating applications (Whitley, 2018), which confirms the likelihood of rejection. Pronk and Denissen (2020) extend the assumption of a high prevalence of rejection among online dating applications, as online dating application users frequently develop a rejection-mindset due to the massive choice options presented. The study demonstrates the greater the potential partner pool offered to online dating applications users, the more likely it is that the users develop feelings of disaffection and pessimism about

finding a relationship online, which results in a higher likelihood of rejecting presented partner options.

Online dating application usage is associated with increased self-criticism, which leads to lower levels of self-esteem. Referring to James (2015), by using dating applications with a "swipe" function, a "shopping" mentality is adopted, which results in steady comparison with other users and self-criticism. Also, it is observed that online dating application users develop an online identity, which tries to present the best version of oneself to receive a greater amount of matches, but which often does not correspond to reality (Ranzini & Lutz, 2017). By creating an idealized online dating identity, the difference between the ideal self and the perceived self leads to high levels of self-criticism, which further results in a decrease of self-esteem (Strubel & Petrie, 2017).

In consequence, grounded on the link between the sociometer theory and the usage of online dating application it is expected that users frequently experience social, interpersonal, and relational rejection. Furthermore, the usage of online dating application can lead to higher social comparison and self-criticism due to an adopted "shopping" mentality and a clash between a designed ideal online dating identity and the perceived identity. Ergo, it is hypothesized that online dating application usage harms self-esteem and the subsequent hypothesis is examined:

H1: Online dating application users have significantly lower self-esteem than non-online dating application users.

The impact of online dating application usage frequency and online dating application usage type on self-esteem

Based on the sociometer theory and previous research it is hypothesized that the usage of online dating application has a negative impact on the mental well-being construct self-esteem.

Frequency. The sociometer theory suggests, the more social and relational rejection an individual experiences, the lower the levels of self-esteem (Leary, 2012). In line with the study of Pronk and Denissen (2020), potential partner choice overload can cause a rejection-mindset. Every time a user logs in an online dating application, new profiles are presented. Therefore, the higher the usage frequency of an online dating application user, the higher the option choice and therewith, the higher the rejection-mindset. Consequently, higher online dating application usage leads to greater rejection and hence, to lower self-esteem. Besides, as previously discussed the usage of the "swipe" function is linked to social comparison and self-criticism and therewith to lower self-esteem (James, 2015) and the usage of online dating applications

can result in decreased self-esteem due to the development of an idealized online dating identity (Ranzini & Lutz, 2017). Accordingly, higher frequency usage is expected to lead to using the "swipe" function more often, which might conclude in lower levels of self-esteem and lead to more intense online dating identity design and to that effect provoke lower self-esteem (Strubel & Petrie, 2017). Moreover, preceding research of the impact of social networking sites on self-esteem demonstrates that increased social networking site usage and investment is associated with lower self-esteem and a higher degree of depressed mood (Blomfield Neira & Barber, 2013). Thence, increase in online dating application usage frequency is hypothesized to lead to a decrease in self-esteem and the following hypothesis is formulated:

H2: High-frequency online dating application users have significantly lower self-esteem than low-frequency online dating application users.

Type. Most previous research has focused on the impact of the online dating application Tinder, as the literature review of this study demonstrates. No clear distinction between the impact of Tinder and other online dating applications on its users is made, which leads to the inquiry whether a significant difference between the impact of Tinder and other online dating applications exists. Even the phenomenon of preferring casual sex over future relationships is called the "Tinder effect", as many people associate Tinder with a platform for "hook-ups" instead of a platform for finding future, long-lasting relationships (Naff, 2017), which is also anticipated to have a negative influence on self-esteem (Waite & Lehrer, 2003). Congruent with the sociometer theory and the rejection-mindset approach (Leary, 2012; Pronk & Denissen, 2020), greater potential partner choice leads to a greater rejection attitude, and so to lower self-esteem. As Tinder is considered as the most famous dating application with most active users, for instance with 7.86 million users in the United States (Statista, n.d.), the biggest potential partner pool is anticipated to be offered on Tinder. In this way, it is expected that Tinder users experience the most rejection and therewith have the lowest self-esteem. Following, Tinder only usage is hypothesized to lead to significantly lower self-esteem than the usage of Tinder and other online dating applications simultaneously and Tinder and other online dating application usage simultaneously is hypothesized to lead to significantly lower self-esteem than only other online dating application usage. The subsequent hypothesis is investigated:

H3: Tinder exclusive users have significantly lower self-esteem than Tinder inclusive users and Tinder inclusive users have significantly lower self-esteem than Tinder excluding users.

Reciprocal interaction between frequency and type. As it is expected, grounded on the sociometer theory, the rejection-mindset approach and previous studies, that increased online dating usage frequency and Tinder usage leads to a decrease in self-esteem, it is hypothesized that high-frequency Tinder exclusive online dating users have significantly lower self-esteem than low-frequency Tinder exclusive online dating application users, which is analysed with the following hypothesis:

H4: High-frequency Tinder exclusive users have significantly lower self-esteem than low-frequency Tinder exclusive users.

