The Relationship Between Preference for Online Social Interaction and Affective Well-Being via Compulsive Dating App Use: The Moderating Role of Algorithmic Beliefs

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Abstract

This study examined whether preference for online social interaction (POSI) was related to poorer affective well-being via compulsive dating app use and whether algorithmic beliefs attenuated the negative association between compulsive use and affective well-being. An online survey among Chinese dating app users (N = 361) was conducted. The sample included participants aged 18–60, with the majority (89.47%) falling within the 18–35 age range (M = 29.19, SD = 6.02). Women comprised a slightly larger proportion (56.2%) of the sample than men (43.8%). Results of the survey revealed that POSI was positively associated with compulsive use, which was positively related to post-dating app joviality. Furthermore, the relationship between algorithmic beliefs and post-dating app sadness was only significant among individuals with a low level of algorithm beliefs. The findings extended prior research on social network sites to dating apps and demonstrated the potential positive relationship between technology use and transient emotional states. Furthermore, our results suggest that algorithmic beliefs, which essentially reflect human-technology relations, may affect interpersonal communication outcomes on dating apps.

Keywords: online dating; problematic smartphone use; social media addiction; AI; well-being; emotion

Editorial Record

Introduction

Dating apps are mobile applications that allow individuals to connect with strangers via profile-based mate-selection processes (Chan, 2018). They have become widely accepted as virtual matchmakers across the world (Rosenfeld et al., 2019). While western users seek romantic encounters on various dating apps, such as Tinder, Hinge, and Grindr (Statista, 2022a; Tiffany, 2019; Timmermans & De Caluwé, 2017), sixty million Chinese users are also enjoying the convenience brought by dating apps, such as Tantan, Momo, and Blued (Statista, 2022b, 2022c). Though dating apps can be useful tools for relationship initiation (e.g., Chan, 2018; Hobbs et al., 2017), recent studies (Her & Timmermans, 2021; Thomas et al., 2023) indicated that using dating apps may take a toll on individuals' affective well-being—the frequency and intensity with which one experiences positive and negative affects (Luhmann et al., 2012). More research is needed to understand the underlying mechanisms (Toma, 2022).

The social skill model (Caplan, 2005; Coduto et al., 2020) suggests that the social affordances of Internet-based networking technologies tend to nurture a preference for online social interactions (POSI) versus offline, which makes individual susceptible to compulsive uses of these technologies. Dating apps, as a typical type of networking technology, provide easier access to communicating with potential dates through location-based recommendations (Chan, 2018; Hobbs et al., 2017). They also facilitate quicker, less effortful intimacy-building processes with text-based chat windows (Chan, 2018; Hobbs et al., 2017). Thus, dating apps can offer greater individual control over relationship development processes while lowering relevant barriers and costs. These social benefits may encourage unregulated, excessive, compulsive uses of dating apps (Coduto et al., 2020), which can decrease affective well-being via negative social experiences (Wolfers & Schneider, 2021).

However, the negative association between compulsive use and well-being was not always confirmed in the extant literature (Her & Timmermans, 2021; Valkenburg, 2022; Wolf & Schneider, 2022), which suggests the existence of moderators for this relationship. We posit that individuals' beliefs in the efficacy of dating app algorithms in finding their compatible partners (Sharabi, 2021) can play an important role in shaping their dating app experience. Algorithmic beliefs can lead to more positive interpretations of negative dating app experiences, potentially mitigating the experiences' adverse effects (Lazarus, 2006). These beliefs may also motivate individuals to craft more positive interpersonal messages when using dating apps, thereby enhancing their chances of having successful initial interaction (Sharabi, 2021). Thus, the negative association between compulsive dating app use and affective well-being may be attenuated by algorithmic beliefs.

This study examined the relationship between POSI and affective well-being via compulsive dating app use and the moderating effect of algorithmic beliefs on this relationship. This study is among the few studies (Hu, 2023; Hu & Wang, 2023; Sharabi, 2021) that quantitatively tested the effect of algorithm perception in online dating contexts. The findings may provide a novel perspective to understand computer-mediated communication (CMC) outcomes, which centers on user understanding of algorithms. Additionally, we extended prior research that tends to focus on one dating app (e.g., Tinder: Her & Timmermans, 2021) by testing the proposed relationships within the general context of dating apps to increase the external validity of previous findings.

Technological Affordances of Dating Apps and POSI

Preference for online social interaction (POSI) describes one's tendency to feel more comfortable and confident when communicating online than face-to-face (Caplan, 2005). According to the social skill model (Caplan, 2005), people who often experience interpersonal challenges offline tend to develop POSI because they tend to believe that they have more control over online interactions. This preference of online interactions over offline is closely related to the technological affordances of Internet-based technologies.

Traditionally, a common way to meet new dates is through family, friends, and colleagues or connect with strangers in casual social occasions (Rosenfeld et al., 2019). However, in addition to being time consuming and inefficient (Giddens, 1992; Hobbs et al., 2017), seeking romantic relationships offline can be challenging for people who tend to find difficulties mobilizing offline networking resources (e.g., newcomers who lack offline connections with local communities). By contrast, dating apps allow individuals to access communication with fewer constraints of time and space due to the affordance of accessibility (Fox & McEwan, 2017). On dating apps, individuals often go through quick, repeated relationship initiation and development processes with people, typically through swiping profile cards, matching/scanning via profile grids, and finally selecting users for interactions (Chan, 2018; Tong et al., 2016). After a brief conversation, they can decide whether to continue with more in-depth interactions or return to the selection processes again (Chan, 2018; Tong et al., 2016). Thus, with simple operations, dating app users can engage in communication with multiple people who share similar needs (Hobbs et al., 2017).

In addition, dating apps make intimacy building easier. Traditionally, relationship development through face-to-face communication involves real-time processing of verbal and nonverbal information about the other person, which makes impression management challenging. The asynchronous, text-based characteristics of mediated communication on dating apps tend to give users more conversational control. Text-based communication decreases the number of available social cues about themselves. Thus, individuals can find it easier to strategically present themselves by manipulating the social cues sent out to the other person (Walther, 1996). The asynchronicity of communication further allows individuals more time for message construction and enables them to only present the best of themselves. Consequently, individuals may find it easier to control impression formation and relationship development processes on dating apps (Ramirez et al., 2015; Walther, 1996).

Taken together, compared to offline-based methods, dating apps increase personal control over relationship initiation and development processes while lowering the costs and barriers. Because of the benefits, individuals—especially those that tend to encounter challenges in offline communication—can develop a preference for online social interaction after using dating apps (Caplan, 2005; Coduto et al., 2020).

