Tinder blue, mental flu?
Exploring the associations between online Tinder use and well-being

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ABSTRACT

Tinder has been one of the most prevalent mobile dating apps in contemporary society, particularly among emerging adults. Media and communication researchers have gradually examined Tinder use in various ways, but its potential psychological outcomes have rarely been addressed. It is thus important to study the factors and the mechanism that might play a role in influencing Tinder users' well-being. The present study investigated the extent to which Tinder users' compulsive Tinder use, subjective online success, self-conscious social comparison and negative online experiences have an association with the users' well-being state after use. Moreover, the study also examined if different Tinder motives moderate the relationship between subjective online success and well-being, and whether Tinder users' subjective online success or objective online success is a better predictor for their well-being after use. A cross-sectional online survey was conducted on 312 current Tinder users who were 18 to 30 years old. The results suggest that while using Tinder compulsively might yield both positive and negative affect, feeling unsuccessful on Tinder and making self-conscious social comparisons both have a positive relationship with sadness, anxiety, and a negative relationship with joviality. In addition, having negative online experiences on Tinder was positively associated with sadness. No moderation effect was found for any of the motives, however, they were associated with well-being as main effects. Using Tinder for social approval and for sexual experience was related to better well-being afterwards. Last but not least, Tinder motive relationship seeking was positively associated with poor well-being after use. The results imply that, while Tinder users may not be able to easily change their success, they might need to be aware of their compulsive Tinder use, self-conscious social comparison tendency on Tinder, and their motives of use (especially if they are looking for a romantic relationship), as these factors might influence their mental health negatively. This study may enrich social comparison theory by demonstrating that comparison can be made self-consciously in the mobile dating context. It also contributes to the uses and gratifications theory by shedding light on the consequences of various Tinder motives, which may further impact the users' well-being and continuous use.

Keywords: Tinder, Well-being, Social Comparison Theory, Use and Gratification Theory, Motives

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1. Introduction

In contemporary society, mobile dating applications (apps) have become increasingly prevalent among young people (Sumter & Vandenbosch, 2018). Particularly, Tinder has been one of the most famous apps in recent years (Duguay, 2016; Jansen, 2019; Lusinski, 2018; Marvin, 2019). Consequently, researchers have been drawing attention into examining this field. Previous studies have investigated the use of online dating from various perspectives, including the users' demographic background, personality traits, motives of use, and self-presentation strategies (Sumter & Vandenbosch, 2018; Timmermans & De Caluwé, 2017a, 2017b; Ward, 2017). However, despite convincing calls for action by both mobile dating and psychology researchers (e.g., Lomanowska & Guitton, 2016; Orosz et al, 2016; Strubel & Petrie, 2017), so far little research has focused explicitly on Tinder users' mental health and well-being.

While social media researchers have suggested that excessive and compulsive use of social networking sites (SNSs) may lead to poor well-being (Błachnio, Przepiorka, &Pantic, 2016; Dhir, Yossiri, Kaur, & Chen, 2018), it is unclear whether or not this is also the case for Tinder users. Moreover, studies have shown that being unsuccessful in the online dating market might influence the users mood negatively and cause frustration (Courtois & Timmermans, 2018; Heino, Ellison, & Gibbs, 2010), but little is known about the extent to which the unsuccessfulness has an impact on the users' well-being. Since being successful or not may be a subjective feeling and many Tinder users interact more often online than offline (Smith & Anderson, 2016), the current study will focus on subjective online success (SOS).

Social Comparison Theory entails that human beings have an inner drive to compare themselves with other people, especially with those who perform better (i.e., upward social comparison), and such comparison can potentially harm one's well-being (Festinger, 1954; Lewallen & Behm-Morawitz, 2016; Rosenthal-von der Pütten et al., 2019). Although users cannot see each other's success – and thus compare – on mobile dating apps, self-conscious social comparison might nevertheless be possible. Users might self-consciously think or believe that other users have more success than themselves even if they cannot know this.

Furthermore, negative online experiences on Tinder may also play a role in influencing the users' well-being (LeFebvre et al., 2019). Such experiences include sexual harassment and one user being deleted by another user without being informed (Thompson, 2018; Vandeweerd, Myers, Coulter, Yalcin, & Corvin, 2016). Taking these factors into account, the following research question is formulated:

RQ1: *To what extent do Tinder users' compulsive Tinder use, subjective online*

success, self-conscious social comparison and negative online experiences affect their well-being after using Tinder?

Uses and Gratifications (U&G) Theory suggests that *why* Tinder users use the app (i.e. motives) is more meaningful than the fact of using it, and that when the users' motives are gratified, they are likely to keep using it (Katz, Blumer, & Gurevitch, 1974; Katz, Gurevitch, & Haas, 1973; Timmermans & De Caluwé, 2017a). An indication of such gratification could be the users' well-being state after use. Research has shown that in interpersonal relationship/communication, rejection can bring about negative well-being, and those who take the relationship more seriously are more subject to the feelings (Leary, Springer, Negel, Ansell, & Evans, 1998). Similarly, when it comes to Tinder use, those romantic users may be more sensitive to the consequences of feeling unsuccessful. Therefore, the second research question is formulated as:

RQ2: *To what extent do Tinder users' various motives of use moderate the relationships between subjective online success and well-being after Tinder use?*

While SOS is the focus of this study, previous research has examined online dating success in both subjective and objective ways (Gibbs, Ellison, & Heino, 2006; Timmermans & Courtois, 2018). To investigate whether SOS or objective online success (OOS) is a better predictor for Tinder users' well-being, the third research question is:

RQ3: *Is subjective online success or objective online success better for predicting Tinder users' well-being after using the app?*

To answer these questions, an anonymous online survey was delivered using Amazon Mechanical Turk, to ensure privacy and reduce sampling bias (Bryman, 2012; Gilbert, 2008). Confirmatory factor analyses were used to examine if the three self-created scales are adequate. Afterwards, multiple linear regression analyses were performed for hypothesis testing (Field, 2013; Field, Miles, & Field, 2012). In the following sections, literature review on all the above-discussed concepts will be presented, followed by detailed explanation of the methods and the results section. Last but not least, conclusions, implications, limitations and suggestions for future research will be discussed.

Lomanowska and Guitton (2016) have shown that research on the mental health impact resulting from the social use of Internet technologies is still in its early stage, and that existing studies have yielded mixed results. While some studies showed that online social interaction can improve one's mood and self-esteem (Green et al., 2005; Shaw & Gant, 2002), others reported an opposite relationship between online communication and well-being, including increased depression and anxiety (Dhir et al., 2018; van den Eijnden,

Meerkerk, Vermulst, Spijkerman, & Engels, 2008). As Tinder is highly prevalent with many young adults using it on a daily basis, understanding the consequences it might have on its users' well-being and in what ways are highly necessary (Strubel & Petrie, 2017). Moreover, the study has practical relevance, as extreme and long-lasting poor well-being can lead to psychological disorders, inferior physical health, and interfere with a person's ability to function in his or her daily life (Huppert, 2009). If the company Tinder wants to consider its users' well-being after using the app, they may make some adjustments with the app by taking into account this study's findings. The study also advances the literature on mobile dating platforms. It can potentially contribute and support the understanding of social comparison theory, the U&G framework, mobile dating affect, and ongoing research on computer-mediated communication. By shedding lights on the moderating role of Tinder motives on the association between Tinder success and well-being, the users can understand for instance, what kind of the motives are more likely to lead to negative outcomes.

2. Literature review and theoretical framework

2.1. Emerging adults' Tinder use

According to the Pew Research Center (Smith, 2016), in 2015, 27% of 18- to 24-year-old American adults have ever used an online dating website and/or mobile dating app. Among them, 22% have ever used a mobile dating app, which was a more than fourfold increase from 5% in 2013 (Smith, 2016). Such increase may be partly the result of Tinder's existence since 2012, as it has been growing continuously and is a leading mobile dating app (Hobbs, Owen, & Gerber, 2017; Jansen, 2019; Sevi et al., 2018; Timmermans & De Caluwé, 2017a). Up until recently, it already had 50 million users, 10 million daily active users, and 20 billion matches with approximately 26 million per day (Smith, 2019). It is a free dating app with an easy set up (Timmermans & De Caluwé, 2017a). Next to its prevalence, another reason to focus exclusively on Tinder rather than including various popular mobile dating apps is because different dating apps tend to have different affordance or mechanisms, such as not being free of use or only for few matches (e.g. Match or Bumble) making comparison among apps less straightforward.

According to Arnett (2000), emerging adulthood is a transitional life course period from 18 to 29 years. This group grew up relying on technology and is exploring romantic and sexual relationships (LeFebvre et al., 2019; Morgan, 2012; Pew Research Center, 2018). Moreover, emerging adults seem to be most likely to use mobile dating apps, which have become part of their day-to-day life for many (Smith & Anderson, 2016; Timmermans & De

Caluwé, 2017b). It was also suggested that their romantic and social relationships are relatively fragile, salient and unstable, potentially making their well-being more easily influenced by dating apps than other age groups (van Dulman, Claxton, Collins, & Simpson, 2015). Therefore, to study Tinder's impact on the users' well-being, emerging adults are the focus.