The current study

This study investigates the impact of online dating application usage on the mental well-being construct self-esteem, which is moderated by online dating application usage frequency, online dating application type and the interaction between online dating application frequency and type.
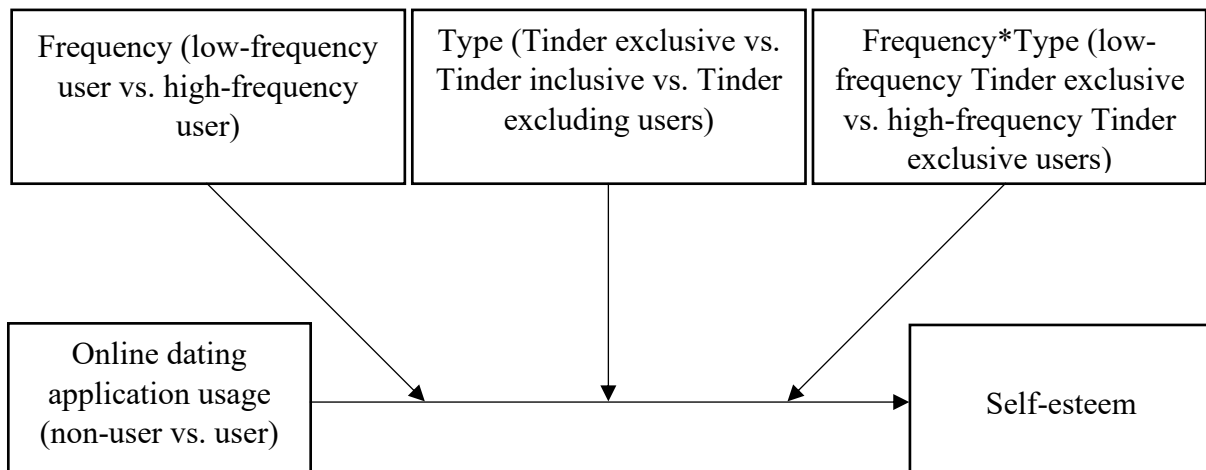

Figure 1. Research model

Method

Design

A cross-sectional survey as part of a larger study with a between-participants design was employed with three independent categorical variables, namely online dating application usage (non-user vs. user), online dating application frequency (low-frequency user vs. high-frequency user) and online dating application type (Tinder exclusive user vs. Tinder inclusive user vs. Tinder excluding user) with self-esteem as the dependent variable.

Participants

The study comprised a sample of 262 participants. The convenience sample was recruited via the University of Twente Behavioural Management Sciences (BMS) subject pool called BMS SONA system, which is accessible for BMS students of the University of Twente. Participants selected via the BMS SONA system in exchange for participation received 0.25 partial course credits. In addition, participants were recruited via personal networks of the researchers. Since this study was designed as part of a larger study, a snowballing principle was applied, meaning that all involved researchers recruited participants via their networks and asked participants that were willing to partake to distribute the study to their networks likewise. Thence, an exact number of invitations cannot be defined. The selection criteria for inclusion in the study were a minimum age of 18 years, ability to understand, read and write in English and willingness to self-reflect upon the construct self-esteem of mental well-being.

Materials

In this study, an online survey was designed consisting of 17 items of which seven items were self-developed and ten items were retrieved from the Rosenberg Self-Esteem Scale (RSE scale) (see appendix A). The online survey was created and distributed with the software Qualtrics XM.

 Demographics and online dating behaviour. The participants provided data about age, gender, and nationality. The participants indicated if they currently used online dating applications, had used online dating applications in the past or never used online dating applications. If online dating application usage was indicated, data about usage frequency by asking how often they logged in (Rosen, Whaling, Carrier, Cheever, & Rokkum, 2013; *never, once a month, 2-3 times a month, once a week, 2-3 times per week, 4-5 times per week, daily, 2-3 times per day, 4-6 times per day, once an hour, 2 or more times per hour*) and data about usage type was requested by asking which online dating application(s) the participants used *(Tinder, Lovoo, Bumble, Badoo, Others)* (see the data analysis section for further information).

 Self-esteem. To measure self-esteem the RSE scale developed by Morris Rosenberg was used. According to the Fetzer Institute (n.d.), the RSE scale is a ten-items scale that quantifies global self-esteem by assessing positive and negative evaluations about self-worth and self-acceptance. The items were answered utilizing a four-point Likert scale ranging from 4 (*strongly agree*) to 1 (*strongly disagree*). One example of these ten items depicted: "On the whole, I am satisfied with myself." Ciarrochi and Bilich (2006) reported test-retest reliability for two weeks with excellent stability with a Cronbach`s alpha of .85 and .88. and a significant

correlation with Coopersmith Self-Esteem Inventory and measures of depression and anxiety was found. For this study, a Cronbach`s Alpha of .86 was calculated.

Procedure

The participants partook in the study either by registering in the BMS SONA system for the online survey or by receiving an invitation link to the online survey sent by the researchers. Before the participants were invited to fill out the online survey, every participant received the same informed consent form and was asked to voluntarily give consent to the terms and conditions of this study as part of a larger study (see appendix B). Hereafter, the participants gave the informed consent, the participants were redirected to the first three items of the online survey and were given the standardized instruction to fill in the questions on their demographic data. Thereafter, the participants were redirected to items four to seven and were instructed to answer four questions on their online dating behaviour. Subsequently, the participants were redirected to different scales of the larger study. Albeit, for the scope of this report only the procedure relevant for this research is discussed. Following, the RSE scale was presented and the participant's received the standardized instruction to rate how strongly they individually agree or disagree with the ten statements. Participants generally completed the survey within 15 minutes. After completion of the online survey, the participants who partook via the BMS SONA system got 0.25 partial course credits automatically granted.