POSI, Compulsive Use, and Well-Being

Past research (e.g., Caplan, 2005) has indicated that POSI is associated with more *compulsive technology use* (i.e., unregulated, excessive uses of technology; Dhir et al., 2018). The compulsive uses of technologies may further undermine one's well-being. For example, studies showed that compulsive social media use was associated with burnout, social comparison, and decreased offline social activities with close ties (Chou & Edge, 2012; Dhir et al., 2018; Kim et al., 2009; Thomas et al., 2023). In turn, they predicted worse well-being (Chou & Edge, 2012; Dhir et al., 2018; Wolfers & Schneider, 2021).

Similarly, for dating app users, POSI may also lead to compulsive use, which may increase negative social experiences. First, one distinctive characteristic of dating apps is that they allow users to connect and disconnect with many other users in a short period of time. These short and swift interactions can increase the chance of being rejected and feeling denied, which may decrease the joy of making connections and cause frustration and sadness (Andrighetto et al., 2019; Courtois & Timmermans, 2018; Heino et al., 2010; van der Veen et al., 2019).

In addition, compulsive use of dating apps may lead to self-deprecation through increased chances of social comparisons (i.e., evaluating one's self-worth or relative standing against others; Wood, 1996). Dating apps provide abundant "value cues" that indicate users' worth as dating partners. These cues include the number of followers, one's posts and how others respond to these posts, and personal information and photos. These cues indicate the extent to which one is popular and competitive on the dating market. By reminding users of how other users perform, these dating value cues make social comparisons, especially upward social comparisons, more accessible because the attention of users tends to be directed to the attractive candidates (Thomas et al., 2023). Obviously, compulsive dating app use provides more opportunities for upward social comparisons (Thomas et al., 2023). Prior research found that compulsive dating app use was related to more appearance comparisons (Strubel & Petrie, 2017), self-conscious upward social comparison (Her & Timmermans, 2021; Thomas et al., 2023) and lower self-esteem (Sumter et al., 2017). Thus, individuals that engage in compulsive use of dating apps are more likely to experience upward comparisons, which can ultimately underestimate their value, causing a lowered level of affective well-being.

These two mechanisms—increased rejection and upward comparison intensity—are closely related to affective well-being. Affective well-being is the intensity and frequency of experiencing positive and negative feelings and moods (Luhmann et al., 2012). A good affective well-being can be indicated by the presence of positive and absence of negative affects (Luhmann et al., 2012). A recent systematic review found that while quantitative examinations of the effects of online dating on well-being are limited and tend to focus on long-term oriented outcomes such as life satisfaction or loneliness (e.g., Cao & Smith, 2021; Obarska et al., 2020; Zervoulis et al., 2020), we know even less about the impact of dating apps on relatively short-term affective well-being (Toma, 2022). Investigations on affective well-being can contribute to our knowledge about immediate emotional responses to dating app use and offer a more comprehensive understanding of dating apps' impacts on well-being.

In addition, we investigated affective well-being multi-dimensionally as a response to calls from previous research (Her & Timmermans, 2021; Kern et al., 2015). Though positive and negative affects are by literal meaning opposite, neither of them is an indicator of the other (Wason & Clark, 1999). For example, lack of sadness does not always mean happiness (Rafaeli & Revelle, 2006). Thus, mixing them up in one composite measurement can be problematic. Following Her and Timmermans (2021), we used two of the most common positive/negative affects in the PANAS X (Wason & Clark, 1999), joviality and sadness, to indicate affective well-being. Whereas joviality tend to be a positive indicator of affective well-being, sadness can inversely indicate affective well-being. Similar to Her and Timmermans (2021), we approached our understanding of affects by first investigating individuals' *immediate* affects after using dating apps. Because compulsive use may induce rejection (Pronk & Denissen, 2020) and social comparisons (Her & Timmermans, 2021), we predicted that compulsive use would be associated with less post-dating app joviality and more post-dating app sadness. Taken together, we proposed that:

H1: POSI is related to more compulsive dating app use.

H2: Compulsive dating app use is related to poorer affective well-being, indicated by (a) less joviality and (b) more sadness.

Algorithmic Beliefs and Expectation Effect

Although we expected negative consequences of compulsive dating app use, research sometimes did not identify a negative relationship between social platform use and psychological well-being (Her & Timmermans, 2021; Valkenburg, 2022). This suggests that there might be moderators on the path from compulsive use to well-being.

Given the salience of algorithms in shaping dating app experience (Courtois & Timmermans, 2018), we focused subsequent elaborations on dating algorithms. Dating apps adopt different kinds of algorithms to recommend users or user-related content to the person who uses dating apps. For example, matching algorithms work on optimizing the odds of finding stable matches (Sharabi, 2022); collaborative filtering algorithms work on optimizing the odds of users liking the content by pushing content that similar users like (Pardes, 2019). With "algorithmic love-seeking" becoming a popular metaphor in online dating culture, individuals may develop their own beliefs about how dating algorithms work (Hu, 2023; Hu & Wang, 2023; Huang et al., 2022; Sharabi, 2022). For example, in Huang et al. (2022), online dating users compare online dating to hide-and-seek, which means that they believe they can find good dates through proper search; Users who compare online dating to "bingo"—a word used to express satisfaction with or surprise of a sudden positive outcome by Huang and colleagues—think that the process is rather random and that we can only hope for magic to appear.

These layperson beliefs can generate *expectations effects*. Expectation effects have long been observed in educational psychology. For example, offering positive expectations to students can boost their self-efficacy and motivate them to work hard to become what they are expected of (Rosenthal, 1994). Relationship scholars also found that beliefs about relationships can shape relationship prospect. For example, Maxwell et al. (2017) found sexual growth beliefs promoted relationship satisfaction by encouraging relational work and reducing disagreements. The finding suggested that positive interpersonal expectations can be turned into favorable social reality by guiding individuals to look for signs that conform with their expectations and construct social reality accordingly.

Synergizing psychological literature on human belief systems (e.g., Maxwell et al., 2017; Price et al., 2008; Rosenthal, 1994), Sharabi (2021) identified an expectation effect of positive beliefs in online dating. Sharabi further conceptualized the potential cause of the effects—beliefs about the efficacy of the algorithmic online dating process in finding them ideal partners—as *algorithmic beliefs*. When individuals have strong algorithmic beliefs, they believe that they will eventually meet the ideal partner with the help of algorithms. When people have weak algorithmic beliefs, they doubt the feasibility of relying on machines and math formulas to seek compatible partners.