2.2. Well-being in the digital age

Previous research has shown that engagement in meaningful or intimate social interactions and relationships has an important influence on mental health and well-being (Kawachi & Berkman, 2001; Lomanowska & Guitton, 2016; Ryff & Singer, 2000). According to Lomanowska and Guitton (2016), the shift from offline to online dating has created new ways to experience and actualize intimacy (i.e. love, closeness, and support), both in the context of pre-existing relationships and new relationships with strangers. It also raises the important questions of how and the extent to which the interpersonal relationships experienced in the online context may impact the users' health and well-being outcomes in the digital era (Lomanowska & Guitton, 2016). Clark, Algoe and Green (2018) argued that "social network sites benefit their users when they are used to make meaningful social connections and harm their users through pitfalls such as isolation and social comparison when they are not" (p. 32). However, even if studies have drawn attention on examining SNSs' impact on the users' well-being, little is known regarding the effect mobile dating has on well-being.

Well-being has been variously defined in terms of affective, cognitive, and psychological processes (Howell, Rodzon, Kurai, & Sanchez, 2010). Previous studies on individual well-being have focused on mood states (e.g., presence of positive mood, absence of negative mood), positive and negative affect, life satisfaction, and quality of life (Howell et al., 2010; Ryan & Deci, 2001). Moreover, some researchers (e.g., Keyes, Shmotkin, & Ryff, 2002) have argued that there are two distinct concepts for well-being: psychological well-being (PWB), examining human potential and the meaningful life, and subjective well-being (SWB), which assesses happiness and the pleasant life. However, Chen, Jing, Hayes, and Lee (2013) suggested that PWB and SWB are in fact conceptually related to each other. Nevertheless, well-being at its core refers to satisfaction, contentment, feeling good, functioning well, or happiness deprived from optimal functioning and is important to be examined multidimensionally (Huppert, 2014; Kern, Waters, Alder, & White, 2015; McDowell, 2010).

As well-being is a subjective and relative, rather than an absolute and objective concept, assessing it appropriately can be challenging (McDowell, 2010). Consequently, several measurements of well-being have been proposed and are subject to debates over which is the more appropriate (Diener et al., 2009; McDowell, 2010). Since positive and negative affect are aspects of well-being that Tinder users very likely encounter (Bareket-Bojmel & Shahar, 2011; Ranney & Troop-Gordon, 2015; Rosen, Cheever, Cummings, & Felt, 2008), *joviality* (a positive affect) and *sadness* (a negative affect) are two of the well-being constructs considered in this study (Watson & Clark, 1999). In order to study well-being multidimensionally, in addition to joviality and sadness, whether or not Tinder use and experience can have an impact on the users' feeling of *anxiety* is also examined (Dhir et al., 2018). Even if anxiety has been associated with social media use, it is unclear if this is also the case in the context of mobile dating. In the following sections, factors that might play a role in Tinder users' well-being will be discussed.

2.3. Compulsive Tinder use and well-being

Studies of social media revealed that using SNSs may cause poorer well-being and lower life satisfaction, depending on, for instance, one's frequency of use and how one used it (Błachnio et al., 2016; De Lenne, Vandenbosch, Eggermont, Karsay, & Trekels, 2018; Jeri-Yabar et al., 2018; Kross et al., 2013). For Błachnio et al. (2016), the more addicted a Facebook user is toward Facebook, the more likely that his or her mood will be affected negatively. Similarly, another study showed that using social media compulsively is positively related to SNS fatigue, which is associated with depression and anxiety (Dhir et al., 2018). Compulsive use behavior refers to "an abnormality in controlling behavioral consumptions where an individual is unable to rationally manage his/her routine performances" (Dhir et al., 2018, p. 143; Hirschman, 1992). While the concept has been primarily studied in the context such as excessive food intake and drug abuse, it has recently been used to examine the consequences of various forms of new online media use (Dhir et al., 2018).

Although Tinder is not the same as SNSs, the users might still encounter more or less similar outcomes. As Orosz et al. (2016) advised, Tinder use can have similar psychological background mechanisms to SNS use because their negative consequences on the users' health and well-being may be comparable. If we agree with this, compulsive use of Tinder can also have an impact on the users' well-being. In addition, it has been suggested that frequent Tinder use is associated with mood modification, unpleasant feelings when not being able to

use the app, and emotions/behaviors being dominated (Orosz et al., 2016). Furthermore, Courtois & Timmermans (2018) showed that longer Tinder experience is negatively associated with the users' mood right after use. To investigate whether or not and the extent to which compulsive use of Tinder has an impact on the users' well-being, the first hypothesis of this study is:

H1: Tinder users' compulsive use of Tinder is negatively associated with their well-being after use (see Figure 1).

2.4. Tinder users' subjective online success (SOS)

Research on Tinder use has demonstrated that this app may have psychological impact (Courtois & Timmermans, 2018; LeFebvre, 2018; Strubel & Petrie, 2017). For Strubel and Petrie (2017), using Tinder can negatively affect one's body image confidence and level of self-esteem. They suggested that Tinder use is an objectifying process that increases body image concerns, including appearance comparison, and thus causes psychological distress. For Courtois and Timmermans (2018), getting matches (when both users like each other) and having conversation with people one matched online are positively associated with Tinder satisfaction, and the satisfaction is positively related to the user's current mood. Those who receive little attention (e.g. being swiped left often, only a few matches/conversation received) are likely to feel being ignored and/or not validated by others, thereby boosting negative affect (Courtois & Timmermans, 2018; Strubel & Petrie, 2017). Contrarily, Orosz et al. (2016) also showed that matches can temporarily enhance one's self-esteem as they imply positive feedbacks from other users.

Moreover, research on online dating showed that the lack of quality and quantity in online dating interaction may lead to frustrations (Heino et al., 2010; Zytko, Grandhi, & Jones, 2014). Similarly, Schwartz and Velotta (2018) argued that feeling rejected, having a lack of attention, and when interest turns out to be one-sided are emotional costs that may lead to fatigue among online daters. Furthermore, LeFebvre (2018) showed that about half (50.4%) of the Tinder users had deleted their Tinder accounts between one and seven times, and 67% deleted it due to being unsuccessful. In a similar vein, while social media users' well-being can be impacted negatively when his or her post does not gain many likes, online daters' well-being might likewise decrease if he or she does not receive desirable matches or messages initiated by others, for it might be regarded as more personal and direct feedback (Bäck, Bäck, Fredén, & Gustafsson, 2018). All of the abovementioned studies serve as an indication that a lack of Tinder success might indeed influence users' well-being.

Since approximately one-third of online daters have never gone on a date with someone they met online (Smith & Anderson, 2016; Timmermans & Courtois, 2018), the current study focuses on Tinder users' online success (e.g. matches, conversations initiated by the others) in order to include all of the users rather than solely those who experienced successful offline encounters. Besides, since "a lack of success" or "being unsuccessful" may differ from users to users (e.g. five matches in a week can be a lot for some but a few for the others), Tinder users' subjective online success (SOS) is used as a predictor for well-being. Taking all these into account, the next hypothesis is:

H2: Tinder users' subjective online success (SOS) is positively associated with their well-being after use (see Figure 1).

2.5. Social Comparison Theory and self-conscious social comparison

According to Festinger (1954), human beings have an innate drive to evaluate themselves by examining their qualities and abilities in comparison with others. Essentially, social comparison can be seen as an exploration, which helps to confirm or deny various aspects of one's identity by comparing whether features are similar or dissimilar to others (Festinger, 1954; Lewallen & Behm-Morawitz, 2016). Starting from age seven, such comparison can be realized in many domains, including interpersonal relationships and social media, in which individuals compare their abilities, limitations or appearances with people in their daily lives and/or media models (Festinger, 1954; Lewallen & Behm-Morawitz, 2016; Ozimek, Bierhoff, & Hanke, 2018; Ruble, Boggiano, Feldman, & Loebl, 1980).

According to Reaves (2011), competition is a likely underlying motivation for social comparison and "the evolutionary roots of social comparison are similar to social rank in animal behavior (inferior-superior; weaker-stronger; upward-downward)" (p. 122). There are two main kinds of social comparison: downward and upward (unflattering), and both of them can cause positive and negative effects (Rosenthal-von der Pütten et al., 2019). This study focuses on the negative aspects of upward social comparison. With a growing body of literature and research on social comparison theory in social media contexts, it has been suggested that online communication can harm well-being due to upward social comparison (unflattering social comparison) (Appel, Gerlach, & Crusius, 2016; Burke & Kraut, 2016; Krasnova, Wenninger, Widjaja, & Buxmann, 2013; Lee, 2014). Social media facilitate upward social comparison, in which the users compare oneself to someone who performs better, possibly decreasing well-being when dissimilarity between one's successes, abilities or attractiveness and those of others occurs (De Lenne et al., 2018; Lewallen & Behm-

Morawitz, 2016; Rosenthal-von der Pütten et al., 2019; Tiggemann & Slater, 2013). Based on online survey data, Lee (2014) also pointed out that social comparisons occur on Facebook use and that the amount of comparisons via Facebook are positively related to the negative feelings elicited by those comparisons.