Data Analysis

To test the formulated hypotheses, quantitative statistical analyses were performed using the software IBM SPSS Statistics 25.

Missing values. Before the analyses were conducted the dataset was screened for cases that did not fulfil the inclusion criteria and for missing cases. For two cases no informed consent was given and for 12 cases only the informed consent form was filled out, but no further data were recorded, which resulted in listwise deletion. For 19 cases values were recorded for the first items about demographical data and online dating behaviour but no values were recorded for the RSE scale. According to Little's MCAR test the data were missing completely at random ($X^2 [N = 229; df = 1] = 0.870, p = .351$). Therefore, no missing values were imputed and listwise deletion was applied. The final dataset included 229 participants.

Independent variables and dependent variable. The first categorical independent variable usage was created based on item four about current, past, or non-usage of online dating applications. Usage was categorized in users (current and past users) and non-users (non-users).

The second categorical independent variable frequency was developed grounded on items six and seven. In line with the study of Heinrichs, Lim, and Lim (2011) about the influence of social networking sites, based on the sample-data different categories of usage frequency were defined. The same method was applied in this study and frequency was categorized as follows: low-frequency users (use or have used online dating applications and log/logged in at least once a month and not more than once a week) and high-frequency users (use or have used online dating applications and log/logged in at least 2-3 times per week). The third categorical independent variable type was constructed based on survey item five about the type of online dating application. Users were grouped according to the online dating application they used. Participants who only use/used the online dating application Tinder were categorized as Tinder exclusive users, participants who use/used the online dating application Tinder and simultaneously other online dating applications were considered as Tinder inclusive users and participants who only use/used online dating applications other than Tinder were defined as Tinder excluding users. The continuous dependent variable self-esteem was created based on the sum score of the RSE scale items one to ten.

Overview, distributional properties, and assumptions. To receive an overview of the dataset, descriptive statistics were generated to determine means and standard deviations. Distributional properties including skewness, kurtosis and outliers were checked and within normal ranges. Moreover, the assumptions for the parametric test were examined and accepted, compromising normality, independence, homogeneity, and linearity.

Hypotheses testing. To test the four hypotheses, regression analyses were applied using linear modelling. The statistical significance was set at $p < .05$. Hypothesis one and hypotheses two to four were examined in two analyses, to make a clear distinction between the inclusion of non-online dating application users and online dating application users. The first hypothesis was tested by fitting a simple linear regression model with the categorical independent variable usage with two levels (non-user vs. user) and the numeric dependent variable self-esteem. The second, third, and fourth hypotheses were tested by a multiple regression analysis with the categorical independent variables frequency (low-frequency users vs. high-frequency users) and type (Tinder exclusive users vs. Tinder inclusive users vs. Tinder excluding users) and the numeric dependent variable self-esteem to determine the main and interaction effects.

Results

General overview

The study comprised a sample of 229 participants (M_{age} = 22.89, SD = 4.50) with 65.1% (149) female and 34.9% (80) male. The participants had different nationalities including 72.1% (165) German, 9.2% (21) Dutch, and 18.7% (43) Other. 67.2% (154) of the participants were considered users of online dating applications and 32.8% (75) as non-users. 40.9% (63) of the participants were defined as low-frequency users and 59.1% (91) as high-frequency users. 46.1% (71) of the participants were categorized as Tinder exclusive users, 34.4% (53) as Tinder inclusive users and 19.5% (30) as Tinder excluding users. 53.5% (38) of the Tinder exclusive users were grouped into the low-frequency Tinder exclusive user group and 46.5% (33) of the Tinder exclusive users we grouped into the high-frequency Tinder exclusive group. More information about participants sociodemographic characteristic per category are presented in Table A1 (see appendix C). The mean for the dependent variable self-esteem is equal to 29.48 with a standard deviation of 4.79 on a scale of 10-40 with higher scores indicating higher self-esteem. The means and standard deviations for the dependent variable self-esteem per category are shown in Table 1.

Table 1

Means (M) and Standard Deviations (SD) for the dependent variable Self-esteem per participant group

Participant groups	Self-esteem	
	M	SD
User	29.51	4.70
Non-user	29.41	4.93
Low-frequency user	29.02	4.61
High-frequency user	29.86	4.73
Tinder exclusive user	28.87	4.33
Tinder inclusive user	29.87	5.02
Tinder excluding user	30.4	4.74
Low-frequency Tinder exclusive user	29.03	4.00
High-frequency Tinder exclusive user	28.70	4.67

Impact of usage, frequency, type and the interaction between frequency and type of online dating application on self-esteem

For the first hypothesis a linear regression was computed to predict self-esteem from usage, $F(1, 228) = 0.20$, $p = .880$, $R^2 = -.004$. Usage was not a significant predictor of self-esteem ($b = -0.100$, $SE = 0.68$, $p = .676$). Table 2 displays the results of the linear regression analysis.

