

99 + matches but a spark ain't one: Adverse psychological effects of excessive swiping on dating apps

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ABSTRACT

Studies showed adverse experiences related to the use of dating applications such as Tinder. However, it remains unclear by which mechanism and under which conditions dating app use has undesired effects. As a mechanism, we investigated excessive swiping, operationalized as youth's mental preoccupation with profile browsing and swiping compulsivity. As moderators, we investigated swiping in assessment (i.e., critically evaluating profiles), and locomotion (i.e., taking intuitive gut decisions) modes. To this end, we surveyed a quota-sample of 464 transition age dating app users (16–25 years old). Moderated mediation analyses showed that dating app use was associated with excessive swiping, which was in turn linked to a) upward social comparison, b) fear of being single, and c) partner choice overload. In conclusion, frequent dating app use was related to undesired outcomes only when it was related to excessive swiping. Neither assessment, nor locomotion mode moderated these relationships; thus, excessive swiping is detrimental for young dating app users' well-being, no matter how they swipe.

1. Introduction

In principle, dating apps can quickly and efficiently connect people. Yet, the app architecture engages users so powerfully that the average Tinder user logs in eleven times a day and stays up to eight minutes each time, which may add up to one and a half hours per day (Bilton, 2014). Dating apps reward frequent use as the profiles of those who were recently online appear toward the front of the line while profiles of inactive users are shown later. Another example of how apps reward frequent use is that Grindr has no push-notifications, so users must open the app to check if they received new matches or messages. Coupled with the incorporated game mechanics (Zichermann & Cunningham, 2011), this seems to successfully draw users to dating apps and keep them engaged for hours (Alexopoulos et al., 2020; Bilton, 2014). Many users even report to never arrange in-person dates but exclusively remain in the online domain (Best & Delmege, 2012). Therefore, dating apps are colloquially said to have turned dating into an addiction (Stampler, 2014).

While there are exceptions of researchers who attempted to establish “Tinder addiction” as a clinical disorder (Orosz et al., 2016), most researchers are critical of adopting the language of addiction to problematic behaviors (Grant & Chamberlain, 2016; LaRose et al., 2003), and even proponents of behavioral addictions advise against using the addiction framework for problematic technology use (Panova & Carbonell, 2018). Instead, previous research has conceptualized excessive use of (social media or) dating apps as compulsive, that is, characterized by a lack of control and rationality over behavioral routines (Dhir et al., 2018), similar to compulsive

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gambling, eating, or buying. Researchers have further identified a range of personality correlates relating to compulsive dating app use (Orosz et al., 2018; RoCHAT et al., 2019) and linked it to decreased well-being (Coduto et al., 2019; Her & Timmermans, 2020; Obarska et al., 2020). However, it remains entirely unclear what exactly users are doing (compulsively) on dating apps that would harm their well-being. Therefore, problematic patterns of dating app use remain a gap in the literature (Bonilla-Zorita et al., 2021).

The most distinctive element of dating apps, and also the one considered the most "addictive", is swiping. Swiping means browsing through profiles by thumb-brushing right or left to accept or dismiss a profile. As soon as two users mutually accept each other's profile, they have a *match*. Thereby, prolonged swiping can be rewarding because over time, one will collect more and more mutual acceptances ("matches"). As swiping is fascinating and often rewarding, it can get quite addictive and youth may find it hard to exercise enough self-regulation to disengage from it. Similar to profile browsing on social media, swiping constitutes rather non-communicative use, which has been related to adverse outcomes (Karsay et al., 2019). Yet, in contrast to non-communicative social media or smartphone use, swiping on dating apps has received little scientific attention.

We advance scholarship by investigating the specific activity of excessive swiping as a potential mechanism by which dating app use could relate to undesired outcomes. We define excessive swiping as youth's compulsive swiping and mental preoccupation with swiping, similar to excessive smartphone use (Karsay et al., 2019). As outcomes, we examine upward social comparison, fear of being single, and partner choice overload, based on theories and findings on social comparison (Festinger, 1954; Vogel et al., 2014), tyranny of choice-theory (Schwartz, 2000) and choice overload (Chernev et al., 2015). As moderating conditions for these associations, we examined swiping in assessment (i.e., critically evaluating profiles) and locomotion (i.e., taking intuitive gut decisions) mode. We expected stronger adverse effects in assessment mode as assessment style judgments induce fear of failure and self-evaluation and decrease well-being (Kruglanski et al., 2000).