Unlike social media users, who can see the amount of success (e.g. amount of likes, views) their friends and/or other users have, the amount of success each Tinder user has is not public. Due to this affordance difference, it is more difficult for Tinder users to compare one's success with that of others'. Despite that direct and explicit comparison is not possible in Tinder, it is unknown whether or not Tinder users compare themselves with other users self-consciously. That is, while Tinder users cannot see the amount of matches and so on the other users have, they might still self-consciously think that others are more successful than themselves (Hobbs et al., 2017). For example, some mobile dating app users felt that only the top attractive people can be successful on the network (Hobbs et al., 2017), which can serve as an indication that users self-consciously compare themselves with others. It is thus important to measure the extent to which Tinder users agree or disagree with statements like "I think other Tinder users have more matches then me". Moreover, research showed that social comparison can occur on social media partly because the users seem to be "sensitive" to the amount of likes they receive (Rosenthal-von der Pütten et al., 2019). As Tinder users might also be sensitive to their own success, social comparison is expected, potentially causing poor well-being. Thus, the third hypothesis is:

> *H3*: Tinder users' self-conscious social comparison is negatively associated with their well-being after use (see Figure 1).

2.6. Tinder users' negative online experiences (NOEs)

In addition to compulsive use of Tinder, SOS, and the users' self-conscious social comparison, negative experiences the users face may also influence their well-being (LeFebvre et al., 2019) and elicit uncomfortable feelings (Vandeweerd et al., 2016). Specifically, since almost half of the Tinder users have never had offline encounter with another Tinder user (Timmermans & Courtois, 2018), and many of the commonly appeared negative Tinder experiences happen online (Hess & Flores, 2016; LeFebvre, 2018; LeFebvre et al., 2019; Vandeweerd et al., 2016), only negative online experiences (NOEs) are examined in the study. NOEs in this study entail the negative aspects of online dating that may cause negative emotions but are not brought about by the user himself/herself, including e.g. deception and lying of the other users, receiving unwanted messages, and being scammed

(Finkel, Eastwick, Karney, Reis, & Sprecher, 2012; Vandeweerd et al., 2016). In the present study, attention is mainly paid to online sexual harassment and ghosting.

Online sexual harassment (OSH), which may include (naming and) shaming, objectification, and sending unwanted messages/sexually explicit contents (e.g. dick pic), also occurs often on mobile dating apps and bring about negative feelings (Hess & Flores, 2016; Shaw, 2016; Thompson, 2018). Research has shown that for emerging adults especially, dating apps like Tinder have become intertwined with the hookup culture and OSH, with the latter being possibly detrimental (Blackwell, Birnholtz, & Abbott, 2015; Hess & Flores, 2016; Sales, 2015; Vandeweerd et al., 2016). For Vandeweerd et al. (2016), middle-aged women who are dating online reported that receiving unwanted sexual messages can make them feel uncomfortable, annoyed or uneasy. For LeFebvre (2018), OSH and sexually explicit content are two of the reasons why some of the emerging adults deleted Tinder. Although one may assume that OSH occurs mostly among females, Gordon (2017) showed that it is not uncommon for many men to have received (sexual) shame/harassment for reasons such as sexual inexperience, masturbation/pornography remorse, and sexual performance insecurity/anxiety.

According to LeFebvre et al. (2019), ghosting, which can happen in the mobile dating world, implies "Unilaterally ceasing communication (temporarily or permanently) in an effort to withdraw access to individual(s) prompting relationship dissolution (suddenly or gradually) commonly enacted via one or multiple technological medium(s)" (p. 10). While the users who initiate ghosting might do it for their own convenience or safety, those who are ghosted may feel hurt and painful, as ghosting is a form of social rejection (LeFebvre et al., 2019; Vandeweerd et al., 2016). Moreover, people being ghosted can have no idea why the initiator deletes them, wondering "What is wrong with me?" (LeFebvre et al., 2019) or feeling disappointed by the uncertainty (Vandeweerd et al., 2016). It is highly possible that Tinder users' NOEs, especially OSH and being ghosted, are associated with having poor well-being. To test this, the next hypothesis is:

H4: Tinder users' negative online experiences (NOEs) are negatively associated with their well-being after use (see Figure 1).

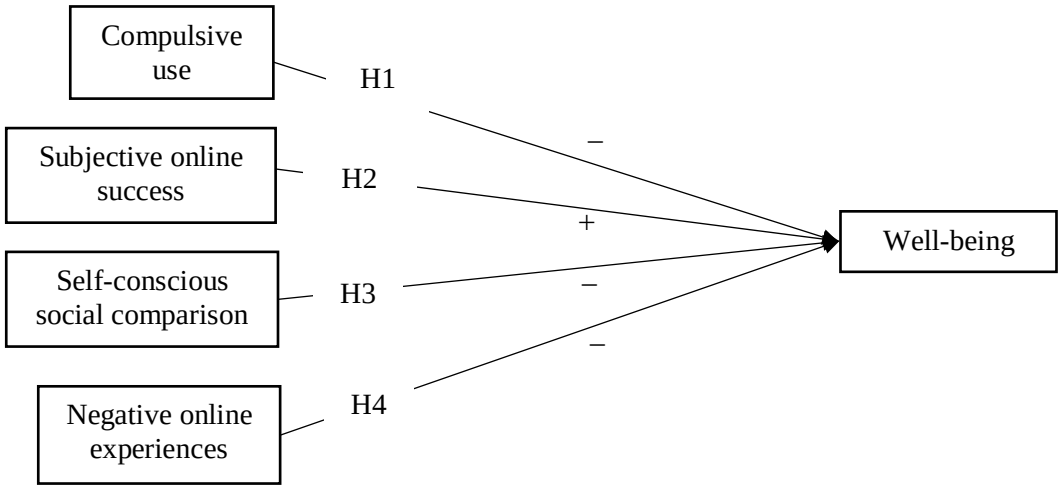

Figure 1. Illustration of hypotheses 1 – 4

2.7. Uses and Gratifications Theory

Uses and Gratifications (U&G) theory focuses on how media users utilize media to satisfy their special social/psychological needs (Rubin, 1993). Instead of treating media users as passive consumers, U&G framework is used to study the active role of media users. Scholars have suggested a recursive relationship between users, media usage, motives and consequences: users use media to satisfy needs, and while their needs are gratified, these gratifications in turn construct needs, implying that they are more likely to use media to satisfy the needs again (Katz et al., 1973; Katz et al., 1974). Although U&G theory was developed to study mass media, it has been successfully applied to examine reasons for using mobile dating apps (Sumter, Vandenbosch, & Lightenberg, 2017; Timmermans & De Caluwé, 2017a).

In order to establish whether Tinder users' needs are satisfied, it may be important to investigate well-being, as better well-being after Tinder use might indicate gratification. By examining which motives of Tinder use influence well-being more positively or negatively, we may know what motives lead to continued app usage. For example, if using Tinder to pass time can positively affect the relationship between Tinder use and well-being, implying that one's need is satisfied, one might continue using it for such motive. As a result, this study contributes to the U&G framework for having a better understanding of the mechanism that might function in the latter part: when certain needs are satisfied, more needs are constructed. However, the U&G theory might not be applicable to Tinder users who use the app to find a serious partner and are successful, as when their need is gratified (i.e. have found someone to

date long term), they are likely to quit using Tinder.

Even though research on the association between motives and well-being when using online media seems scarce, a few studies have drawn attention to it. For instance, Shen and Williams (2011) showed that users of Internet and massively multiplayer online game's psychological well-being was affected depending on their purposes of use. For example, using the Internet for meeting new people was associated with increased loneliness (as the time one spent with family and friends offline was compensated), whereas it had a positive effect on well-being when it was used for communication with family and friends (Shen & Williams, 2011). In addition, Young, Len-Ríos and Young (2017) suggested that experience of online aggression may lead to depression and poor well-being among victims, and such experience depends not only on the amount of social media use but also on *why* adolescents use social media. Their results showed that while adolescents with romantic motives and social belongingness motives use are more likely to experience online aggression, it is less likely the case for those with information and entertainment motives (Young et al., 2017). These studies imply that motives for online communication use may play a direct or indirect role on well-being. Therefore, the next section will delve deeper into the associations between Tinder motives and well-being.

2.8. The moderating role of Tinder motives

Human beings have a fundamental need for social interactions and lasting relationships (DeWall & Bushman, 2011; Moor, Crone, & van der Molen, 2010). While social acceptance can bring us pleasant emotions, rejection or ignorance by others may cause hurt feelings. Even unfamiliar faces or people we form relationship in relatively trivial ways can elicit negative or hurt feelings from us (Whitesell & Harter, 1996). According to Moor et al., (2010), when people get rejected by strangers, their heart rate can become slower, suggesting that social rejection results in bodily responses reflecting social hurt (p. 1331). Although hurt feelings on its own do not get as much attention as well-being, Leary et al. (1998) showed that hurt feelings are highly correlated with general feelings of distress and downheartedness, which seem to share substantial similarities with well-being (Watson, Clark, & Tellegen, 1988).

Furthermore, studies often suggested that negative effects and feelings happen more frequently when people are in contact with family members, friends and partners than by strangers and acquaintances, implying that the better and the more serious the impersonal relationship is, the more likely people are susceptible to being hurt after rejection or

exclusion (Leary et al., 1998; Rosen, Mickler & Collins, 1987; Whitesell & Harter, 1996). Similarly, Finkel et al. (2012) also indicated that the success or failure of romantic relationships play a central role in individuals' emotional well-being. While it is true that most Tinder users do not know each other, their well-being state might still be impacted negatively when feeling unsuccessful, especially those who use it romantically/seriously (Whitesell & Harter, 1996). In this case, according to the U&G theory, it is more likely for those Tinder users who use the app for romantic motive to stop using the app if they are not successful, as such motive has their well-being, as an indication for gratification, decrease even more. Despite that those with motive social approval are not necessarily looking for any romantic or emotional relationship, it may be still considered a serious motive, as social approval can be related to self-esteem (Franks & Marolla, 1976; MacDonald, Saltzman, & Leary, 2003). Thus, if one who seeks social approval on Tinder fails, his/her well-being might be impacted negatively (Diener et al., 2009).