Algorithmic beliefs may buffer the negative impact of compulsive dating app use on affective well-being. It is likely that algorithmic beliefs prompt individuals to dismiss rejections as a sign of their low attractiveness—for example, they may be more focused on continuing finding "the one" instead of dwelling on the questioning of their attractiveness—which can limit the adverse impact of negative experiences on their feelings (Lazarus, 2006). In addition, algorithmic beliefs may affect how individuals interact. Stronger algorithmic beliefs indicate a higher level of perceived compatibility, which can increase individuals' liking of a mathematically selected user (Sharabi, 2022; Tong et al., 2016). Individuals may express their liking through messages, which may in turn prompt their contacts to send positive feedback (Walther, 1996). Eventually, the positive imaginaries help construct social reality in a desirable direction, which can give individual a more positive communication experience. These speculations received some empirical support. For example, using a longitudinal design, Sharabi (2021) found that online dating users with stronger algorithmic beliefs reported deeper self-disclosure and lower uncertainty on dating apps. In addition, they reported more successful first dates, indicated by higher levels of social attraction and anticipated future interaction (Sharabi, 2021). Taken together, we proposed:

H3a: The negative relationship between compulsive dating app use and joviality will be weaker among individuals with a high level of algorithmic beliefs than among individuals with a low level of algorithmic beliefs.

H3b: The positive relationship between compulsive dating app use and sadness will be weaker among individuals with a high level of algorithmic beliefs than among individuals with a low level of algorithmic beliefs.

To control for the effects of potential confounders, we followed previous research to include demographics, social skills, anxiety attachment, and current mood in our models. First, previous dating app studies (e.g., Hughes et al., 2020; Sawyer et al., 2020; Scott, 2020) suggested that different groups of demographics (e.g., age, gender) and sexual orientation tend to have different online dating preferences, motivations, and usage patterns. Therefore, we included the aforementioned variables as control variables. In addition, Timmermans et al. (2018) also showed that relationship status can affect online dating preferences and usage. Thus, we also included relationship status as control variables. Moreover, social dispositions such as social skills and anxiety attachment tend to lead individuals to approach dating apps in different ways (Coduto et al., 2020; Timmermans & Alexopoulos, 2020). As such, social skills and anxiety attachment were included as control variables. Furthermore, we controlled the effect of education because it may influence the perceptions, attitudes, and behaviors of algorithmic technologies (Gran et al., 2021). Finally, to prevent the participants' mood at the time of survey to influence their self-reports of affective well-being, we followed Her and Timmermans (2021) to control the effect of current mood.

Methods

Recruitment

We conducted an online survey among Chinese dating app users who had used dating apps in the past month in mid-March 2022. We administered our questionnaire on *credamo.com*, a Chinese online survey and experiment platform with three million users in its pool. Many Chinese researchers have endorsed the platform for social survey and experiments (e.g., Hu, 2023). Asking every user in their pool to verify their identity when they register, the platform ensures that there is a human participant behind every IP to complete the questionnaire rather than a bot. To participate in this study, participants should be at least 18 years old and used Chinese dating apps in the past month. Cases with missing data were automatically rejected by Credamo. 381 complete responses were obtained.

This research was approved by the first author's research institute before data collection. It closely followed the ethical guidelines of the *Declaration of Helsinki* (World Medical Association, 2022). Before starting the survey, all informants were informed of the purpose, methods, and significance of this study, data anonymization and confidentiality, and one researcher's identity information with which they could reach us. Only adults who gave their informed consent could participate in this survey. No potentially harmful questions (e.g., asking for feelings about identity-related attacks) were asked (Appendix). In addition, participants were also reminded that they could terminate their participation at any point without any penalty if they feel uncomfortable answering the questions. At the end of the survey, informants were thanked and offered three RMB (approximately 43 U.S. cents) for compensation. The data were anonymous and kept confidential on an encrypted hard drive and a cloud drive, which can only be accessed by the authors.

Dating Apps in the Present Study

The present study focuses on three dating apps that are widely used in China, namely Tantan, Soul, and Momo. These dating apps explicitly claimed that they incorporate various selection algorithms (e.g., matching, filtering) to help users find compatible dates (Tantan: Liu, 2018; Soul: Lew, 2021; Momo: Fade the Market, 2021). Similar to Tinder, Tantan features swiping user profile cards and matching. Soul also features matching but gives users more power to choose the way they like to connect with other users. For instance, they can (a) explore personalized recommendations of people nearby and talk to the ones they select or (b) explore personalized user-generated content feed and talk to the contributor of the content. Momo is also a mixture of different algorithmic features. It used to feature the people-nearby grid design but has incorporated more matching design since the latter has become more popular in recent years.

Sample Profile

Demographics

After data cleaning and ensuring the eligibility of the respondents (see below), the final sample size was 361. Over half of the sample were women (56.2%) and the rest were men (43.8%). The participants aged between 18–60 but

most of them (89.47%) were aged between 18–35 (*M* = 29.19, *SD* = 6.02), which resembles the age distribution among users of Chinese mainstream dating apps (e.g., the majority are aged between 18 and 42; Tantan: Statista, 2022b, 2022c). Ninety percent of the participants were heterosexual and the rest of them were non-heterosexual. Most participants held a college degree or above (95.9%). For monthly family income, 9.4% were below 5,000 RMB, 33.2% were between 5,001–10,000 RMB, 42.7% were between 10,001–20,000 RMB, and 14.7% were above 20,001 RMB. For sexual orientation, 90.0% of the sample were heterosexual and 9.5% were non-heterosexual. For relationship status, 53.5% were in a monogamy relationship and 46.5% were not.

Usage of Dating Apps

When asked about their motivations to use dating apps, 91.9% of the participants somewhat agreed or strongly agreed they used dating apps for socializing; 39.4% somewhat agreed or strongly agreed they used dating apps to seek a serious relationship; 14.7% somewhat agreed or strongly agreed they used dating apps for sexual experience[1]. We included both because people can use dating apps for various purposes, following Timmermans and De Caluwé (2017) as well as Sharabi et al. (2021).[2]

We also asked participants about their usage of the three aforementioned, most popular dating apps in China. There was also an "other" option which allowed users to indicate the other dating apps not listed.