Previous studies on heterosexual samples often relied on (highly educated) women, and studies on non-heterosexual populations exclusively relied on gay men (Bonilla-Zorita et al., 2021). To address this bias, we provide data from girls and boys of all sexual orientations (and of diverse educational backgrounds). We examined transition age youth between 16 and 25 because dating apps are especially popular in young people (Vogels, 2020), they report the most excessive social media use (Tang et al., 2016), and media effects are generally assumed to be stronger in younger people (Livingstone, 2007).

2. Theoretical foundation

2.1. Dating app use and excessive swiping

A growing body of literature problematizes excessive media use, especially in young people (Livingstone, 2007). However, social media research showed that the mere time spent online seems to have no direct effects on well-being (Coynne et al., 2020). Research on smartphone use further showed that more frequent use does not automatically equal but may be linked to problematic use (Elhai et al., 2017b; Noë et al., 2019). Similarly, studies problematize the excessive use of dating apps by linking it to adverse psychological outcomes (Her & Timmermans, 2020; Obarska et al., 2020). Yet, it remains unclear *how* overuse has these effects; and we entirely lack research on specific *patterns* of use that may be associated with undesired outcomes. Therefore, scholarship must not only examine time spent using dating apps but also the mediating role of specific activities on dating apps.

Findings on smartphone use show that frequent users engage in more non-communicative than communicative uses of the smartphone (Elhai et al., 2017a; Noë et al., 2019). Importantly, Noë and colleagues (2019) found that the mere use of the dating app Tinder did not correlate with smartphone addiction but that the activity most connected to smartphone addiction was *scrolling*, (e.g., for profile browsing on social media). In online dating, profile browsing has been termed "the central activity" (Finkel et al., 2012, p. 16). Richardson et al. (2020) clustered dating app users into four groups and called one group *swipeaholics*. When observing dating app users' in-app behavior for ten minutes, Cummings and Mays (2021) found that almost all participants used the entire ten minutes exclusively for swiping.

Two potential explanations for why frequent dating app use should relate to excessive swiping are first, risk-free reward seeking and second, maximizing. First, swiping can yield gratifications in the form of matches. Thereby, matches positively reinforce the behavior swiping. Pavlovian learning theories of compulsive behaviors assert that behaviors which are initially successful in self-esteem or mood enhancement are positively reinforced, that is, individuals associate the behavior with pleasure (Heinz et al., 2019; Robinson & Berridge, 2003; Salzman, 1981). If individuals develop an attentional bias, become oversensitive to cues, and mentally preoccupied with the behavior, it becomes compulsive (Salzman, 1981). Swiping is an ideal candidate for a compulsive behavior because dating apps are programmed like slot machines: In the beginning, they provide many matches to convince new users and then just enough to keep them on the app and chase the initially attained pleasure. In addition, swiping seems to have no cost: It only provides positive feedback or no feedback (but then still fascinating profile information). In contrast, interactive or active uses such as messaging or self-presentation bear the risk of negative feedback. Therefore, a safe path for risk-free reward seeking is to keep swiping: Swiping allows users to receive solely positive feedback and avoid rejections.

The following findings are in line with the idea that reward seeking is a mechanism behind the association of frequent dating app use and excessive swiping: One motivation for dating app use is to collect positive feedback for self-esteem enhancement (Sumter et al., 2017). Self-esteem enhancement and online dating success (which points to swiping and collecting matches) are predictors of problematic online dating (Bonilla-Zorita et al., 2021; Her & Timmermans, 2020). Her and Timmermans (2020) found a strong positive correlation ($r = 0.61$) between online dating success and compulsive Tinder use. That is, when users received a lot of gratification (e.g., through matches) from Tinder use, this seemed to reinforce swiping (Her & Timmermans, 2020).