Table 2

Regression coefficients for predicting self-esteem by usage

Effect	Estimate	*SE*	95% CI		*p*
			LL	*UL*	
Intercept	29.513	0.387	28.751	30.275	.000
Non-users	-0.100	0.676	-1.432	1.232	.676

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

A multiple regression was calculated to predict self-esteem from frequency, ($F(1, 153) = 1.90$, $p = .592$, $R^2 = .004$; type ($F(1,153) = 0.32$, $p = .572$, $R^2 = .004$ and the interaction between frequency and type ($F(1, 153) = 1.40$, $p = .238$, $R^2 = .004$. Frequency was not a significant predictor of self-esteem ($b = -0.329$, $SE = 1.12$, $p = .769$), nor was type ($b = -0.340$, $SE = 1.37$, $p = .805$); ($b = -0.610$, $SE = 1.08$, $p = .572$) and neither the interaction between frequency and type ($b = -1.880$, $SE = 1.59$, $p = .238$). Table 3 presents the results of the multiple regression analysis.

Table 3

Regression coefficients for predicting self-esteem by frequency, type and the interaction between frequency and type

Effect	Estimate	*SE*	95% CI		*p*
			LL	*UL*	
Intercept	29.366	1.141	27.112	31.620	.000
High-frequency user	1.551	1.127	-0.676	3.777	.171
Tinder exclusive user	- 0.340	1.372	-3.052	2.372	.805
Tinder inclusive user	-0.610	1.076	-2.736	1.516	.572
High-frequency Tinder exclusive user	-1.880	1.588	-5.018	1.258	.238

Note. CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

Summary of the results

Concluding from the analyses conducted in this study, all four hypotheses cannot be supported. The results of hypothesis one revealed no significant difference between online dating application users and non-users on self-esteem. The outcome of hypothesis two testing depicted no significant difference between low-frequency and high-frequency online dating application users on self-esteem. Similarly, no significant difference between Tinder exclusive and Tinder inclusive and Tinder inclusive and Tinder excluding users on self-esteem was found. Lastly, no significant main effect and no significant interaction effect for a difference between low-frequency Tinder exclusive users and high-frequency Tinder exclusive users were observed.

Discussion

The results of this study reveal no significant differences and therewith no support for the formulated hypotheses. No support for the impact of online dating application usage, regardless of usage frequency, usage type and the interaction between frequency and type on self-esteem is found.

Reflection of the findings

The examined hypotheses of this study are based on the theoretical framework constructed for this study. The theoretical framework consists of the connection made between the sociometer theory and results of different research that defines online dating applications as platforms with a great potential for experiences of social and relational rejection and self-criticism, which is ultimately expected to result in lower levels of self-esteem.

Impact of usage. In line with hypothesis one, it was expected that online dating application users have significantly lower self-esteem than non-online dating application users. Despite the incongruence with the theoretical framework and findings of Strubel and Petrie (2017), the results of this study indicate that online dating application usage does not predict lower self-esteem. This is in accordance with the findings of Shimokobe and Miranda (2018), which do not show significant support for a difference in self-esteem between online dating application users and non-users. On the one hand, it might be that the findings of this study are opposed to the findings summarized within the theoretical framework because within the theoretical framework no clear definition of social/relational rejection and which level of social/relational rejection affects self-esteem is given. Hence, the theoretical framework might be revised by formulating a clearer definition of social/relational rejection, whether this definition is also valid in online and dating interaction contexts, and with a categorization that

defines how much social/relational rejection is needed to impact self-esteem. This revision must be made for self-criticism accordingly. On the other hand, it might be as the study of Shimokobe and Miranda (2018) does not find an impact of online dating application usage on self-esteem likewise and the results of Strubel and Petrie (2017) only predict lower levels in self-esteem due to Tinder usage in male users, that social/relational rejection and self-criticism is not as prevalent as previously hypothesized in this study and therewith does not impact the self-esteem of all online dating application users significantly.

Impact of frequency. As stated in hypothesis two it is anticipated that high-frequency online dating application users have significantly lower self-esteem than low-frequency online dating application users. Contradicting with the theoretical framework and the results of Blomfield Neira and Barber (2013), the findings of this study suggest that an increase in frequency usage of online dating applications does not predict lower self-esteem. This corresponds to the results of Harman, Hansen, Cochran, and Lindsey (2005), who describe no increased negative effect of increased internet frequency usage and Rönnestad (2017), who presents only a weak correlation of the negative relationship between Tinder intensity and self-esteem for female and male users. The incongruence with the earlier findings might be because not the number of logins is relevant for increased frequency usage as assumed within this study, but it might be that the time spent actively using the online dating applications should be considered. Besides, it might be that high-frequency online dating application users develop a tolerance limit for the impact of online dating application usage or/and that online dating application users adapt to social/relational rejection and self-criticism and develop defence mechanisms, which prevent a negative impact of online dating application usage on self-esteem.

Impact of type. Explained in hypothesis three it is expected that Tinder exclusive users have significantly lower self-esteem than Tinder inclusive users and Tinder inclusive users have significantly lower self-esteem than Tinder excluding users. Notwithstanding the discordance with the theoretical framework, the findings of this study assume that the usage of different online dating application types does not predict lower self-esteem. The incongruence with the earlier findings might be due to less social and relational rejection prevalent among Tinder than hypothesized within this study. It might be that even though Tinder presents the most dating profiles, that online dating application users develop a tolerance limit with a specific amount of online dating profiles presented, which results in a tolerance for the impact of the rejection mindset and therewith for a decrease in self-esteem. Further, it might be that the image of Tinder changed and is no longer considered as a "hook-up-app" as previously assumed in this study

and now is popular for being a platform for finding serious romantic relationships.