For at least once a week, 73% of the participants used Tantan, 82.7% used Soul, 77.2% used Momo, and 46.7% also used "other dating apps". Perhaps because of Tantan, Soul, and Momo's explicit claims or/and displays of their algorithmic features, almost all the participants (94.8%) reported that their most frequently used dating app "employed some algorithms to recommend other users to them". However, still a few participants reported either the app had not used any algorithms (1.6%) or that they did not know (3.7%). Following Sharabi's (2021) practice, their responses (*n* = 20) were removed from subsequent analyses because this study focused on algorithmic beliefs. The final size of the sample for analysis is 361.

Measurement

We asked our participants to answer questions regarding POSI, algorithmic beliefs, compulsive dating app use, and affective well-being based on the specific dating app they had been using most frequently in the past month.

POSI was measured using three items from Caplan's (2005) POSI Scale. They were rephrased to fit in the dating app context (1 = *totally disagree*, 7 = *totally agree*; *M* = 5.69, *SD* = 1.12, α = .86). We asked participants about their preference for online interactions over offline interactions (e.g., *I prefer communicating with other people on the dating app rather than face-to-face*).

Compulsive dating app use was measured using four items from Dhir et al.'s (2018) Compulsive Use Scale, which were reworded to fit in the dating app context (1 = *not true at all*, 7 = *totally true*; *M* = 5.41, *SD* = 1.08, α = .84). We asked participants to assess the extent to which they had felt it difficult to control their usage of dating apps in the past month (e.g., *In the past month, to what extent have you felt an urge to use the dating app more and more*).

Joviality was measured with four items from PANAS-X (an expanded version of PANAS: Watson & Clark, 1994; 1 = *never*, 5 = *always*). We asked participants how they had felt after using dating apps in the past month (e.g., *After using the dating app, I have felt delighted*; *M* = 4.08, *SD* = 0.59, α = .77).

Sadness was measured using four items from PANAS-X (an expanded version of PANAS: Watson & Clark, 1994; 1 = *never*, 5 = *always*). We asked participants how they had felt after using dating apps in the past month (e.g., *After using the dating app, I have felt blue*; *M* = 1.58, *SD* = 0.42; α =. 60). Although the Cronbach's α value of sadness measure did not reach .7, it is acceptable according to Pallant's (2001) standard based on Nunnally and Bernstein (1994) that above .6 is an index of reliability and acceptability.

Algorithmic beliefs were measured using seven items from Sharabi's (2021) Algorithm Beliefs Scale, which were rephrased to fit in the dating app context (1 = *totally disagree*, 7 = *totally agree*; *M* = 5.81, *SD* = 0.68, α = .84). We asked participants how much they think dating app algorithms could bring them more satisfying communication partners than other means (e.g., *Dating app algorithms lead to more successful relationships*).

Control Variables. The measures for the control variables were adapted from previous literature. Following Caplan (2005) and Oldmeadow et al. (2013), social skills were measured using eight items asking about self-presentation skills from the Social Skill Inventory by Riggio (1989). Items include *I'm often chosen to the leader of a group* (1 = *not*

true at all, 7 = *totally true*; *M* = 5.39, *SD* = 1.25, α = .94). Anxiety attachment was measured using items from the short form of the Experiences in Close Relationship Scale (ECR) by Wei et al. (2007). Items include *I need a lot of reassurance that I'm loved by my partner* (1 = *not true at all*, 7 = *totally true*; *M* = 3.51, *SD* = 1.46, α = .90). Current mood was measured by asking the participants *How are you feeling right now?* (1 = *very unhappy*, 7 = *very happy*; *M* = 5.75, *SD* = 0.89; Her & Timmermans, 2021). Age (*M* = 29.19, *SD* = 6.02), gender (0 = *men*, 1 = *women*), sexual orientation (0 = *heterosexual*, 1 = *non-heterosexual*), and relationship status (0 = *in a monogamous relationship*, 1 = *not in a monogamous relationship)* were also controlled. For a comprehensive list of the items used, please refer to the Appendix.

The Reliability and Validity of the Measures

To test the reliability and validity of the measures, we ran a confirmatory factor analysis (Levine et al., 2006) on all the non-single-term measures (10 constructs and 41 items in total), including the measures for the variables specified in the hypotheses and control variables. Results showed the measurement model had an acceptable fit, $\chi^2(774) = 1,534.125$, $p < .001$, CFI = .91, IFI = .91, NNFI = .90. RMSEA = .052. The loadings of items for each measure either exceeded or could be round up to .70, except that algorithmic beliefs had two items at .60 and the four items for sadness ranged between .45 and .63. The composite reliability of all measures were over .70 or could be round up to .70, which suggests good reliability. The only exception was the reliability of sadness (.58), which is merely acceptable according to Nunnally & Bernstein (1994) and Pallant (2001). The average variance extracted (AVE) for all measures were above .50, which indicated good convergent validity, except sadness (.26). In addition, the square roots of AVE were larger than the correlation coefficients of the construct and other constructs, which suggested that a good discriminant validity, except sadness. The square root of AVE for sadness was .51, which was slightly lower than the correlation between sadness and algorithmic beliefs (−.53) and joviality (−.64). This indicates that the validity of sadness was merely acceptable (Segars, 1997). The less satisfactory results for sadness can be explained by the fact that the data distribution for three out of the four items of sadness was positively skewed. Many participants reported relatively low scores on the three items, making the variances small. However, the measure of sadness was drawn from established scales, which were theoretically constructed and used in highly relevant studies (Her & Timmermans, 2021). Transforming a dependent variable for normality could make results difficult to interpret. Additionally, the data of the averaged index were normally distributed. Therefore, we decided to leave the measure for sadness as it was and use cautions in interpreting the results concerning sadness.

Plans of Hypothesis Testing

To test the hypotheses, we followed Coduto et al. (2020) to run ordinary least squares (OLS) regression analysis with the Process Macro (v3.4.1) function in R. We selected this software because it allows researchers to analyze moderated mediation models (Hayes, 2018). Based on our theoretical framework, we customized the model by adjusting R syntax so that the final model was similar to Model 14 (Hayes, 2018) except that there was no direct link from POSI to joviality or sadness. We included age, gender, sexual orientation, relationship status, education, social skills, anxiety attachment, and current mood as covariates for reasons elaborated in the measurement section. Again, we customized the model so that current mood was only related to the dependent variables (joviality and sadness) but not the mediator.