A second potential mechanism for prolonged swiping is maximizing. For one, people prefer exploring large numbers of options in

online dating (Lenton et al., 2008), and for another, exposure to many options triggers excessive searching. That is, even when there have already been good-enough options, one keeps searching through more and more options in order to maximize their gains (Iyengar & Lepper, 2000). On the basis of this theorizing and on previous findings on excessive smartphone use (Elhai et al., 2017b; Noë et al., 2019), we expected frequent use to be a risk factor that one cannot put an end to swiping.

H1: More frequent dating app use will be associated with excessive swiping.

2.2. Effects of excessive swiping

A vast body of literature has examined adverse outcomes of youths' heavy (social) media use (e.g., Boer et al., 2021). Many find digital media not to be intrinsically harmful to young people but only when used excessively (Przybylski & Weinstein, 2017) or non-communicatively (Elhai et al., 2017a; Karsay et al., 2019). The most widely accepted explanation for the adverse outcomes is that social media use, and particularly non-communicative content consumption (i.e., profile browsing), induces upward social comparison (Appel et al., 2016; Vogel et al., 2014). Social comparison theory asserts that we construct our identities by comparing ourselves to others (Festinger, 1954). While comparisons with inferior others increases self-esteem, comparisons with superiors deflates self-esteem (Festinger, 1954).

Online profiles on social networking sites (Kleemans et al., 2018; Reinecke & Trepte, 2014) and on dating apps (Toma et al., 2008) are notoriously idealized and biased in a positive direction; that is, realistically negative content is missing (Yau & Reich, 2019). Therefore, users may get the distorted impression that most comparison targets are superior (e.g., higher physical attractiveness and quality of life). As Vogel et al. (2014) put it, when users browse through profiles, they compare their authentic situation ("actual self") to the curated, idealized and selected self-presentations ("ideal self") of others. As a consequence, upward social comparison is more salient on social media than in person (Appel et al., 2016). Accordingly, higher use of social media relates to more upward social comparison (Schmuck et al., 2019) and compulsive users are more likely to report that their self-esteem is contingent on others (Ali et al., 2022).

Social comparison can also be expected on dating apps, notwithstanding that heterosexual dating app users expose themselves to other-gender profiles. Social comparison with potential other-gender partners is possible because comparison, for example, on the basis of status and physical attractiveness is not restricted to same-gender targets but also prevalent within heterosexual romantic relationships or other cross-gender interactions (Buunk & van der Laan, 2002; Hudders & De Jans, 2021; Thai et al., 2016). Social comparison is likely to happen because seeking superior partners has several downsides. Intuitively, one may think that dating app users would invest their energy on the most attractive profiles – even if comparison with them would result in inferiority; because we do not *compete* with romantic partners but *identify* with them (Pinkus et al., 2008). However, while identification may be a protective factor within established romantic relationships (Pinkus et al., 2008) or in groups (Gardner et al., 2002), users are unlikely to identify with unknown dating app users and include them in their self-construal. Instead, the early stage of (pre-) dating requires a realistic estimation because there are dangerous downsides of being exposed to an abundance of overly attractive partners: For one, overly attractive mates attract superior competitors and for another, people want to avoid frustrations and therefore do not waste their energy on potential partners who are *out of their league* (van Straaten et al., 2009). Whether consciously or unconsciously, individuals know that it is best to have a similar partner and thus need to detect mates who match their own physical attractiveness and popularity. Research on assortative mating has repeatedly shown that romantic partners are often similar in physical attractiveness, self-worth, and popularity (Garcia & Khersonsky, 1996; Shaw Taylor et al., 2011), and both similarity in physical attractiveness (Folkes, 1982) and in personality (Arrindell & Luteijn, 2000) predict beneficial relationship outcomes. In case of dissimilarity, observers assume that if one partner is, for example, more attractive than the other, the outperforming person will be less committed (Hoplock et al., 2019). Taken together, people know that assortative mating is beneficial and that perceiving potential partners in early stages of dating as more attractive than oneself is an unpleasant experience.