In the current study, to examine the potential moderating role of Tinder motives more concretely and structurally, the Tinder Motive Scale (TMS) by Timmermans and De Caluwé (2017a) is utilized. Originating from the U&G framework – which focuses on the motives behind Tinder use – the TMS was built based on four independent studies (Timmermans & De Caluwé, 2017a). The final 58-item TMS with 13 different motives was developed, of which the four commonly appeared motives: pass time/entertainment, social approval, sexual experience and relationship seeking are used in this study. While the motive entertainment implies using Tinder for occupying time and for fun, motive social approval suggests using it to get compliments and/or an "ego boost". Moreover, those who use it for sexual experience seek a one-night-stand and/or a friend-with-benefit, and the relationship seeking users look for a serious and emotional relationship (Timmermans & De Caluwé, 2017a). Applying these four Tinder motives, the last four hypotheses, as illustrated in Figure 2, are:

H5: The association between Tinder users' SOS and well-being after use is moderated by motive entertainment negatively. Specifically, it is assumed that among Tinder users, those with motive entertainment would be less subject to negative well-being because of low SOS.

H6: The association between Tinder users' SOS and well-being after use is moderated by motive social approval positively. With this, it is expected that those who use Tinder for social approval are more sensitive to feeling unsuccessful.

H7: The association between Tinder users' SOS and well-being after use is moderated by motive sexual experience negatively. (Same logic as *H5*)

H8: The association between Tinder users' SOS and well-being after use is moderated by motive relationship seeking positively. (Same logic as *H6*)

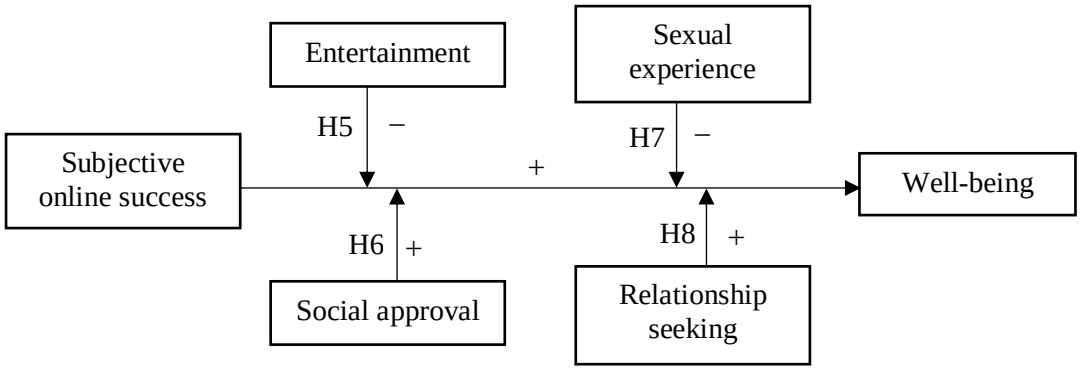

Figure 2. Illustration of hypotheses 5 – 8

2.9. Tinder online success: Subjective vs. objective measurement

Online/mobile dating researchers have studied dating success in both self-perceived and objective manners (Courtois & Timmermans, 2018; Gibbs et al., 2006; Timmermans & Courtois, 2018). For instance, Gibbs et al. (2006) used items such as "I feel I able to achieve my online dating goals" to assess perceived strategic success[1]. Timmermans and Courtois (2018) measured objective success by asking the participants questions like "how many in 10 Tinder users they would match with" (i.e., when two users both like each other they have a match and are able to start a conversation with each other; Hobbs et al., 2017). While tracking the amount of matches a Tinder user has (per swipe) can be straightforward and effective, it may fail to capture how each user subjectively considers success to be. This is important and is the reason why Tinder users' SOS is the focus of this study, as discussed above. However, even if SOS is the main predictor for Tinder users' online success, (objective online success) OOS may also have an influence on the users' well-being (Courtois & Timmermans, 2018). To examine if SOS is really a better predictor than OOS on Tinder users' well-being, the last hypothesis is formulated as follow:

H9: Subjective online success (SOS) is a better predictor than objective online success (OOS) for predicting Tinder users' well-being after use.

[1] The perceived success measurements used in Gibbs et al. (2006) are not used in this study as they assessed the users' self-presentation success and strategic success, which are not what the goal of this paper.

3. Methods

3.1. Quantitative survey and statistical methods

The purpose of this thesis is to investigate the potential impact of Tinder use and experience on well-being, and to test if the users' motives of use play any moderating role on the relationship between Tinder success and well-being. Understanding that well-being is a sensitive topic, an anonymous online survey was used for data collection in order to protect the respondents' privacy and to make them feel comfortable while expressing their well-being status (Bryman, 2012; Gilbert, 2008). The online survey was designed using the Qualtrics online survey tool. The complete survey questions can be found in appendix A.

Statistical software IBM SPSS Statistics 24 and R 3.4.2 were used for analyzing the data (Field, 2013; R Core Team, 2017; Rosseel, 2012; Beaujean, 2014). Confirmatory factor analyses were conducted with the R package lavaan 0.6-3 for testing whether the self-created items: SOS, self-conscious social comparison and NOEs are appropriate (i.e. the items of each scale form a single construct) or need adjustment (e.g. any item needs to be omitted; Field, Miles, & Field, 2012). Afterwards, multiple linear regression analyses were used for examining the main effects and interaction effects of the hypotheses in SPSS (Field, 2013).

3.2. Participants and procedure

To reduce non-random sampling and to ensure that all the respondents come from the same country, participants of this study were recruited through Amazon Mechanical Turk. Every participant received an incentive of one US dollar after successfully completing the survey. The participants have been informed about the topic and goal of this study and consented to participate if they decided to proceed with the survey. The data collection period was from 10th to 11th of April 2019. In total, 351 individuals living in the United States have completed the online questionnaire (completion rate: 75%). Only responses of those who were close to emerging adulthood were included in the analyses[2]. After excluding those who were older than 30 years old (N =39)[3], 312 participants who were between 18 to 30 years old (M = 26.46; SD = 2.96) remained, with 60% males, 89% identifying as straight and 70% singles. Additionally, those who filled in neither female or male (N = 2), neither straight nor

[2] Given the sample size of this study and considering that age 30 is still very close to emerging adulthood, participants who were 30 years old (N = 11) were also included in the analyses.
[3] The study targeted at Tinder users close to emerging adulthood during data collection, but some people who were not in the target group also filled in the survey.

LBGTQ+ (N = 2) or neither single nor in a relationship (N = 1) were recoded as missing values, as the effects of the groups could not be reliably estimated given the low sample size.

3.3. Measures

All of the research variables used in the survey will be introduced and discussed below. Participants were asked to answer the Tinder questions based on their Tinder use and experience of *the past one week*, except for the questions related to the swipe activity (see section 3.3.8). For constructs containing more than one items, a mean across the items was used as construct score. In this way, comparison between variables with different amount of items was made possible.

3.3.1. Socio-demographic background and other information

In this study, the respondents' socio-demographic background such as age, gender, sexual identity and relationship status were measured and included in the regression analysis, as they can be potential confounders and thus need to be controlled for (Timmermans & De Caluwé, 2017b). In addition, one's attractiveness was adjusted for. Participants were asked to rate their perceived physical attractiveness based on a 9-point Likert scale, ranging from 1 (being very unattractive) to 9 (being very attractive) (M = 6.73, SD = 1.54; Courtois & Timmermans, 2018). Since participants' well-being regarding their Tinder use was measured, it may be important to also control for their mood state when filling out the questionnaire. Therefore, they were also asked to give a score of their current mood on a scale from 1 (very unhappy) to 10 (very happy) (M = 7.15, SD = 1.87).

3.3.2. Compulsive use of Tinder

The measurement for compulsive use of Tinder was based on the scale measuring compulsive use of social media utilized by Dhir et al. (2018). The original scale consisted of items like "spent a lot of time thinking about FB (Facebook) or planned use of FB?" and was measured using a five-point Likert scale ranging from 1 (never) to 5 (always). This scale has good model fit, reliability and sufficient construct validity (Dhir et al., 2018). When applying this scale to the present study, Tinder was used to replace the word FB (see appendix A). This compulsive Tinder use scale (M = 2.86, SD = .97) also showed good reliability (α = .84).

3.3.3. Subjective online success (SOS)

To measure Tinder users' perceived online success, the scale SOS was created. Using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), participants were asked to indicate the extent to which they agree or disagree with statements such as: "In the past one week I have thought that I have many matches on Tinder" (see appendix A). This self-created scale (M = 3.25, SD = .95, α = .85) was tested by confirmatory factor analysis, with all the items belonging to the scale having good factor loadings (all of them were above 0.7), indicating that each item contributed to the scale meaningfully (see Table 1).