Results

The Relationship Between POSI and Affective Well-Being Mediated by Compulsive Use

We first ran serial mediation models without algorithmic beliefs as the moderator using the Process Macro function (v3.4.1) in R (Table 2). H1 predicted that POSI would be positively related to compulsive dating app use. POSI showed a positive relationship with compulsive dating app use (*b* = .62, *SE* = .04, *p* <. 001), supporting H1. H2a predicted that compulsive use would be associated with less joviality. Surprisingly, results showed that compulsive dating app use was positively related to joviality (*b* = .23, *SE* = .02, *p* < .001). H2a was not supported. H2b predicted that compulsive use would be associated with more sadness. However, results showed that compulsive use was not significantly related to sadness (*b* = −.01, *SE* = .02, *p* = .780). H2b was not supported either.

Taken together, compulsive dating app use was associated with better affective well-being (Her & Timmermans, 2021).

To test whether the indirect effect of POSI on joviality and sadness were significant, we used 10,000 bootstrap samples to generate a 95% confidence interval (CI). If zero is not included in the 95% CI, the indirect effect is considered significant. For joviality, the indirect effect of POSI mediated by compulsive use was significant (b = .14, SE = .03, 95% CI [.0952, .1942]). For sadness, the indirect effect of POSI mediated by compulsive use was not significant (b = −.00, SE = .02, 95% CI [−.0396, .0272]).

Among control variables, age, social skills, and anxiety attachment were positively related to compulsive use (age: b = .01, SE = .01, p = .005; social skills: b = .15, SE = .04, p < .001; anxiety attachment: b = .11, SE = .03, p = .001). Age, social skills, and current mood were positively related to joviality (age: b = .01, SE = .00, p = .017; social skills: b = .14, SE = .002, p < .001; current mood: b = .13, SE = .03, p < .001) and anxiety attachment was negatively related to joviality (b = −.05, SE = .02, p = .009). Age, social skills, and current mood were negatively related to sadness (age: b = −.01, SE = .00, p = .006; social skills: b = −.05, SE = .02, p = .012; current mood: b = −.10, SE = .03, p < .001) and anxiety attachment was positively related to sadness (b = .06, SE = .02, p < .001).

The Moderating Role of Algorithmic Beliefs

To test H3a and H3b, we ran moderated mediation models with algorithmic beliefs included as the moderator on the path from compulsive use to joviality and sadness (Table 3). We predicted that algorithmic beliefs would moderate the relationship between compulsive use and joviality (H3a) / sadness (H3b). We mean-centralized compulsive use and algorithmic beliefs before producing an interaction item using the Process Macro function in R.

For joviality, results further showed that the index of moderated mediation was not significant (index = −.00, SE = .02, 95% CI [−.0417, .0280]). The mediation between POSI and joviality through compulsive use of dating apps was significant regardless of the strength of algorithmic beliefs. For sadness, results further showed that the index of moderated mediation was significant (index = −.05, SE = .02, 95% CI [−.0761, −.0092]). When the moderated mediation was probed, the mediation between POSI and sadness through compulsive use became significant when algorithmic beliefs were low (1 SD below the mean: b = .04, SE = .02, 95% CI [.0003, .0768]). However, the same mediation was not significant when algorithmic beliefs were at a moderate level (at the mean: b = .01, SE = .02, 95% CI [−.0256, .0421]) and at a high level (1 SD above the mean: b = −.02, SE = .02, 95% CI [−.0652, .0201]). Based on the index of the moderated mediation, the indirect effects when algorithmic beliefs were at different levels were significantly different from one another (Hayes, 2018).[3]

Table 1. *Bivariate Correlations Among Measured Variables (N = 361).*

	POSI	CMU	AB	JOV	SAD	AGE	GD	SO	RS	SS	AA
CMU	.672**	–									
AB	.359**	.496**	–								
JOV	.406**	.541**	.677**	–							
SAD	−.108*	−.117*	−.370**	−.433**	–						
AGE	.087	.187**	.240**	.290**	−.249**	–					
GD	.196**	.074	−.118*	−.079	.009	−.029	–				
SO	.011	.045	−.102	−0.08	.065	.047	−.016	–			
RS	−.123*	−.125*	−.054	−.107*	.076	−.368**	−.163**	−.051	–		
SS	.157**	.224**	.551**	.565**	−.381**	.196**	−.040	−.169**	−.086	–	
AA	.085	.091	−.184**	−.300**	.344**	−.127*	.168**	.151**	−.078	−.490**	–
CM	.117*	.244**	.457**	.496**	−.358**	.193**	−.204**	−.157**	.024	.467**	−.294**

Note. POSI = preference for online social interaction, AB = algorithmic beliefs, CMU = compulsive use, JOV = joviality, SAD = sadness, AGE = age, GD = gender, SO = sexual orientation, RS = relationship status, SS = social skills, AA = attachment anxiety, CM = current mood.

Table 2. *OLS Regressions for the Mediation Test (N = 361).*

|	Compulsive use		Joviality		Sadness	
	b (SE)	p	b (SE)	p	b (SE)	p
Constant	.35 (.58)	.546	1.50 (.32)	< .001	2.65 (.30)	< .001
POSI	.62 (.04)	< .001	—	—	—	—
Compulsive use (CMU)	—	—	.23 (.02)	< .001	−.01 (.02)	.780
Age	.02 (.01)	.005	.01 (.00)	.017	−.01 (.00)	.006
Gender	−.13 (.09)	.135	−.04 (.04)	.315	−.06 (.04)	.121
Sexual orientation	.13 (.14)	.362	−.02 (.07)	.760	−.03 (.07)	.713
Relationship status	.02 (.09)	.792	−.02 (.05)	.649	−.01 (.04)	.740
Education	−.09 (.10)	.364	−.05 (.05)	.326	.01 (.05)	.896
Social skills	.15 (.04)	< .001	.14 (.02)	< .001	−.05 (.02)	.012
Attachment anxiety	.11 (.03)	.001	−.05 (.02)	.009	.06 (.02)	< .001
Current mood	—	—	.13 (.03)	< .001	−.10 (.03)	< .001
Model summary	$F_{(8, 352)} = 43.58$ $R^2 = .50$ $p < .001$		$F_{(9, 351)} = 49.98$ $R^2 = .56$ $p < .001$		$F_{(9, 351)} = 12.49$ $R^2 = .24$ $p < .001$	

Note. OLS = ordinary least squares.