Impact of the interaction between frequency and type. As formulated in hypothesis four, significantly lower self-esteem is anticipated for high-frequency Tinder exclusive users compared to low-frequency Tinder exclusive users. Despite the inconformity with the theoretical framework, the findings of this study show that higher frequency of online dating application usage in interaction with the type of online dating applications does not predict lower self-esteem. The findings of this study might be opposed to previous results due to a combination of the above exemplified reasons for why no effects might be observed for online dating application frequency usage and online dating application type.

Limitations and future recommendations, and strengths of the study

Confounding variables. The results of this study reveal a relatively high mean self-esteem score for all participants with an average of about 30 on a scale of 10 to 40. Similar mean self-esteem scores for all participant groups are observed (see Table 1), indicating no great variations in self-esteem across the groups. The low difference in self-esteem among the participant groups might be a sign for possible confounding effects. The dependent variable self-esteem might be mixed with effects of other additional factors that influenced the self-esteem of all participants, which results in distortion of the true association between online dating application usage and self-esteem due to cancelling out the effect of online dating usage by other factors (Skelly, Dettori, & Brodt, 2012). Two examples of possible confounding variables illustrate the educational level of the participants and the influence of social distancing during data collection.

As the participants are recruited via the BMS Sona system accessible only for BMS students of the University of Twente and the researchers of this study recruited participants by contacting their social networks, it is expected that students constitute a large proportion of the sample. This is also supported by analysing the participants' demographical data, as a relatively young sample is identified with an average age of about 23 years. Thence, it is assumed that a large proportion of the sample is highly educated as they are anticipated to follow higher educational paths. By looking at the literature about the influence of educational level on self-esteem, most research focused on the prediction of education outcome by the level of self-esteem and only few studies determined the effect of the level of education on self-esteem. However, a study conducted in Turkey reports by comparing the educational levels, specifically pre-graduate, graduate and postgraduate students at Süleyman Demirel University, that grade level is positively associated with self-esteem because the highest educational level group is

found to have the highest self-esteem score (Saygılı, Kesecioğlu, & Kırıktaş, 2015). In conclusion, in this study due to an expected highly educated sample a confounding effect of education on self-esteem is possible.

Yet, no empirical research is published that examines the impact of social distancing due to SARS-CoV-2 pandemic on online dating applications. Nevertheless, according to statistics published by Tinder and others, an increase in the usage of online dating applications during times of social distancing was recognized (Karantzas, 2020; Sullivan, 2020). Further, Karantzas (2020) and Sullivan (2020) report that the numbers of daily messages increased up to 125% compared to the numbers of daily messages before times of social restrictions. Also, longer conversations by 10% to 30% are observed and it is evaluated that online dating application users tend to show changes in online dating behaviour. Users report that co-users, especially men, are kinder and higher willingness for longer chats and meaningful conversations develops. By linking the fact, that no other dating options during times of social distancing are given and changes in online dating behaviour are observed, to the sociometer theory it can be hypothesized that online dating application users experience an increase in self-esteem due to more social and relational acceptance on online dating application platforms than before. Less rejection mindset is expected by more time spent with one potential partner, as fewer partner options are presented because the swipe-function to see more option is less used. In consequence, as data collection occurred during times of social distancing and the peak of the Corona pandemic in Europe, a decrease in rejection and increase in acceptance on online dating applications might confound the results of this study.

Resulting, educational level and social distancing are hypothesized as possible confounding variables, but further variables are conceivable. Thus, it would be highly beneficial to investigate which variables might impact self-esteem positively or negatively to determine how self-esteem overall is influenced in the context of online dating application usage. Therewith, in practice, recommendations for usage could be communicated to different user types by for instance offering different tests to find out how online dating application usage might impact self-esteem by taking other individual factors that influence users' self-esteem into account to support mental well-being and psychological functioning of a generation of online dating application users.

Categorization of past users. In this study the participants are categorized as follows: online dating application usage (past or current online dating application usage) or non-usage (never online dating application usage). Past online dating application users are included in the online dating application user category and no distinction between the time passed since the

last time an online dating application was used was made. No research yet is found that examines the temporality and duration of positive or negative effects of online dating applications or social networking sites on self-esteem. Additionally, in this study, no clear definition of online dating application usage is given in the survey instructions. The absence of a standardized definition in the instructions might result in misunderstanding or misinterpretation of current or past online dating application usage because participants might understand themselves as non-online dating application users as their last usage was evaluated as not relevant any more due to too long disuse.

Following, the uncertainty of the correct procedure for categorizing past online dating application users leads to the assumption that past online dating application users might have biased the results. Therefore, it is suggested that future research should examine how past online dating users can be grouped and specify cut-off scores for continuity of potential effects of online dating application usage by using a longitudinal study approach to ascertain whether the effects of online dating application usage fluctuates or is constant over time.

Data collection and cross-sectional study design. This study is part of a larger, cooperation study. Participants are recruited via the subject test pool of the University of Twente and via personal networks of involved researchers. Supplementary, participants are asked to distribute the online survey to their social networks, which resulted in data collection through a snowballing principle. Accordingly, no exact response rate is defined, as it cannot be backtracked how many potential participants are invited to partake in the online survey. In line with Lefever, Dal, and Matthíasdóttir (2006), who illustrate the advantages and disadvantages of online data collection in academic research, the response rate is a fundamental factor that influences the reliability of online surveys and a response rate of 30% is defined as acceptable. As in this study, no exact response rate can be identified, the effect of the response rate on the reliability of the results cannot be examined and therefore might have affected the findings or lead to participation bias. In this study, it is expected that the participants of the non-response group differ systematically in self-esteem from the participants that partook and hence the effect on self-esteem may be underestimated because the non-response participants who might have lower levels of self-esteem were less likely to participate in the cross-sectional survey.