On this basis, we assume dating app users to very carefully compare themselves with potential partners on the basis of relevant criteria such as physical attractiveness, popularity (e.g., indicated by pictures with friends) or economic status (e.g., signaled by displaying expensive cars, clothing, or holidays). Although similarity would be beneficial, we expected more upward social comparison (i.e., perceiving others as generally higher in physical attractiveness, life satisfaction, popularity) due to the positivity bias.

Users may particularly fall for the positively biased profiles when excessively swiping through many profiles. Perhaps users would be more critical and realistic when deliberately inspecting few profiles more closely. However, since social comparison is a spontaneous and unintentional reaction (Gilbert et al., 1995) and excessively swiping through an abundance of profiles makes identification with all of them impossible, we particularly expected excessive swiping through vast numbers of profiles to provoke upward social comparison.

Indeed, research showed that compulsive Tinder use was linked to appearance comparisons (Strubel & Petrie, 2017) and self-conscious social comparisons (Her & Timmermans, 2020). Problematic use of online dating is associated with self-esteem enhancement (Bonilla-Zorita et al., 2021) and impulsive Tinder use seems to be associated with lower self-esteem (Rochat et al., 2019). These correlations suggest upward social comparison while swiping on dating apps. Yet, causality could also be reversed such that users try to repair their already low self-esteem and mood with (excessive) dating app use (Sumter et al., 2017). An experimental study however confirmed that swiping through a large number of profiles decreases self-esteem compared to swiping through a small number of profiles (Thomas et al., 2022). This finding points not only to social comparison but also shows that the specific activity of excessive profile browsing induced upward social comparison processes. On this basis, we theorize that excessive swiping mediates associations of dating app use with upward social comparison.

Second, when browsing through hundreds of dating app profiles, users can get the impression that there is an abundance of

potential partners available (Thomas et al., 2022). Therefore, one may think that browsing would increase users' confidence to find the romantic or sexual relationship that they seek and alleviate their fear of being single. Fear of being single is a fear of losing or (prospectively) not having a romantic partner and a general preference for being romantically attached over being single (Spielmann et al., 2013). Fear of being single entails the normative belief that one should be partnered and there must be something wrong with those who are not (Spielmann et al., 2013). As a consequence, individuals with a pronounced fear of being single can be ready to settle for less satisfying relationships and partners in order to avoid singledom at all costs (Spielmann et al., 2013). This conviction reflects the dominant discourse wherein singledom is constructed as a deficit or failure – other than novel modern discourses constructing singledom as free choice (Reynolds & Taylor, 2005). Fear of being single can be evoked by extreme scarcity of partnering options (Spielmann et al., 2013) and is a predictor of dating app use (Brubaker et al., 2016; Timmermans & De Caluwé, 2017).

Yet surprisingly, fear of being single is also evoked by abundant partnering options: Taylor (2013) showed that a partner abundance prime decreased romantic confidence compared to no prime. Similarly, Thomas et al. (2022) found that browsing through a large number of dating app profiles and the perception that there is an abundance of partnering options aggravate rather than alleviate adults' fear of being single. They explain this counterintuitive finding with what Schwartz (2000, p. 81) called the “tyranny of choice”. Following this theory, some degree of freedom of choice seems to be beneficial for well-being; however, when the number of options is excessively large, autonomous choice does not increase but decrease well-being. This is because limitless options can trigger fears, for example, of failure or anticipated regret (Schwartz, 2000). Furthermore, excessive options exert pressure on the individual because taking away all contextual excuses fosters dispositional attribution of failure (Schwartz, 2000).