Table 3. *OLS Regressions for the Moderated Mediation Test (N = 361).*

	Compulsive use		Joviality		Sadness	
	b (SE)	p	b (SE)	p	b (SE)	p
Constant	−5.06 (.58)	< .001	3.37 (.33)	< .001	2.32 (.32)	< .001
POSI	.62 (.04)	< .001	—	—	—	—
Compulsive use (CMU)	—	—	.17 (.02)	< .001	.02 (.02)	.405
Algorithmic beliefs (AB)	—	—	.28 (.04)	< .001	−.20 (.04)	< .001
CMU × AB	—	—	−.00 (.02)	.918	−.07 (.02)	< .001
Age	.02 (.01)	.005	.01(.00)	.075	−.01 (.00)	.007
Gender	−.13 (.09)	.135	−.01 (.04)	.900	−.09 (.04)	.031
Sexual orientation	.13 (.14)	.362	.00 (.07)	.997	−.06 (.07)	.399
Relationship status	.02 (.09)	.792	−.04 (.04)	.387	.02 (.04)	.628
Education	−.09 (.10)	.364	−.06 (.05)	.193	.01 (.04)	.908
Social skills	.15 (.04)	< .001	.08 (.02)	< .001	−.02 (.02)	.471
Attachment anxiety	.11 (.03)	.001	−.05 (.02)	.001	.06 (.02)	< .001
Current mood	—	—	.09 (.03)	< .001	−.08 (.03)	.003
Model summary	$F_{(8, 352)} = 43.58$ $R^2 = .50$ $p < .001$		$F_{(11, 349)} = 50.83$ $R^2 = .62$ $p < .001$		$F_{(11, 349)} = 13.24$ $R^2 = .30$ $p < .001$	

Note. OLS = ordinary least squares.

Figure 1. *The Moderated Mediation Models (N = 361).*
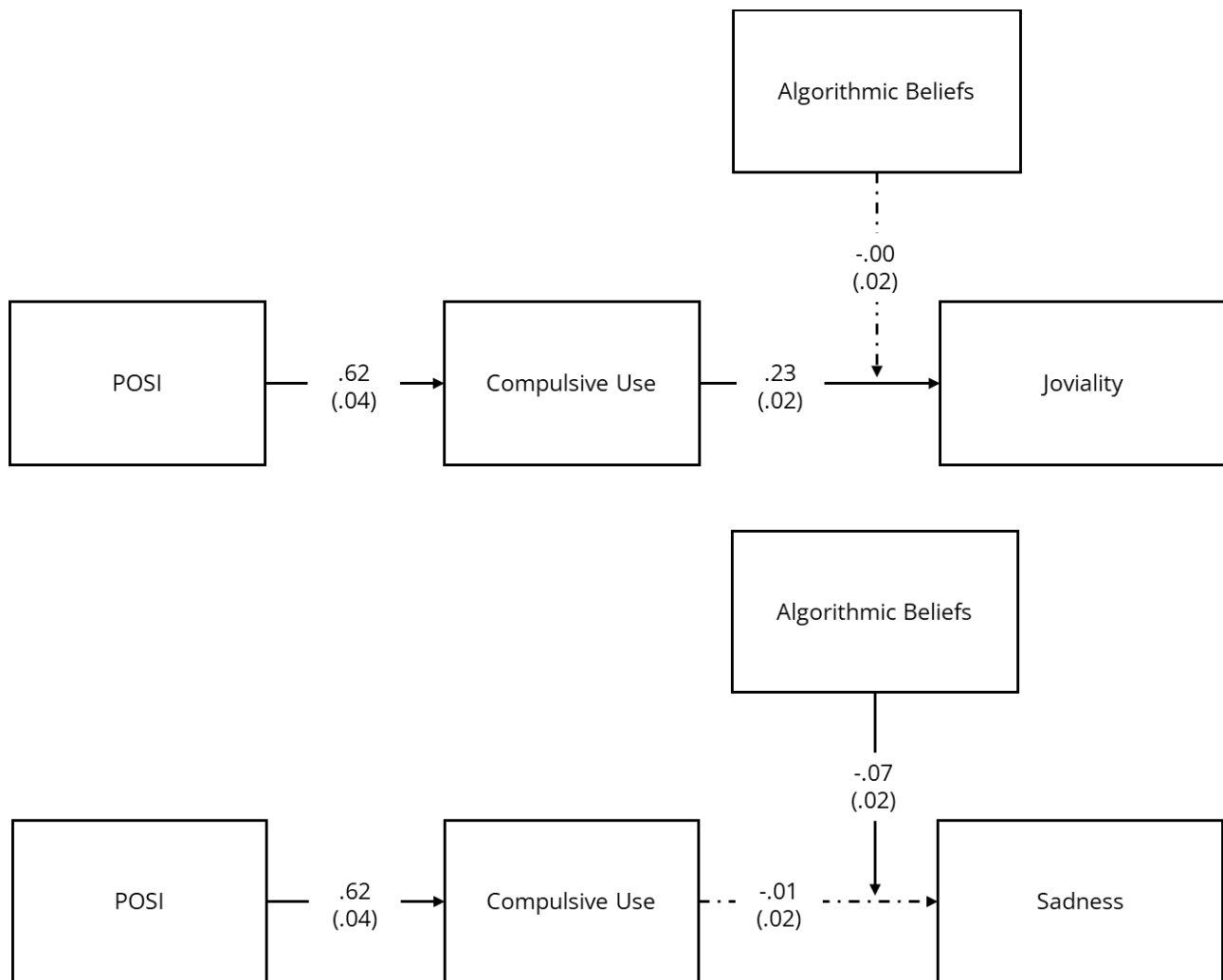
Note. Solid lines are significant and dotted lines are insignificant. Standard errors are shown below the coefficients on the paths. Control variables are omitted for readability.

Discussion

The prevalence of dating apps makes it imperative to examine how these apps may affect our well-being. Drawing upon the social skill model (Caplan, 2005), we examined whether POSI was associated with more compulsive dating app use and poorer affective well-being. In addition, we examined whether algorithmic beliefs attenuated the negative relationship between compulsive use and affective well-being. We found that POSI predicted more compulsive use. However, we did not find evidence of a negative relationship between compulsive dating app use and affective well-being in the total sample. Instead, compulsive dating app use was positively related to joviality. In addition, while compulsive use was not related to sadness in the total sample, it was associated with more sadness among those with weak (i.e., 1 SD below the mean) algorithmic beliefs. This study tested the social skill model in the context of dating apps in a non-Western culture. More importantly, it is among the first few quantitative investigations of how algorithmic beliefs affect the association between dating app usage and well-being, thereby shedding light on how human-algorithm relation affects interpersonal communication in this technology-saturated environment.