3.3.4. Self-conscious social comparison

Tinder users' self-conscious social comparison was intended to measure the users' self-conscious social comparison tendency with regard to Tinder use. An items included in this scale was e.g., in the past one week, "I have thought that most Tinder users have more matches than me". Participants were asked to score on this measure using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) (M = 3.30, SD = 1.06). The scale also had good reliability (α = .88), with all the factor loadings of CFA being above 0.8, showing that the items fit really well to the concept (see table 1).

3.3.5. Negative online experiences (NOEs)

No clear existing scale for measuring NOEs using quantitative survey method exists. However, taking into account the contribution from the previous research (i.e., LeFebvre, 2018; LeFebvre et al., 2019; Vandeweerd et al., 2016), a five-point scale (1 = strongly disagree; 5 = strongly agree) accounting for NOEs regarding Tinder use was created, consisting of 4 items, such as "In the past one week, I have been often ghosted on Tinder […]" (see Appendix A).

To carry out CFA for this self-created scale, the item "In the past one week, I have thought that my Tinder experience online is often positive" was recoded for consistent direction with the other items. However, this item appeared not to be contributing to the concept NOE well, for the factor loading was -.211. Thus, the item was removed from the analysis and CFA was carried out again based on the remaining three items. The factor loadings of these three items were all acceptable (see Table 1) and the scale after omitting the one item also had an acceptable reliability (α = .68, M = 2.87, SD = .99). Based on the factor

analyses, the self-created scales SOS, self-conscious social comparison, and NOEs excluding the one item were used in the regression analyses.

Table 1. Confirmatory factor analysis of the scales: Subjective online success, self-conscious social comparison, and negative online experience

	Items **In the past one week…**	Loadings	Cronbach's alpha
Subjective online success (SOS)	I have thought that I have many matches on Tinder	.744	.85
	I have thought that I receive many conversations initiated by other users on Tinder	.794	
	I have thought that I have many continuous conversations (that people you chat with respond to you when you write him/her) on Tinder	.766	
	I have considered myself being successful on Tinder	.738	
Self-conscious social comparison	I have thought that most Tinder users have more matches than me	.855	.88
	I have thought that most Tinder users have more conversations initiated by other users than me	.818	
	I have thought that most Tinder users have more continuous conversations (that people you chat with respond to you when you write him/her) than me	.863	
Negative online experiences (NOEs)	I have been often ghosted on Tinder. (Being ghosted: Someone deleted you after having matched with you without notifying you.)	.498	.68
	I have often received unwanted messages on Tinder (including harassment, unwanted sexually explicit messages, etc.).	.587	
	I have often had other negative online Tinder experiences that are not mentioned above.	.884	

Notes: For scale SOS, robust RMSEA = .000, SRMR = .008, robust CFI = 1.000, robust TLI = 1.012 and chi-square/degrees of freedom ratio = .359. For scales self-conscious social comparison and NOEs, since each scale only had three items (i.e. just identified model), the tests of model fit were not applicable.
All of the factor loadings were significant ($p < 0.001$).

3.3.6. Tinder motives

Timmermans and De Caluwé (2017a)'s Tinder Motive Scale (TMS) was used in this study. Originally, the TMS consists of 13 reliable factors (motives) with the Cronbach's alpha for motives ranging between .70 and .95. It is a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) (Timmermans & De Caluwé, 2017a). In the current study, the four motives selected for this study measured the participants' motives for using Tinder in the past one week. Motive *pass time/entertainment* (M = 5.08, SD = 1.11, α = .87)

had 7 items (e.g. I have used Tinder when I have nothing better to do), motive *social approval* (*M* = 4.64, *SD* = 1.33, α = .88) was measured using 6 items (e.g. I have used Tinder to see how desirable I am), motive *sexual experience* (*M* = 4.33, *SD* = 1.52, α = .91) had 6 items (I have used Tinder to find a one-night-stand), and motive *relationships seeking* (*M* = 4.32, *SD* = 1.46, α = .87) consisted of 5 items (e.g. I have used Tinder to fall in love). In line with the study by Timmermans and De Caluwé (2017a), the entertainment motive was also the most common motive of Tinder use. The correlations between the four main predictors and the four Tinder motives used in this study can be found in the table below.

Table 2. Correlations between the 4 main predictors and the 4 Tinder motives (*N* = 312)

Variables	1	2	3	4	5	6	7	8
1. Compulsive use	-							
2. SOS	.61**	-						
3. Self-conscious social comparison	.28**	-.05	-					
4. NOEs	.47**	.36**	.43**	-				
5. Entertainment	.31**	.32**	.09	.19**	-			
6. Social approval	.50**	.48**	.23**	.29**	.63**	-		
7. Sexual experience	.45**	.39**	.16**	.26**	.36**	.52**	-	
8. Relationship seeking	.41**	.35**	.37**	.26**	.12*	.35**	.26**	-

Note: significance levels: * p< .05 **p< .01

3.3.7. Well-being

To measure Tinder users' well-being after use, the positive affect joviality and the negative affect sadness from the PANAS-X scale were used (Watson & Clark, 1999). Howell et al. (2010) showed that as one of the measurements of well-being, PANAS-X has good reliability, validity and generalizability even when it is measured using an Internet survey. While joviality consisted of items such as happy and cheerful, sadness included items like blue and downhearted (Watson & Clark, 1999). Participants were asked to recall the extent to which they felt the emotions of joviality and sadness (see Appendix A for details) in the past one week after their Tinder use using a five-point Likert scale (1 = very slightly or not at all; 5 = extremely) (Watson & Clark, 1999). Participants from this study on average scored higher in joviality (*M* = 3.10, *SD* = 1.04, α = .94) than in sadness (*M* = 2.29, *SD* = 1.08, α = .90).

As discussed, a scale measuring anxiety was also used in this study, This measure was used by Dhir et al. (2018) for studying social media effects and has also showed good reliability and validity. Adjusting this five-point scale (1 = always; 5 = never) to the intended

time frame and to Tinder use, items included are, for instance, "In the past one week after using Tinder, I have worried about what others say about me" (see appendix A). The slightly adjusted anxiety scale used in the current study showed excellent reliability (α = .92, *M* = 2.68, *SD* = 1.10).

3.3.8. Swipe activity, objective online success (OOS), and well-being T_2

In order to measure objective online success, participants were also requested to use Tinder for 3 minutes, focusing only on swiping in the online survey (after they filled in the questions discussed in sections 3.3.1–3.3.7). After swiping, they were asked to report the amount of swipes and matches they had "within the swipe activity" (see appendix A). By doing so, OOS can be assessed next to SOS with reduced recall bias and mistakes. In Qualtrics, timed response was added and the participants were not allowed to proceed to the next page within the three minutes. To examine how OOS (of the swipe activity) may influence the participants' well-being, they were requested to fill in the well-being questions again after the activity. As well-being was measured again after the swipe activity, from now onwards well-being measured before the swipe activity is called well-being time 1 (T_1), including joviality T_1, sadness T_1 and anxiety T_1, while the one afterwards is shown as well-being time 2 (T_2), including joviality T_2, sadness T_2 and anxiety T_2.

A further data cleaning step was made for the swipe activity. While the respondents were asked to report the amount of matches and swipes they had in the activity, the amount of matches some of them reported was higher than their amount of swipes, which is not impossible (if they also counted the people they swiped right before but only matched them during their swipe activity) but unlikely. Given the low chance of accurate response, the answers of those 30 people on the two variables (matches and swipes) were set to missing. No other problematic outliers were detected.

On average, participants spent 255.86 seconds on the swipe activity (*SD* = 146.00), had 19.10 swipes (*SD* = 19.37) and 4.59 matches (*SD* = 5.68). The respondents scored higher in joviality T_2 (*M* = 3.02, *SD* = 1.13, α = .95) than in sadness T_2 (*M* = 2.13, *SD* = 1.11, α = .92) and anxiety T_2 (*M* = 2.53, *SD* = 1.14, α = .93). All of the dependent variables (well-being T_1 and T_2) were normally distributed, for the absolute skewness values being all below 2 and the absolute kurtosis values being all below 7 (Kim, 2013).

3.4. Analytical strategy

Multiple linear regression analyses (OLS regression analyses) were carried out for hypothesis testing. In the regression models with the outcomes joviality T_1, sadness T_1 and anxiety T_1, the control variables were: Age, gender, sexual identity, relationship status, perceived attractiveness and current mood, the main predictors were: Compulsive Tinder use, SOS, self-conscious social comparison and NOEs, and the other independent variables (IVs) were: Tinder motives entertainment, social approval, sexual experience and relationship seeking. The motives were also included in the main effect models as many of them had meaningful contribution, making the predictive power of the models stronger. For each of the outcome, all of the IVs were tested in one model in order to understand the independent effect of each predictor and to avoid potential confounders.

To test for interaction between SOS and motives, product terms were added to the main effect regression models. To avoid overfitting the models, each interaction term was tested in a separate regression model. In order to have the specific effects more interpretable, the four motives were centered in the interaction models (Timmermans & Courtois, 2018). For the models of well-being T_2, the six control variables and OOS were included.

Moreover, since multiple outcomes were tested (three for well-being T_1 and three for well-being T_2), the p-values of the regression analyses were adjusted using False Discovery Rate (FDR) in R to correct for multiple testing (Benjamini & Hochberg, 1995). Although Bonferroni is the classical method of adjusting p-values, it is often considered overly conservative (Feise, 2002). Contrarily, FDR is less strict, gives great power of statistical inference and has also been widely used (Chen, Feng, & Yi, 2017). As a result, FDR was applied, aiming to reduce both false positive and false negative rates.