Besides, in this study a cross-sectional study design is used to access the exposure, online dating application usage, on the outcome, users' self-esteem. Corresponding with Setia (2016) a limitation of a cross-sectional study depicts that the findings only present a one-time assessment of exposure and outcome. Respectively, the results reported in this study only illustrate the measurement process of the impact of online dating application usage on self-

esteem for that specific point in time the data was collected. No conclusions about the temporality of the results can be drawn and by a repetition of the study different findings may be assessed.

Thereof, future studies should ensure a participant recruiting process that allows determination of an exact response rate and a longitudinal study design to define the impact of online dating application usage on self-esteem over time.

Strengths

The emphasis of relevance. An advantage of the current study represents the analysis of the relevance of online dating application usage nowadays and thereby highlights the research gap and the essential need for future research on the impact of online dating application usage on its' users. The literature review of this study demonstrates the prevalence of online dating application usage among diverse social groups and shows that online dating application usage is important in today's dating life.

A robust analysis technique. In this study all linear model assumptions were accepted, indicating that the formulated model and the test statistics used to assess the model were fitting (Field, 2013). In addition, robust methods were applied by bootstrap estimations which are flexible and automatic (Wright, London, & Field, 2011). Therefore, the analysis technique applied in this study is expected to reduce the impact of biases and hence, generates results that are generalizable to the population.

Conclusion

The results of the current study show no support for the impact of online dating application usage on self-esteem. Nevertheless, in this study, the great relevance of online dating applications in the 21st-century is clearly defined, which highlights the need for future research in the field of online dating applications. Therefore, the current study can be understood as groundwork and pioneering for future studies. The following directions are given: Investigation of an approach for categorization of past-online dating application users; Examination of the duration of possible effects of online dating application usage; Determination of variables that might strengthen/weaken/cancel out the impact of online dating application usage on self-esteem and development of practical implications that might be drawn from these new insights, such as providing online dating application users with warnings that specific variables in correlation with online dating application usage can lead to lower levels in self-esteem and therewith decrease in overall mental health.

References

Benotsch, E. G., Snipes, D. J., Martin, A. M., & Bull, S. S. (2013). Sexting, substance use, and sexual risk behavior in young adults. *Journal of adolescent health, 52*(3), 307-313. doi: 10.1016/j.jadohealth.2012.06.011.

Bijl, M. (2019, October 29). Dating apps as part of our culture. *Diggit magazine*. Retrieved from https://www.diggitmagazine.com/

Biswadew. (2012, November 1). Dating sites [Web log post]. Retrieved from https://socialmediarsm.wordpress.com/2012/11/01/dating-sites/

Blomfield Neira, C. J., & Barber, B. L. (2013). Social networking site use: Linked to adolescents´ social self-concept, self-esteem, and depressed mood. *Australian Journal of Psychology, 66*(1), 56-64. doi: 10.1111/ajpy.12034

Breslow, A. S., Sandil, R., Brewster, M. E., Parent, M. C., Chan, A., Yucel, A., ... Glaeser, E. (2020). Adonis on the apps: Online objectification, self-esteem, and sexual minority men. *Psychology of Men & Masculinities, 21*(1), 25-35. doi: 10.1037/men0000202

Ciarrochi, J., & Bilich, L. (2006). *Acceptance and Commitment Therapy. Measures Package. Process measures of potential relevance to ACT.* Retrieved from School of Psychology University of Wollongong: https://www.uow.edu.au/library/

Donnellan, M. B., Trzesniewski, K. H., Robins, R. W., Moffitt, T. E., & Caspi, A. (2005). Low self-esteem is related to aggression, antisocial behaviour, and delinquency. *Psychological science, 16*(4), 238-335. doi: 10.1111/j.0956-7976.2005.01535.x

Fetters, A. (2018, December 21). The five years that changed dating. *The Atlantic.* Retrieved from https://www.theatlantic.com/world/

Fetzer Institute (n.d.). *Self report measures for love and compassion research: Self-esteem.* Retrieved from Fetzer Institute: https://fetzer.org/

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). London, England: SAGE.

Fox, J., & Moreland, J. J. (2015). The dark side of social networking sites: An exploration of the relational and psychological stressors associated with Facebook use and

affordances. *Computers in human behavior, 45*, 168-176. doi: 10.1016/j.chb.2014.11.083

Hanks, V. (2019, November 4). How dating apps are revolutionizing relationships today? *Thrive Global.* Retrieved from https://thriveglobal.com/

Harman, J. P., Hansen, C. E., Cochran, M. E., & Lindsey, C. R. (2005). Liar, liar: Internet faking but not frequency of use affects social skills, self-esteem, social anxiety, and aggression. *CyberPsychology & Behavior, 8*(1), 1-6. doi: 10.1089/cpb.2005.8.1

Heinrichs, J. H., Lim, J. S., & Lim, K. S. (2011). Influence of social networking site and user access method on social media evaluation. *Journal of Consumer Behaviour, 10*, 347-355. doi: 10.1002/cb.377

James, J. (2015). *Mobile dating in the digital age: Computer-mediated communication and relationship building on Tinder*. (Master's thesis). Texas State University, Texas.