First, we found that POSI was positively related to compulsive dating app use. The social skill model (Caplan, 2005) posits that individuals who often experience challenges in offline interactions may develop a reliance on online communication. This model received support in the Internet and social media research (Wolfers & Schneider, 2021). Together with Coduto et al. (2020), we extended the context of its application to dating apps. Whereas typical social media platforms are often used between existing social contacts, dating apps—due to its primary focus on relationship initiation—are almost always used between strangers, or zero-history dyads. Interactions on both types of platforms require certain levels of social skills. However, because dating apps afford users greater control over when and how to conduct social interactions, individuals who have experienced the benefits of dating

apps may develop a preference for relational talks online (versus offline). This preference for online interactions could eventually make them addicted to using dating apps.

Contradictory to our expectation, we did not find a negative link between compulsive dating app use and affective well-being. Instead, a positive relationship between compulsive use and joviality was found, and this relationship was significant regardless of the strength of algorithmic beliefs. The finding is consistent with Her and Timmermans's (2021) finding. The affordances of dating apps can boost user autonomy and enhance their control over the intimacy-seeking processes (Hobbs et al., 2017; Chan, 2018). For example, users can present themselves strategically, which enables them to build intimacy with other users quickly. It can also be easy for users to terminate an undesirable conversation and move on to potential candidates whom they may have more pleasant interaction with. As such, compulsive use may allow more of these highly autonomous moves to induce more positive affect.

Notably, whereas the present study focused on transient emotional state of users after using dating apps (Luhmann et al., 2012), research that focused on long-term-oriented measures revealed more negative impacts of compulsive dating app use on well-being (e.g., life satisfaction: Obarska et al., 2020; Zervoulis et al., 2020; fear of being single: Thomas et al., 2023). As of studies on immediate affects, though Her and Timmermans (2021) found that compulsive usage of Tinder could induce more joviality, the relationships between compulsive use and negative affects were stronger compared to the relationship with joviality. Hence, using dating apps may be a mixed experience of immediate joy and sorrow, but in a long-term perspective, using these apps excessively may lead to a poorer well-being.

Furthermore, we extended prior research by showing that the link between compulsive dating app use and sadness might be contingent upon the strength of algorithmic beliefs. When algorithmic beliefs were weak, compulsive dating app use was associated with more sadness. However, when algorithmic beliefs were strong, such an association was not significant. This finding suggests that algorithmic beliefs may condition the impact of compulsive dating app use. A plausible explanation is that algorithmic beliefs help reframe negative experiences in different ways and view romantic talks in a positive perspective. For instance, although individuals may experience interpersonal rejections, they may think they would eventually find their perfect match because of their confidence in algorithms. Similarly, although other users can be more successful than them, they may think that algorithms provide them with a pool of high-quality users and therefore they have a higher chance to meet their perfect match. Moreover, users with a high confidence in algorithms may downplay the importance of winning other users but focus on searching for the perfect match because of their belief in algorithms. Eventually, these perceptions may mitigate the negative affect derived from compulsive uses of dating apps.

To our best knowledge, this study is the first to extend Sharabi's (2021) finding on the positive impact of algorithmic beliefs on social interactions to affective well-being and offered additional evidence which suggests that algorithmic beliefs could guide CMC in a positive direction. This aligns with previous research which found that individual interpretation of messages and cues could affect communication outcomes (e.g., Bodie, Burleson, Gill-Rosier et al., 2011; Bodie, Burleson, Holmstrom, et al., 2011; Lang, 2006; Li & Feng, 2015; Walther & D'Addario, 2001). This line of research argued that the interpretations are influenced by situational impression formation about message senders based on available cues (Li & Feng, 2015; Walther & D'Addario, 2001) or personal traits such as personalities and cognitive capacity (Bodie, Burleson, Gill-Rosier et al., 2011; Bodie, Burleson, Holmstrom, et al., 2011; Lang, 2006). We added to this research by demonstrating that individual interpretation of interpersonal cues can also be shaped by human-technology relation (Hu & Wang, 2023; Sundar, 2020). Although the impact of human-technology relation on the process and outcome of CMC is not novel, our research focuses on algorithms. Algorithms are automatic machine calculations that push personalized content to users based on the machine's understanding of each user. As such, algorithms work by constructing an image of self. Therefore, algorithmic beliefs essentially reflect the extent to which individuals recognize the self that algorithms construct. Although the social skill model posits that the advantages of online communication compared to offline are derived from technological affordances, it does not address the role of algorithms and thereby cannot fully explain the mechanism by which contemporary media technologies work. By considering the effect of algorithmic beliefs, our research does not only function as a response to the current personalized media environment but also offers a different perspective to understanding the process and outcome of CMC which centers on the extent to which individuals recognize the self that algorithms construct.

Limitations and Future Research

Notably, although it makes sense to interpret our finding on the relationship between compulsive use and affective well-being as the former affects the latter, we cannot rule out the alternative explanation that the affective experience of use leads to more usage, especially for joviality. Individuals who have pleasant experiences of using dating apps are more likely to use more. Given the cross-sectional nature of our research design, the findings should be interpreted with caveats. However, from a theoretical perspective, it is less likely that similar logic applies, at least not directly, to sadness as we observed a positive relationship between sadness and compulsive use. Taken together, while this exploratory study did not intent to and could not make any causal claim, future studies can employ experimental and longitudinal designs to untangle the relationship between dating app use and well-being. We also recommend that they measure potential mediators such as social comparisons and rejection experience to test the mechanisms proposed in this study.

In addition, this study did not directly test whether algorithmic beliefs affect the interpretations of interaction and even how individuals interact with potential dates. Future research can manipulate algorithmic beliefs to see whether they affect the interpretations of interaction experience (e.g., rejection, social comparison) and interaction behaviors (e.g., the extent to which individuals actively approach other users and communicate effectively). We also recommend that future research consider the opposite of algorithmic beliefs—doubts about algorithms (Hu & Wang, 2023), because a recent study showed that such doubts may also affect online interaction behaviors (Hu, 2023).