As three tests were performed for a single hypothesis (three outcomes per well-being time point), the main predictors compulsive use, SOS, self-conscious social comparison and NOEs of well-being T_1, and the predictor OOS of well-being T_2 were adjusted for three tests. Similarly, the interaction terms and the additional findings were also adjusted for the three tests.

3.5. Assumption check

To check whether or not the regression analyses met the assumptions for OLS regression, several tests were performed as illustrated in table 3.

Table 3. Assumption check for the regression models of the main effects

Assumptions \ Dependent variables	Joviality T_1 (*N*=307)	Sadness T_1 (*N*=307)	Anxiety T_1 (*N*=307)	Joviality T_2 (*N*=277)	Sadness T_2 (*N*=277)	Anxiety T_2 (*N*=277)
Linearity (checked via scatterplot)	Yes	Yes	Yes	Yes	Yes	Yes
Influential outliers (checked via scatterplot)	No	No	No	No	No	No
Normality (checked via histogram and normal P-P plot of regression standardized residuals)	Very good	Very good	Good	Very good	Adequate	Good
Homoscedasticity (checked via scatterplot)	Yes	Yes	Yes	Yes	Yes	Yes
Durbin-Watson test	2.148	1.957	2.035	2.166	1.861	1.968
Multicollinearity (checked via Tolerance)	All above .377	All above .377	All above .377	All above .594	All above .594	All above .594
Multicollinearity (checked via VIF)	All below 2.656	All below 2.656	All below 2.656	All below 1.682	All below 1.682	All below 1.682
df	14	14	14	7	7	7

Notes: The Durbin-Watson tests for the correlations between errors were all non-problematic (all between 1 and 3). For collinearity diagnostics, the levels of Tolerance were all above .377 and the levels of VIF were all below 2.656, indicating that there was no multicollinearity.

4. Results

4.1. Examining Tinder users' well-being using the four main predictors

The regression main effect model with joviality T_1 as dependent variable was significant, F (14, 292) = 33.789, p< 0.001. When sadness T_1 and anxiety T_1 were used as dependent variables with the same IVs, significant models were also found ($F_{\text{sadness time 1}}$ = 14.052, p< 0.001; $F_{\text{anxiety time 1}}$ = 13.343, p< 0.001), implying that at least one predictor is important. While the predictive power of the model sadness T_1 and the model anxiety T_1 was already good, the one of the model joviality T_1 was even better (61.8% of the variances can be explained by the model – see Table 4). The motives' main effects will be discussed in section 4.2.

As shown in Table 4, compulsive Tinder use was a significant predictor for the three outcomes. While using Tinder compulsively had a positive relationship with both sadness and anxiety, it was at the same time also positively yet weakly associated with the jovial feeling, indicating that H1: Compulsive use of Tinder is negatively associated with healthy well-being was only partly confirmed. Subjective online success, however, robustly predicted the three outcomes: joviality T_1, sadness T_1, anxiety T_1, and showed that the more SOS one had in the past one week of Tinder experience, the more jovial and less sad and anxious one felt

(see Table 4), supporting the second hypothesis.

Moreover, self-conscious social comparison had a negative association with joviality T_1 but a positive relationship with both sadness T_1 and anxiety T_1 (see Table 4), confirming the fourth hypothesis that the more one self-consciously compares oneself with other Tinder users, the lower one's well-being is. For negative online experience of Tinder use, however, only one significant association was found. Despite of this, the result showed that while Tinder users' NOEs increased, their feeling of sadness was also more likely to go up (see Table 4), which corresponds to the fifth hypothesis.

Table 4. Multiple linear regression models of the main effects – Well-being T_1 (N = 307)

Variables	Joviality T_1		Sadness T_1		Anxiety T_1	
	b (SE)	*b**	*b* (SE)	*b**	*b* (SE)	*b**
Constant	0.150		0.570		0.711	
	(0.430)		(0.563)		(0.578)	
Controls						
Age	-0.004	-0.011	0.033	0.091	0.010	0.028
	(0.013)		(0.018)		(0.018)	
Gender	-0.034	-0.016	0.155	0.070	-0.041	-0.018
	(0.088)		(0.115)		(0.118)	
Sexual identity	-0.149	-0.043	0.078	0.021	0.358	0.097†
	(0.133)		(0.174)		(0.178)	
Relationship status	0.136	0.061	0.073	0.031	-0.021	-0.009
	(0.087)		(0.115)		(0.117)	
Attractiveness	0.088	0.131†	0.035	0.050	-0.003	-0.004
	(0.035)		(0.046)		(0.047)	
Current mood	0.168	0.304†††	-0.181	-0.314†††	-0.098	-0.167†
	(0.028)		(0.037)		(0.038)	
Main predictors						
Compulsive use	0.144	0.135*	0.472	0.422***	0.400	0.353***
	(0.057)		(0.075)		(0.077)	
Subjective online success (SOS)	0.216	0.196**	-0.299	-0.260***	-0.219	-0.187*
	(0.065)		(0.085)		(0.087)	
Self-conscious social comparison	-0.156	-0.160*	0.131	0.128*	0.276	0.267***
	(0.046)		(0.060)		(0.062)	
Negative online experiences (NOEs)	-0.073	-0.070	0.167	0.153*	0.127	0.115
	(0.049)		(0.064)		(0.066)	
Other independent variables						
Motive – Entertainment	-0.052	-0.056	-0.096	-0.099	0.012	0.012
	(0.045)		(0.059)		(0.061)	
Motive – Social approval	0.107	0.138*	0.054	0.066	0.107	0.130
	(0.045)		(0.058)		(0.060)	
Motive – Sexual experience	0.068	0.099†	0.010	0.013	-0.101	-0.138†
	(0.033)		(0.044)		(0.045)	

Motive – Relationship seeking	0.074 (0.031)	0.104*	0.160 (0.041)	0.213***	0.135 (0.042)	0.177**
R2	0.618		0.403		0.390	

Note: Dummies: gender (female = 0; male = 1), sexual identity (straight = 0; LBGTQ+ = 1), relationship status (single = 0; in a relationship = 1)
Significance levels: † p< .05 †† p< .01 ††† p< .001; * FDR-corrected p-value< .05 ** FDR-corrected p-value< .01 *** FDR-corrected p-value< .001.

4.2. Tinder motives: Moderating the associations between SOS and well-being T_1 or not

As shown in Table 5, none of the moderators had a significant influence on the relationships between SOS and well-being T_1. As a result, hypotheses 5, 6, 7 and 8 were all not confirmed.

However, even though none of the motives moderated the association between SOS and well-being T_1, several Tinder motives were found to have a direct and significant relationship with well-being T_1: Motive social approval and relationship seeking both showed a positive and significant association with joviality T_1 (see Table 4). Moreover, motive relationship seeking also had a positive correlation with sadness T_1 and with anxiety T_1 (see Table 4). While the effects of motive sexual experience were not significant after the p-values were corrected for multiple testing, the results suggested that the more one uses Tinder for sexual experience, the more jovial and less anxious one might be (see Table 4).

Table 5. Multiple linear regression models of the interaction effects – Well-being T_1 (N = 307)

Variables	Joviality T_1		Sadness T_1		Anxiety T_1	
	b (SE)	*b**	*b* (SE)	*b**	*b* (SE)	*b**
Entertainment * SOS	0.015 (0.031)	0.051	-0.023 (0.041)	-0.076	-0.058 (0.042)	-0.192
Social approval * SOS	0.011 (0.025)	0.045	-0.036 (0.033)	-0.144	-0.048 (0.034)	-0.188
Sexual experience * SOS	0.014 (0.024)	0.069	0.013 (0.032)	0.059	0.010 (0.033)	0.046
Relationship seeking * SOS	0.039 (0.026)	0.186	0.001 (0.034)	0.004	-0.042 (0.035)	-0.184

Note: Each of the interaction effect above was tested in a separate model. In addition to the interaction term, each of the model consisted of the control variables, the four main predictors, and the four motives (centered).
Significance levels: † p< .05 †† p< .01 ††† p< .001; * FDR-corrected p-value< .05 ** FDR-corrected p-value < .01 *** FDR-corrected p-value< .001.

4.3. Subjective online success (SOS) versus objective online success (OOS)

When testing the extent to which Tinder users' OOS is related to one's well-being after the swipe activity (well-being T_2), the amount of matches weighed by the amount of

swipes weighed by duration in minute ("matches per swipe per minute") was first used as the predictor. However, such predictor for measuring objective online success in the swipe activity did not have any significant effect on well-being T_2, including joviality T_2, sadness T_2 and anxiety T_2 (see appendix B). This may suggest that the variable matches itself can be a more suitable predictor for assessing Tinder online success in the activity.

As a result, multiple linear regression models were performed to examine the associations between matches and well-being T_2 (see Table 6). As shown in table, the amount of matches had a positive association with joviality T_2, implying that the more matches one had in the swipe activity the happier one was afterwards. However, no significant effect was found between matches and sadness T_2 and anxiety T_2 (see Table 6). Comparing these results with the relationships between SOS and well-being T_1, where SOS had a significant and meaningful association with all the well-being T_1 outcomes, the last hypothesis was confirmed. A difference in association strength between is not surprising, as the correlation between SOS and matches was relatively weak (r = .34, p < 0.001). In the Table 7, confirmation of the nine hypotheses was summarized.