Concerning dating, the mass availability of partnering options on dating apps may increase the perception that it is easy to find a successful relationship and increase the normative pressure not to be single (Thomas et al., 2022). This norm and the seemingly optimal circumstances may foster individual responsibility and blame in case of failure. Furthermore, dating apps' emphasis on agentic choosing (as opposed to love by destiny) additionally conveys the impression that those who possess the necessary consumer skills of evaluating, detecting fraud, comparing options, and choosing will find the optimal relationship (Illouz, 2012). Failure (i.e., no relationship or an unpleasant one) is then to be attributed to the individual (Illouz, 2012). Since fear of being single is highly relevant for young populations under 25 years – some studies even find higher fear of being single in younger individuals (Weisskirch et al., 2017) – and based on the described research, we expect excessive swiping through dating app profiles to be associated with an increased fear to remain or become single as a result of one's own fault and shortcomings.

Third, we expect undesired outcomes of excessive swiping on partner choice making. On the one hand, dating app users prefer swiping through an extensive set of profiles compared to a smaller set because they expect greater enjoyment and satisfaction from more options (Lenton et al., 2008). On the other hand, users report excessive options as a major disadvantage of online dating (Best & Delmege, 2012). One explanation for their dissatisfaction is choice overload (Chernev et al., 2015; Iyengar & Lepper, 2000). Choice overload denotes adverse effects of excessive choice, similar to information overload (Chernev et al., 2015). Although individuals often think more options would provide more satisfaction, researchers of decision-making have shown that exposure to a large number of options leaves people disoriented, indecisive, and dissatisfied with their decision (Chernev et al., 2015). This is because it takes cognitive and time resources to process options. Specifically, options introduce counterfactual thinking (that is, countless options generate countless “what ifs”) and potentially the anticipation of decisional regret (Schwartz, 2000). Therefore, excessive options can be paralyzing.

Counterfactual thinking and decisional regret can weigh especially heavily when it comes to important life decisions such as partner choice. Online daters report between 20 and 50 as the ideal number of options from which to select a partner (Lenton et al., 2008). However, dating apps offer hundreds of profiles and users can easily get lost in the eternity of possibilities. Several experiments have shown that when online daters excessively browse through profiles, they increasingly reject, reverse, and regret their partner choices (e.g., D'Angelo & Toma, 2017; Pronk & Denissen, 2020; Wu & Chiou, 2009). More specifically, increased swiping led to feelings of overload with regard to partner choice (Thomas et al., 2022). Based on these findings, we expected excessive swiping to be related to partner choice overload and mediate effects of dating app use on partner choice overload.

H2: Excessive swiping will be associated with a) upward social comparison, b) fear of being single, and c) partner choice overload.

H3: Excessive swiping will mediate the effect of dating app use on a) upward social comparison, b) fear of being single, and c) partner choice overload.

2.3. The moderating role of regulatory mode

We expected adverse effects of excessive swiping not to be univocal for all young dating app users. As a moderator, we investigated the role of regulatory mode. According to regulatory mode theory (Higgins et al., 2003; Kruglanski et al., 2000), there are several modes of coming to a decision: In assessment mode, people evaluate entities in relation to alternatives and based on measurable attributes. Avnet and Higgins (2003, p. 526) describe assessment as “an orientation to measure, interpret, or evaluate the rate, amount, size, value or importance of something, to appraise critically for the purpose of understanding or interpreting, or as a guide in taking action”. High (compared to low) assessors are careful to take responsible, defensible decisions and are concerned with *doing the right thing* (Kruglanski et al., 2000).

A separate dimension (Higgins et al., 2003; Kruglanski et al., 2013) is locomotion mode. In locomotion mode, individuals decide intuitively and cannot name the reasons behind their decisions (Chen et al., 2018). High (compared to low) locomotors are concerned with moving from state to state. They straightforwardly and pragmatically undertake action and push forward without looking back, even without destination in mind, as exemplified by Nike's slogan *just do it* (Higgins et al., 2003; Kruglanski et al., 2013). As a result, decision-making in assessment mode is related to lower well-being (Hong et al., 2004) and leads to distress because of the perfectionist

preoccupation with taking the proper, defensible choice (Chen et al., 2018). Assessment style judgments evoke fear of failure and self-evaluation and are linked to social comparison and lower self-esteem (Kruglanski et al., 2000). Assessment provokes counterfactual thinking and regret (Kruglanski et al., 2013). Locomotion is associated with higher well-being, decisiveness, and functional impulsivity (Hong et al., 2004; Kruglanski et al., 2000). Assessment and locomotion are not two extremes of one dimension but separate tendencies which co-occur in individuals. According to regulatory mode theory (Kruglanski et al., 2000), both assessment and locomotion increase with higher motivation and should therefore be studied as separate motivational principles (Higgins et al., 2003).