Jones, C. (2019, June 14). Are dating sites social networking sites? [Web log post]. Retrieved from https://www.quora.com/Are-dating-sites-social-networking-sites

Karantzas, G. (2020, April 21). Online dating in a Covid-19 world. *Psychology Today.* Retrieved from https://www.psychologytoday.com/us

Leary, M. R. (2012). Sociometer theory. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (pp. 151–159). doi: 10.4135/9781446249222.n33

Lefever, S., Dal, M., & Matthiasdottir, A. (2006). Online data collection in academic research: advantages and limitations. *British Journal of Educational Technology, 38*(4), 574-582. doi: 10.1111/j.1467-8535.2006.00638.x

Naff, C., F. (2017, July 5). The future of sex. How technology, morality, and politics are reshaping human sexuality. *The Humanist*. Retrieved from https://thehumanist.com/

O'Brien, E. J., Bartoletti, M., & Leitzel, J. D. (2006). Self-Esteem, psychopathology, and psychotherapy. In M. H. Kernis (Ed.), *Self-esteem issues and answers: A sourcebook of current perspectives* (pp. 306–315). New York, NY: Psychology Press.

Orchard, T. (2019). Online dating sites. *Springer,* 1-4. doi: 10.1007/978-3-319-59531-3

Pronk, T. M., & Denissen, J. J. (2020). A rejection mind-set: Choice overload in online dating. *Social Psychological and Personality Science, 11*(3), 388-396. doi: 10.1177/1948550619866189

Ranzini, G., & Lutz, C. (2017). Love at first swipe? Explaining Tinder self-presentation and motives. *Mobile Media & Communication, 5*(1), 80-101. doi:10.1177/2050157916664559

Rönnestad, M. (2017). *Swiping right for love?: A study about the relationship between Tinder usage and self-esteem.* (Bachelor´s thesis). Uppsala University, Uppsala.

Rosen, L. D., Whaling, K., Carrier, L. M., Cheever, N. A., & Rokkum, J. (2013). The media and technology usage and attitudes scale: An empirical investigation. *Computers in human behavior, 29*(6), 2501-2511. doi: 10.1016/j.chb.2013.06.006

Rosenfeld, M., Thomas, R. J., & Hausen, S. (2019). Disintermediating your friends: How online dating in the United States displaces other ways of meeting. *Proceedings of the National Academy of Sciences, 116*(36), 17753-17758. doi: 10.1073/pnas.1908630116

Sampasa-Kanyinga, H., & Lewis, R. F. (2015). Frequent use of social networking sites is associated with poor psychological functioning among children and adolescents. *Cyberpsychology, Behavior, and Social Networking, 18*(7), 380-385. doi: 10.1089/cyber.2015.0055

Saygılı, G., Kesecioğlu, T. I., & Kırıktaş, H. (2015). The effect of educational level on self-esteem. *Journal of Research in Education and Teaching, 21*, 1. Retrieved from http://www.jret.org/FileUpload/ks281142/File/21c..gizem_saygili.pdf

Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian journal of dermatology, 61*(3), 261-264. doi: 10.4103/0019-5154.182410

Shimokobe, T., & Miranda, M. A. (2018). *I have clout. Swipe right: Dating apps and implications on self-esteem and body image.* (University publication). California Polytechnic State University, San Luis Obispo.

Skelly, A. C., Dettori, J. R., & Brodt, E. D. (2012). Assessing bias: the importance of considering confounding. *Evidence-based spine-care journal, 3*(1), 9-12. doi: 10.1055/s-0031-1298595

Smith, A. (2016, February 11). 15% of American adults have used online dating sites or mobile dating apps. *Pew Research Center.* Retrieved from https://www.pewresearch.org/

Statista (n.d.). *Online dating (worldwide)* [2017 - 2024]. Retrieved April 22, 2020 from https://www.statista.com/

Statista (n.d.). *Most popular dating apps in the U.S. 2019, by audience size (U.S.)* [2019]. Retrieved April 22, 2020 from https://www.statista.com/

Strubel, J., & Petrie, T. A. (2017). Love me Tinder: body image and psychosocial functioning among men and women. *Body image, 21*, 34-38. doi: 10.1016/j.bodyim.2017.02.006

Sullivan, A. (2020, March 27). Love in the time of coronavirus: COVID-19 changes the game for online dating. *DW.* Retrieved from https://www.dw.com/en/top-stories/s-9097

Tyson, G., Perta, V. C., Haddadi, H., & Seto, M. C. (2016). A first look at user activity on Tinder. *IEEE*, 461-466. Retrieved from https://ieeexplore.ieee.org/abstract/document/7752275/citations?tabFilter=papers

Waite, L., & Lehrer, E. (2003). The benefits from marriage and religion in the United States: A comparative analysis. *Population and Development Review, 29*(2), 255-275. doi: 10.1111/j.1728-4457.2003.00255.x

Whitley, R. (2018, October 18). Are dating apps damaging our mental health? *Psychology Today.* Retrieved from https://www.psychologytoday.com/us

Wright, D. B., London, K., & Field, A. P. (2011). Using bootstrap estimation and the plug-in principle for clinical psychology data. *Journal of Experimental Psychopathology, 2*(2), 252-270. doi: 10.5127/jep.013611

Zeigler-Hill, V. (2011). The connections between self-esteem and psychopathology. *Journal of Contemporary Psychotherapy, 41*(3), 157-164. doi: 10.1007/s10879-010-9167-8

Appendices

Appendix A

Online survey

Please fill in the following questions on your demographics.