Table 6. Linear regression models measuring well-being T_2 using matches as a main predictor (N = 277)

Variables	Joviality T_2		Sadness T_2		Anxiety T_2	
	b (SE)	*b**	*b* (SE)	*b**	*b* (SE)	*b**
Constant	0.180		1.207		1.909	
	(0.502)		(0.658)		(0.689)††	
Controls						
Age	-0.013	-0.035	0.059	0.159†	0.045	0.118
	(0.017)		(0.023)		(0.024)	
Gender	0.148	0.063	0.057	0.025	0.035	0.015
	(0.105)		(0.137)		(0.144)	
Sexual identity	-0.469	-0.120††	0.014	0.004	0.311	0.080
	(0.177)		(0.232)		(0.243)	
Relationship status	0.387	0.156††	0.228	0.095	0.178	0.072
	(0.113)		(0.147)		(0.154)	
Attractiveness	0.120	0.160††	0.024	0.034	-0.068	-0.091
	(0.042)		(0.055)		(0.058)	
Current mood	0.296	0.485†††	-0.141	-0.239††	-0.052	-0.086
	(0.034)		(0.045)		(0.047)	
Main predictors						
Matches	0.023	0.113*	0.015	0.079	0.014	0.072
	(0.009)		(0.012)		(0.013)	
R2	0.494		0.071		0.043	

Note: Dummies: gender (female = 0; male = 1), sexual identity (straight = 0; LBGTQ+ = 1), relationship status (single = 0; in a relationship = 1). Significance levels: † p< .05 †† p< .01 ††† p< .001;

* FDR-corrected p-value< .05 ** FDR-corrected p-value < .01 *** FDR-corrected p-value< .001.

Table 7. Confirmation of the hypotheses

H #	Hypothesis	Support
H1	Tinder users' compulsive use of Tinder is negatively associated with their well-being after use	Partly
H2	Tinder users' subjective online success is positively associated with their well-being after use.	Yes
H3	Tinder users' self-conscious social comparison is negatively associated with their well-being after use.	Yes
H4	Tinder users' negative online experience is negatively associated with their well-being after use.	Yes
H5	The association between Tinder users' SOS and well-being after use is moderated by motive entertainment negatively	No
H6	The association between Tinder users' SOS and well-being after use is moderated by motive social approval positively	No
H7	The association between Tinder users' SOS and well-being after use is moderated by motive sexual experience negatively	No
H8	The association between Tinder users' SOS and well-being after use is moderated by motive relationship seeking positively.	No
H9	Subjective online success is a better predictor than objective online success for predicting Tinder users' well-being after use.	Yes

5. Discussion

This study explored and investigated Tinder users' well-being after using the app, especially the potential contributors to well-being. The findings suggest that while Tinder users who use the app compulsively may feel sadness and anxiety afterwards, they can simultaneously experience joviality. However, compulsive use' positive association with sadness and anxiety are both stronger than its relationship with joviality, implying that those users who are addicted to Tinder are still more likely to have poor well-being after using the app. Compulsive Tinder use' positive relation with joviality, yet, is still not in line with previous research on social media, which showed that addiction to SNSs is negatively related to healthy well-being (Błachnio et al., 2016; Dhir et al., 2018). An explanation could be that the relationship between compulsive Tinder use and well-being is confounded by other variables. Compulsive use goes along with longer use of tinder, which increases the chances for positive experiences on Tinder. Perhaps it would be necessary to control for tinder use frequency separately from compulsive use in the future.

Secondly, the results demonstrated that the higher a Tinder user's SOS is, the better his/her well-being status may be, implying that feeling successful on Tinder can function similar to positive feedback on social media (Bäck et al., 2018; Clark, Algoe, & Green, 2018). While NOEs on Tinder, surprisingly, did not show as much negative affect as expected, self-conscious social comparison on Tinder did.

Social comparison theory has been well established and adopted in studying many scientific fields, including social media, but not yet to mobile dating. A reason could be that seeing other users' success can be difficult in such context. However, given what our findings suggest – the more a Tinder user self-consciously compares himself/herself on Tinder with other Tinder users, the worse his or her well-being may be – social comparison theory may also be applicable in the mobile dating context, as comparison may also happen without having a concrete object (e.g. the amount of matches other users have). This result might demonstrate that even without witnessing other people's success, one can still self-consciously compare oneself with other people, which is an important finding and contributes to the existing understanding of social comparison theory. Previous studies examining social comparison often focus only on the degree one compare oneself with some visible qualities of other people (e.g., Lee, 2014; Young et al., 2017), instead of what one self-consciously believes or "imagines". This finding thus argues that there is a possibility of self-conscious social comparison, which can also have a negative impact on well-being. It also supports the qualitative study by Hobbs et al. (2017), in which participants reported having compared themselves with other users even if they did not see the others' success.

Despite that all the four Tinder motives used in this study (entertainment, social approval, sexual experience and relationship seeking) did not have significant interaction effect on the relationship between Tinder users' SOS and well-being after using Tinder, many of them showed an association with Tinder users' well-being after use by themselves. Using Tinder for social approval lead to better well-being after use, independent from one's SOS and attractiveness. This finding is intriguing and requires future investigation. Moreover, the results suggest that for those who use Tinder for sexual experience, their well-being state might improve afterwards (increase in joviality and decrease in anxiety). Tinder users who use the app to find a relationship, however, may be subjected to poorer well-being. Although their feeling of joviality can increase after use, it may not be enough to compensate feeling more blue and worried. No matter whether one feels successful or not, when one uses Tinder for relationship seeking, his/her well-being is impacted more negatively than positively. This suggests that Tinder might not be ideal to use for those who look for a romantic partner.

If we agree that the extent to which Tinder users feel good after using the app can serve as an indication of whether or not more needs are constructed, the current study enriches the understanding of how the U&G theory may work regarding Tinder use by shedding lights on which motives improve well-being. Among the four motives, Tinder users using the app to seek relationship are more likely to delete Tinder, as using the app may have them feel hurt and downhearted, possibly implying that their needs are not satisfied, which prohibits continuous needs. Nevertheless, for those who use Tinder for pass time/entertainment, social approval, sexual experience, their well-being status is likely to either remain the same or enhance. Those users are thus more likely to continue using Tinder. These findings are also in line with previous suggestion that motives of using online communication/media can have influences on one's well-being status (Shen & Williams, 2011; Young et al., 2017).

Since matches (as the measurement for OOS) did not yield as robust result as SOS did, SOS may be a better measurement for one's online success in Tinder. Moreover, the fact that the variable matches was a better predictor for joviality T_2 than the originally-planned variable "matches per swipe per minute" may suggest that matches bring jovial mood to Tinder users no matter how many profiles one swipes per minute. For example, three matches might make a Tinder user happy no matter whether he/she swiped for three or ten profiles. Another explanation may be that the variable "matches per swipe per minute" is similar to one's objective attractiveness and that one's perceived attractiveness was controlled for in the regression models already, making the independent effects of this variable insignificant.

Theoretically this study provides more insights into social comparison theory and the U&G framework. Additionally, it also shows that mobile dating apps may share many similarities with that of SNSs, especially in terms of their relationship with the users' well-being after use and how the well-being can be impacted (i.e. using compulsively, feeling unsuccessful, comparing oneself with the others). Given the growing amount of emerging adults who use Tinder (Smith, 2016), it is important to address the psychological impact online Tinder use may have. Moreover, since long-term poor well-being can lead to mental disorders such as clinical depression and anxiety (Huppert, 2009), it is meaningful for the present study to have discovered potential factors that may contribute to Tinder users' negative well-being. Regarding practical implications, while Tinder users cannot control their SOS, it is advised that they should try to reduce the degree of compulsive Tinder use and self-conscious social comparison on Tinder to have their well-being balanced or improved.

Furthermore, Tinder users who use the app for relationship seeking shall be aware that they are at higher risk of adverse consequences.

Limitations of the current study are the observational, cross-sectional and the self-reported nature of the data. Therefore causal interpretations of the associations are limited and some of the participants might have had recall bias toward whatever is more socially desirable. Nevertheless, self-report survey-based measures conducted online can generally still yield good results (Weigold, Weigold, & Russell, 2013). In addition, whether or not the participants have a premium account (accounting for approximately 7% of the users; Iqbal, 2019) was not examined, which may affect their compulsive use and success. Moreover, only online Tinder use was examined in this study. NOEs surprisingly did not show as strong influence as expected, which may be related to the reliability of this self-created scale. As the Cronbach's alpha of this scale was .68 (see Table 1), the scale may need some more adjustments. Finally, since SOS and OOS's relationship with well-being were compared using two well-being time points (not the same outcome), the comparison might be less straightforward. However, the result that SOS is a better predictor than OOS can still be valid, as the predictor and outcome were from the same time point (i.e., SOS from T_1 and well-being T_1, OOS from T_2 and well-being T_2).