Applied to online dating, Finkel et al. (2012) presumed that excessive swiping may evoke assessment mode judgments. Lenton and Stewart (2008) showed that when browsing through an abundance of profiles in a sequential manner, users comparatively evaluated profile attributes. The focus on detached attributes and the design feature to accept or reject likely introduces an assessment mode (Finkel et al., 2012). Thereby, users can assess which profiles are more attractive than others but not which profile will make them spark for no graspable reason (Finkel et al., 2012). Moreover, dating app users report to sort out unsuitable options instead of looking for a suitable date and decisively taking action (Best & Delmege, 2012). Although user motives are well-researched, user strategies remain a gap in the literature and we particularly lack research on the proposed connection between excessive swiping and regulatory mode (Finkel et al., 2012). One study on user strategies focused on maximizing. It showed that the adverse effects of browsing through many profiles were stronger in individuals with high maximizing tendencies (Yang & Chiou, 2010).

Thus, based on regulatory mode theory (Kruglanski et al., 2000) and prior research, we expected effects of excessive swiping to depend on *how* users swipe. First, we expected excessive swiping to be especially detrimental if one swipes in assessment mode, that is, critically evaluating profile attributes. Second, we expected the effects of excessive swiping to be buffered if one swipes in locomotion mode, that is, intuitively and spontaneously.

H4: The effect of excessive swiping on a) upward social comparison, b) fear of being single, and c) partner choice overload will be stronger in individuals with higher levels of swiping in assessment mode.

H5: The effect of excessive swiping on a) upward social comparison, b) fear of being single, and c) partner choice overload will be weaker in individuals with higher levels of swiping in locomotion mode.

3. Method

3.1. Procedure

We conducted a quota-based cross-sectional survey in Germany. Data were collected online through two polling companies between end of July and mid-August 2021. Those who indicated not to be smartphone users and have never used social media were screened out. Our quota sample was based on the distribution of age and gender in Germany. The present study is part of a larger project that focused on youth's smartphone and social media use. The Institutional Review Board of the Department of Communication at the University of Vienna approved the study (IRB-20210601_038). All participants provided informed consent.

After deleting speeders (defined as one third faster than the median speed) and participants who failed all three attention checks, the sample consisted of $N = 840$ participants. For the present study, we asked participants about their experiences with using dating applications. Out of 840 participants, 376 reported no experience, while 464 responded to have ever used dating applications. Therefore, our final sample consisted of 464 dating app users between 16 and 25 years old ($M_{\text{age}} = 21.61$, $SD_{\text{age}} = 2.48$). All data is available on OSF (<https://doi.org/10.17605/OSF.IO/4BZQF>). In terms of gender, 46.6 % participants identified as male, 52.6 % identified as female, and 0.9 % chose the "other" option. Regarding relationship status, 54.7 % indicated to be single, 43.8 % were partnered, and 1.5 % preferred not to answer. Participants' sexual orientation was 80.6 % heterosexual, 10.1 % bisexual, pansexual, and queer, 5.0 % homosexual, and 4.3 % preferred not to answer. Educational levels were 36 % low (i.e., lower secondary or vocational school), 50 % middle (i.e., upper secondary education), and 14 % high (i.e., completed upper secondary education or university).