Furthermore, the sampling method can also be improved. Like many other CMC studies, our sample is not representative. Specifically, the majority of the participants were young people under 35. Senior citizens may face greater social exclusion and have a stronger emotion-regulation goal for socializing, which is different from young people (Carstensen et al., 1999; Rui et al., 2023). Therefore, the conclusions in this study may not apply to this population and need further investigations. As such, more inclusive samples should be employed in the future. For example, with a more diversified sample, future research can identify the population that tends to develop strong confidence in algorithms, which can be beneficial for designers. The finding of algorithmic beliefs suggests that we may improve the quality of interpersonal communication via dating apps by strengthening algorithmic beliefs. Gran et al. (2021) showed that algorithmic awareness, which can be related to algorithm-related attitudes and beliefs (Hu & Wang, 2023), differs across groups of different ages and with different educational backgrounds. As Hu and Wang (2023) showed, there can be a wide range of beliefs about dating algorithms. Based on a thorough understanding of different beliefs that are prevalent among distinct groups of people, system designers can promote healthy algorithmic beliefs for different user groups accordingly and protect them from potential negative impacts of dating apps.

There are also measurement limitations. First, the study only measured conventional, binary gender identities—man and woman—given Chinese participants' relative unfamiliarity with Western gender classification systems[4]. However, future studies should explore whether a more refined measure will generate more insights. Another limitation is the way we measured compulsive use. We adopted Dhir et al.'s (2018) scale, which uses items that capture the frequency and urge to use dating apps, which does not capture the valence of experiences. Therefore, future studies can adopt scales that account for interaction valence and see whether the results will differ.

Finally, we encourage researchers to examine the hypotheses in other contexts such as health (e.g., algorithmically matched patients and health providers) and business-consumer communication (e.g., algorithmically matched uber drivers and passengers). In potential cross-context applications, we suggest that researchers distinguish between different types of algorithms, they can vary in human involvement and machine autonomy (Kim et al., 2023).

Conclusion

Drawing upon the social skill model, this study found that POSI was indirectly associated with better affective well-being, indicated by more joviality, through compulsive dating app use. In addition, we extended the model by showing that the relationship between compulsive dating app use and sadness was attenuated by algorithmic beliefs. The findings suggest that dating apps use may be beneficial to immediate affective well-being and underscore that user expectations about dating algorithms can change the outcome of dating app usage.

Footnotes

[1] The percentage of the participants that reported a "socializing" motive was larger than that of those who reported a "relationship seeking" motive or a "sexual experience" motive. One reason may be that we allowed the participants to report multiple motives for use. Because socializing, which involves making new friends and broadening one's intimacy network, is often deemed as a prerequisite for finding serious or casual relationships among online daters (Hobbs et al., 2017), it makes sense that it was the most commonly-held motive among all.

[2] Timmermans et al. (2018) suggested that single and non-single users may have different motives for using dating apps. To explore whether relationship status correlates with the three motives we focused on, we conducted three independent t-tests. Motives for dating app use were briefly assessed using six items from Timmermans and De Caluwé (2017), two items for each of the three motives (1 = *strongly disagree*; 5 = *strongly agree*). Examples for items include *I use the dating app to find someone for a serious relationship* (for relationship seeking; M = 2.88, SD = 1.23, α = .86), *... to increase my sexual experience* (for sexual experience; M = 2.10, SD = 1.03, α = .77), *... to make new friends* (for socializing; M = 4.33, SD = 0.65, α = .67). Results showed that single users reported higher relationship seeking motive than non-single users, t(359) = 7.526, p < .001, but lower socializing motive than non-single users, t(295.542) = −2.951, p = .003. Given this correlation, we decided to include relationship status as a covariate.

[3] Her and Timmermans (2021) suggested that the motives of dating app use can predict how individuals interact with others when using dating apps, thus influencing affective well-being. Therefore, we also ran the models with the three motives (for relationship seeking, for sexual experience, for socializing) to see whether the results on hypothesis testing still held. We found that sexual experience motive and socializing motive were positively related to joviality (relationship seeking: b = .08, SE < .001; socializing motive: b = .14, SE = .04, p < .001), and the socializing motive was negatively related to sadness (b = −.16, SE = .04, p < .001). However, the other results did not change. Given the robustness of hypothesis testing results and the fact that motives can be highly correlated with the covariates used in the social skill model (e.g., social disposition and relationship status; Caplan, 2005; Coduto et al., 2020), which can decrease the efficiency of control variables and cause overfitting problems, we decided to follow Coduto et al. (2020) and not include motives in the formal regression models.

[4] There is no difference in Chinese expressions for "gender" and "sex" ("性别"). In addition, there has been a lack of formal education at school or media promotion about non-conventional gender identities.

Conflict of Interest

The authors have no conflict of interests to declare.

Authors' Contribution

Junwen Hu: conceptualization, funding acquisition, investigation, formal analysis, writing—original draft. **Jian Raymond Rui:** conceptualization, validation, writing—reviewing & editing.

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Appendix

Table A1. *Measure Items*.

Variable	Items	References
POSI	1. I prefer communicating with other people on the dating app rather than face-to-face 2. I feel like I have more control over other people on dating apps than I do in face-to-face conversations 3. Meeting and talking with people is better when done on dating apps rather than in face-to-face situations	Caplan (2005)
Compulsive use of dating apps	In the past month, to what extent have you … 1. spent a lot of time thinking about the dating app or planned use of the dating app? 2. felt an urge to use the dating app more and more? 3. used the dating app in order to forget about personal problems? 4. become restless or troubled if you have been prohibited from using the dating app?	Dhir et al. (2018)
Algorithmic beliefs	1. Dating app algorithms really work 2. I would trust dating app algorithms to find me a partner 3. Dating app algorithms lead to more successful relationships 4. A mathematical formula can predict who I will be attached to. 5. Dating app algorithms are better than I am at finding me a partner 6. Dating app algorithms provide me with better quality partners 7. Dating app algorithms are more effective than traditional ways of meeting people.	Sharabi (2021)
Joviality	After using the dating app, I have felt … 1. happy 2. enthusiastic 3. excited 4. energetic	Her and Timmermans (2021); Watson and Clark (1994)
Sadness	After using the dating app, I have felt … 1. sad 2. blue 3. downhearted 4. lonely	Her and Timmermans (2021); Watson and Clark (1994)
Social skills	1. I'm often chosen to the leader of a group 2. I can be comfortable with all types of people—young and old, rich and poor … *There are eight items in total, but only two are shown as examples. The rest of the items are not presented due to potential copyright issues.*	Riggio (1989)
Anxiety attachment	When you are in a close relationship (e.g., a romantic relationship), how much do you feel … 1. I worry that romantic partners won't care about me as much as I care about them 2. My desire to be very close sometimes scares people away … *There are six items in total, but only two are shown as examples. The rest of the items are not presented due to potential copyright issues.*	Wei et al. (2007)
Current mood	How are you feeling right now?	Her and Timmermans (2021)

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