What is your age?

_____

What is your gender?

- o   Male
- o   Female
- o   Other, namely: _____
- o   Prefer not to answer

What is your nationality?

- o   Dutch
- o   German
- o   Other, namely: _____

Do you use online dating sites or mobile dating apps?

- o   Yes, I use it currently
- o   Yes, I used it in the past
- o   No, I never used it

Which site or app do/did you use?

- o   Tinder
- o   Lovoo
- o   Bumble
- o   Badoo
- o   Other, namely _____

How often do you make use of online dating apps/websites? How often have you made use of online dating apps/websites in the past?

- o Once a month
- o 2-3 times a month
- o Once a week
- o 2-3 times per week
- o 4-5 times per week
- o Daily

How often do you make use of online dating apps/websites per day? How often have you made use of online dating apps/websites per day in the past?

- o 2-3 times per day
- o 4-6 times per day
- o Once an hour
- o 2 or more times per hour

Please rate how strongly do you agree or disagree with the following statements.

	Strongly Agree	Agree	Disagree	Strongly Disagree
On the whole, I am satisfied with myself.				
At times I think I am not good at all.				
I feel that I have a number of good qualities.				
I am able to do things as well as most other people.				
I feel I do not have much to be proud of.				
I certainly feel useless at times.				

I feel that I'm a person of worth, at least on an equal plane with others.

I wish I could have more respect for myself.

All in all, I am inclined to feel that I am a failure.

I take a positive attitude towards myself.

Appendix B

Informed consent

Dear participant,

You are being invited to participate in a research study about "Mental wellbeing in an era of online dating". This study is being done by a group of third-year Psychology students from the University of Twente from the Faculty of Behavioural, Management, and Social Sciences at the University of Twente.

The purpose of this research is to investigate the relationship between online dating and different facets of mental wellbeing and will take approximately 20-30 minutes to complete. The data collected in this online survey will be treated strictly confidential. As such, all analysis of the collected data occurs anonymously and only for the purpose of this study. If the data is published, measures will be taken to ensure that no data of any individual is recognizable as such.

Your participation in this study is entirely voluntary and you can withdraw at any time. There are no right or wrong answers to the questions. Try to go along with the first thoughts you have.

We believe there are no known risks associated with this research study. We will minimize any risks by safely storing the data and anonymize all of your answers. However, during the study you are asked to individually self-reflect upon different constructs of your current mental well-being level. If you have the feeling that your current level of mental well-being is at risk we kindly invite you (if you are a student of the University of Twente to contact the student psychologist (please contact the secretariat of SACC on office hours: +31 53 489 2035 or visit the desk in the Vrijhof, 3rd floor, room 311) or your study advisor) to get help by contacting self-help hotlines (https://www.nhs.uk/conditions/stress-anxiety-depression/mental-health-helplines/).

Study contact details for further information:

Miriam Sanhaji, m.sanhaji@student.utwente.nl

Charlie Chrie, c.s.chrie@student.utwente.nl

Lea Faesing, l.m.faesing@student.utwente.nl

Thank you for your participation.

In compliance with the EU General Data Protection Regulation GDPR for collection of new data active, informed consent is required.

I understand and consent that:

1. I am 18 years old or older.

2. The procedure will approximately take 20-30 minutes.

3. I understood the content and agreed to contribute my data for the use of this research.

4. I can withdraw from this research at any time by informing the researchers and all my data will be deleted.

5. My personal information will be anonymised to protect my privacy.

6. With my permission, I agree that all my data can be evaluated and used for the research.

7. I have been given the guarantee that this research project has been reviewed and approved by the BMS Ethics Committee. For research problems or any other questions regarding the research project, the Secretary of the Ethics Commission of the faculty Behavioural, Management and Social Sciences at the University of Twente may be contacted through ethicscommittee-bms@utwente.nl

In the case of questions or ambiguities, the researchers Miriam Sanhaji (m.sanhaji@student.utwente.nl), Charlie Chrie (c.s.chrie@student.utwente.nl) , Lea Faesing (l.m.faesing@student.utwente.nl) will be available in order to help.

- o   Yes, I do consent.
- o   No, I do not consent.

Appendix C

Additional information on participants sociodemographic characteristics per category

Table A1

Sociodemographic Characteristics of Participants at Baseline

Baseline characteristic	User		Non-user		Low-frequency user		High-frequency user		Tinder exclusive user		Tinder inclusive user		Tinder excluding user		Low-frequency Tinder exclusive user		High-frequency Tinder exclusive user		Full sample	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Gender																				
Female	64	41.6	16	21.3	25	39.7	39	42.9	23	32.4	29	54.7	12	40.0	13	34.2	10	30.3	80	34.9
Male	90	58.4	59	78.7	38	60.3	52	57.1	48	67.6	24	45.3	18	60.0	25	65.8	23	69.7	149	65.1
Nationality																				
Dutch	16	10.4	5	6.7	3	4.8	13	14.3	8	11.3	6	11.3	2	6.7	1	2.6	7	21.2	21	9.2
German	110	71.4	55	73.3	43	68.2	67	73.6	45	63.4	39	73.6	26	86.6	25	65.8	20	60.6	165	72.1
Other	28	18.2	15	20.0	17	27.0	11	12.1	18	25.3	8	15.1	2	6.7	12	31.6	6	18.2	43	18.8

Note. N = 229