3.2. Measures

3.2.1. Dating App Use

Those who had ever used dating apps in their life were asked about their current frequency of dating app use. To this end, we used the single item "How often do you use dating apps? Some examples are Tinder, OkCupid, Lovoo, Badoo or Grindr" from Thomas et al. (2022). On a scale from 1 = "never" to 10 = "more than two hours per day", 19.6 % participants selected "never", 22.2 % selected "almost never", 15.9 % selected "once a month", 10.3 % selected "several times a month", 7.3 % selected "once a week", 10.6 % selected "several times a week", 7.3 % selected "up to ten minutes per day", 4.3 % selected "11–60 min per day", 1.5 % selected "1–2h per day", 0.9 % selected "more than 2h per day"; $M = 3.61$, $SD = 2.28$, $Mdn = 3.00$. Excluding participants who have ever used dating apps but indicated currently not to use them ($n = 91$) did not change any results significantly.

3.2.2. Excessive Swiping

We adapted the seven items of the excessive smartphone use scale by Karsay et al. (2019) to swiping on dating apps. In a pretest (see <https://doi.org/10.17605/OSF.IO/4BZQF>) with 319 dating app users (18–67 years old), principal component analysis indicated a one-dimensional scale (eigenvalue = 5.94 accounting for 84.84 % of variance and highly reliable ($\alpha = 0.97$). To avoid redundancy, we tested a short version including only the three items with the highest factor loadings. The three-item solution replicated the single-factor structure (eigenvalue = 2.71 accounting for 90.42 % of variance and highly reliable ($\alpha = 0.95$). Thus, we used three items in the present study. On a 5-point Likert scale (1 = "does not apply to me"; 5 = "very much applies to me"), participants answered to these

statements: “I just have to keep swiping - there’s no other way”; “I often think about swiping when I’m doing something else”; “I would miss not being able to swipe anymore”. Principal component analysis resulted in one factor solution with high reliability; $\alpha = 0.84$, $M = 2.29$, $SD = 1.12$.

3.2.3. Upward Social Comparison

We adapted four items developed for adolescent social media use (Boer et al., 2021) to refer to dating apps. Participants were asked to indicate (1 = “never” to 5 = “very often”) how often, when seeing others’ profiles, they thought: “Others do more fun things than I do”; “Others are more popular than me”; “Others receive more matches than me”; and “Others look better than I do”. Principal component analysis showed one factor; $\alpha = 0.87$, $M = 3.00$, $SD = 1.11$.

3.2.4. Fear of Being Single

On a 5-point scale, participants rated to what extent the following applied to them: “If I end up alone in life, I will probably feel like there is something wrong with me”; “I feel anxious when I think about being single forever”; “It scares me to think that there might not be anyone out there for me.” The three items (Spielmann et al., 2013) formed one factor (eigenvalue = 2.06 accounting for 68.77 % of variance, $\alpha = 0.77$, $M = 3.03$, $SD = 1.05$).

3.2.5. Partner Choice Overload

We asked participants to what extent they agreed with the following three statements (Thomas et al., 2022): “I feel that I see so many potential partners on dating apps that I can barely process the information.”, “I am distracted by the excessive number of potential partners available for me on dating apps”, “I am overwhelmed by the number of potential partners on dating apps”. Thomas et al. (2022) had adapted items on self-reported information overload (Karr-Wisniewski and Lu, 2010) to the topic of partner choice overload on dating apps. Principal component analysis confirmed a one factor solution, eigenvalue = 2.25, accounting for 74.94 % of the variance; $\alpha = 0.83$, $M = 2.58$, $SD = 1.08$.

3.2.6. Swiping in Assessment Mode

We developed four swiping-specific items based on the regulatory mode scale by Kruglanski (2000). On a 5-point Likert scale ranging from 1 = “does not apply to me” to 5 = “very much applies to me”, we asked participants how they proceeded when swiping: “I weigh critically, compare and judge”; “Before I swipe a person left or right, I look carefully at all the information in the profile and think hard about my decision”; “Before I can decide whether a person is a good fit for me, I need to know as many alternatives as possible”; “I have concrete, superficial criteria (e.g., first name, hair color, pet, instrument) by which I decide”. When tested together with swiping in locomotion mode, principal component analysis confirmed two factors, with four items for assessment (eigenvalue = 3.42; accounting for 48.89 % of the variance; $\alpha = 0.73$, $M = 2.64$, $SD = 0.92$) and three for locomotion mode (eigenvalue = 1.03; accounting for an additional 14.72 % of the variance).