As one of the first study examining the relationships between online Tinder use and well-being, replication of the study is necessary. To demonstrate the causality of the relationships, longitudinal research (e.g., experience sampling) can be a good approach. Future researchers might also want to take the other limitations into account and conduct studies accordingly. Additionally, qualitative research might need to be conduct to understand why using Tinder for social approval has a positive association with well-being. Since only four Tinder motives were tested in this study, investigating the other motives' relationship with well-being may benefit Tinder users even more. To understand if increase in Tinder users' well-being really contributes to increased need, it is also important to test the association between Tinder users' well-being and their continuous use, and to discover if there is any mediation effect between Tinder users' motive, well-being, and continuous use. After demonstrating that mobile dating can have associations with the users' well-being, future researchers might want to compare these with that of offline dating. This is in line with the suggestion by Finkel et al. (2012), who studied if computer-mediated communication in the dating context is really advantageous for human beings.

Despite these limitations, the present study shows that online Tinder use is indeed associated with the users' well-being after use, which users should be conscious about. While

having subjective online success may improve one's mental health, one's compulsive Tinder use, self-conscious social comparison and negative online experiences may all bring about negative mental consequences. On the one hand, using Tinder for motives social approval and sexual experiences was associated with more well-being after Tinder use. On the other hand, those who use it for relationship seeking need to be more aware of the downside of such motive, as it might make them feel blue after using Tinder.

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Appendix A. Survey questions

Consent form before entering the survey		
First, you will be asked some questions regarding your demographic background and perceived attractiveness. Secondly, you will answer some questions about your Tinder use and well-being. Afterwards, you will participate in a short swipe activity on Tinder. Finally, you will fill in some questions regarding your Tinder use and well-being for the swiping activity.		
Concepts	Questions	Literatures
Demographics	What is your gender? In which years were you born? What is your sexual identity? Which of the following best describe your ethnicity? What is your education level (the highest form of education for which you have obtained a degree)? What is your relationship status? I consider myself… Since you first started using Tinder, how many times have you purposefully deleted and/or de-activated Tinder for more than one week? In the past one week, how often have you seen interesting profiles on Tinder?	
Compulsive Tinder use	Please answer the following questions based on a scale of 1 (= never) to 5 (= always). Please answer them based on your Tinder use in the past one week.	Dhir et al. (2018)
	In the past one week, to what extent have you…	
	felt an urge to use Tinder more and more? used Tinder in order to forget about personal problems? become restless or troubled if you have been prohibited from using Tinder? spent a lot of time thinking about Tinder or planned use of Tinder?	
Subjective online success (SOS)	Please indicate the extent to which you agree or disagree with the following statements using a scale of 1 (= strongly disagree) to 5 (= strongly agree). Please answer them based on your Tinder use and experience of the past one week.	Scale designed by myself
	In the past one week…	
	I have thought that I have many matches on Tinder I have thought that I receive many conversations initiated by other users on Tinder I have thought that I have many continuous conversations (that people you chat with respond to you when you write him/her) on Tinder I have considered myself being successful on Tinder	
Negative online experience (NOEs)	Please indicate the extent to which you agree or disagree with the following statements using a scale of 1 (= strongly disagree) to 5 (= strongly agree). Please answer them based on your Tinder use and experience of the past one week.	Scale designed by myself

	In the past one week, I have been often ghosted on Tinder. (Being ghosted: Someone deleted you after having matched with you without notifying you.) In the past one week, I have often received unwanted messages on Tinder (including harassment, unwanted sexually explicit messages, etc.) In the past one week, I have often had other negative online Tinder experiences that are not mentioned above In the past one week, I have thought that my Tinder experience online is often positive	
Self-conscious social comparison	Please indicate the extent to which you agree or disagree with the following statements using a scale of 1 (= strongly disagree) to 5 (= strongly agree). Please answer them based on your Tinder use and experience of the past one week.	Scale designed by myself
	In the past one week, I have thought that most Tinder users have more matches than me In the past one week, I have thought that most Tinder users have more conversations initiated by other users than me In the past one week, I have thought that most Tinder users have more continuous conversations (that people you chat with respond to you when you write him/her) than me	
Tinder motives	Please indicate the extent to which you agree or disagree with the following statements on a scale of 1 (= strongly disagree) to 7 (= strongly agree). Please answer them based on your Tinder use of the past one week.	Timmerman & De Caluwė (2017a)
	In the past one week, I have used Tinder…	
	To pass time To relax To get an "ego-boost" To fall in love To increase my sexual experience To occupy my time To find a friend-with-benefits/fuckbuddy To live out a sexual fantasy To get self-validation from others To meet a future husband or wife To see how desirable I am For fun Because it is entertaining To find a lover/mistress To be able to estimate my own attractiveness To find a one-night-stand Because it passes time when I'm bored To seek out someone to date When I have nothing to do To see how easy it is to find a sex partner	

	To get compliments To build an emotional connection with someone To get attention To find someone for a serious relationship	
Well-being time 1	Please indicate the extent to which you have felt the following ways in the past one week after you used Tinder based on a scale of 1 (= very slightly or not at all) to 5 (= extremely). Please answer them based on your Tinder experience of the past one week.	Watson & Clark (1999)
	In the past one week, after using Tinder I have felt…	
	happy blue excited cheerful sad delighted lonely downhearted joyful lively energetic alone enthusiastic	
	Please indicate the extent to which you have felt the following statements in the past one week after you used Tinder based on a scale of 1 (= never) to 5 (= always). Please answer them based on your Tinder experience of the past one week.	Dhir et al. (2018)
	In the past one week, after using Tinder…	
	I have worried about what others say about me I have worried that others don't like me I have been afraid that others will not like me I have been worried what others think of me I have felt that others make fun of me	
Sentiment of Tinder experience	Please use one sentence or a few sentences that best describe your Tinder experience of the past one week	
Current mood	Before starting the swiping activity, please indicate the extent to which you are happy or unhappy now based on a 10-points scale	
Swipe activity, including matches and swipes	Now, please open your Tinder app. Please indicate how many matches you have when you open it. Note: You can only fill in number(s).	Similar to that of Courtois & Timmermans (2018)

	Please start to swipe for 3 minutes on Tinder. You are asked to swipe naturally, like how you normally did in the past one week. While you are swiping, please also calculate and note down how many profiles you swipe right and how many matches you have in the 3 minutes. After you have actively swiped for 3 minutes on Tinder, you may continue the survey. Please note: You can only continue the survey if you have actively swipe for 3 minutes.	
	Please indicate how many profiles you have swiped right in the 3 minutes swipe activity. Note: You can only fill in number(s). Please indicate how many matches do you have in the 3 minutes swipe activity. Note: You can only fill in number(s).	
Well-being time 2	Please indicate the extent to which you have felt the following ways after the 3 minutes Tinder swipe activity based on a scale of 1 (= very slightly or not at all) to 5 (= extremely). Please answer them based on your Tinder experience of the 3 minutes swipe activity.	Watson & Clark (1999)
	After the 3 minutes swipe activity on Tinder, I feel...	
	happy blue excited cheerful sad delighted lonely downhearted joyful lively energetic alone enthusiastic	
	Please indicate the extent to which you have felt the following statements during and/or after the 3 minutes Tinder swipe activity based on a scale of 1 (= never) to 5 (= always). Please answer them based on your Tinder experience of the 3 minutes swipe activity.	Dhir et al. (2018)
	After the 3 minutes swipe activity on Tinder, ...	
	I have worried about what others say about me I have worried that others don't like me I have been afraid that others will not like me I have been worried what others think of me I have felt that others make fun of me	

Thank you very much again for your time and participation!

If you have any questions about this study, encounter any uncomfortable feelings, or want to know the results of this study, please contact me at 410816yh@student.eur.nl

On the next screen you will receive a code which you can copy and paste in Mechanical Turk to confirm that you have completed the questionnaire.

If you have any further questions or comments about this study, please type them in the box below.

Appendix B: Predictor well-being T_2 using "matches per swipe per minute" as a main predictor

Table 1 of Appendix B. Linear regression models of the main effects – Measuring well-being T_2 using "matches per swipe per minute" as a main predictor (N = 275)

Variables	Joviality T_2		Sadness T_2		Anxiety T_2	
	b (SE)	*b**	*b* (SE)	*b**	*b* (SE)	*b**
Constant	0.279		1.319		1.974	
	(0.509)		(0.666)†		(0.694)††	
Controls						
Age	-0.017	-0.043	0.056	0.151†	0.043	0.113
	(0.017)		(0.023)		(0.024)	
Gender	0.113	0.049	0.040	0.018	0.034	0.014
	(0.106)		(0.138)		(0.144)	
Sexual identity	-0.424	-0.108†	0.035	0.009	0.386	0.098
	(0.180)		(0.236)		(0.246)	
Relationship status	0.402	0.163†††	0.236	0.098	0.176	0.071
	(0.114)		(0.149)		(0.156)	
Attractiveness	0.127	0.171††	0.024	0.033	-0.067	-0.090
	(0.043)		(0.056)		(0.058)	
Current mood	0.297	0.490†††	-0.143	-0.242††	-0.059	-0.097
	(0.035)		(0.045)		(0.047)	
Main predictors						
Matches / swipes / duration	0.606	0.046	0.775	0.060	1.109	0.083
	(0.648)		(0.846)		(0.883)	
R2	0.482		0.072		0.049	

Note: Dummies: gender (female = 0; male = 1), sexual identity (straight = 0; LBGTQ+ = 1), relationship status (single = 0; in a relationship = 1)
Significance levels: † p< .05 †† p< .01 ††† p< .001.