3.2.7. Swiping in Locomotion Mode

Again based on the regulatory mode scale by Kruglanski (2000), we asked: “I take decisions based on my gut”; “I like the profiles that spontaneously trigger a good feeling in me”; “I follow my first impression”. (1 = “does not apply to me” to 5 = “very much applies to me”, $\alpha = 0.82$, $M = 3.15$, $SD = 1.07$).

3.2.8. Control Variables

We included participants’ age because prior research demonstrated higher levels of problematic social media use in younger people (Tang et al., 2016), gender with two dummy variables (1 = female; 0 = male; and 1 = diverse; 0 = female and male), relationship status (1 = partnered; 0 = single), because single individuals report higher fear of being single (Weisskirch et al., 2017), educational levels with two dummy variables (1 = high; 0 = low and middle and 1 = middle; 0 = high and low), and sample provider (1 = Kantar; 0 = TGM).

To detect insufficient effort responding, we included three bogus items, e.g., “I was born on February 30” (Dunn et al., 2018) to rate from 1 (fully disagree) to 5 (fully agree). Participants passed the check if they (strongly) disagreed and were excluded if they failed all three attention check items.

3.3. Data analysis

To test our hypotheses, we ran three moderated-mediation models using SPSS PROCESS 3 macro model no. 16 (10,000 bootstraps, Hayes, 2017) with frequency of dating app use as the independent variable, excessive swiping as mediator, and swiping in assessment mode (mean-centered) and swiping in locomotion mode (mean-centered) as moderators. As dependent variables, we respectively used upward social comparison, fear of being single, or partner choice overload. Furthermore, we controlled for age, female gender (1 = female; 0 = male or diverse), diverse gender (1 = diverse; 0 = female or male), relationship status (1 = partnered; 0 = single), education, and sample provider. For additional analyses see <https://doi.org/10.17605/OSF.IO/4BZQF>.

4. Results

We report unstandardized regression coefficients (b). For an overview of correlations and results, see Table A.1, A.2 and Figs. A.1,

A.2, and A.3. In line with our H1, we found a positive effect of dating app use frequency on excessive swiping ($b = 0.17, p < .001, 95\% \text{ CI } [0.12, 0.21]$). Thus, a higher frequency of dating app use was related to higher scores on excessive swiping. Concerning our mediator, we found a direct positive effect of excessive swiping on upward social comparison (H2a; $b = 0.17, p = .004, 95\% \text{ CI } [0.06, 0.29]$), on fear of being single (H2b; $b = 0.15, p = .014, 95\% \text{ CI } [0.03, 0.27]$), and partner choice overload (H2c; $b = 0.36, p < .001, 95\% \text{ CI } [0.26, 0.46]$). Thus, we found full support of our H2. Furthermore, we observed mediation effects, that is, an indirect effect of participants' dating app use on social upward comparison (H3a; $b = 0.03; 95\% \text{ CI } [0.01, 0.05]$), on fear of being single (H3b; $b = 0.03; 95\% \text{ CI } [0.00, 0.05]$), and on partner choice overload (H3c; $b = 0.06; 95\% \text{ CI } [0.04, 0.0]$) via excessive swiping. However, we found no support for our H4 and H5. The interaction effects of excessive swiping and assessment mode on upward social comparison (H4a; $b = -0.02, p = .714, 95\% \text{ CI } [-0.13, 0.09]$), fear of being single (H4b; $b = 0.11, p = .051, 95\% \text{ CI } [-0.00, 0.22]$), and partner choice overload (H4c; $b = -0.03, p = .461, 95\% \text{ CI } [-0.13, 0.06]$) showed no significant associations. For high levels of assessment, the effect of excessive swiping on fear of being single was positive as expected but closely failed to reach statistical significance. The same applied for the interaction effects of excessive swiping and locomotion mode on upward social comparison (H5a; $b = -0.02, p = .730, 95\% \text{ CI } [-0.12, 0.08]$), fear of being single (H5b; $b = 0.04, p = .483, 95\% \text{ CI } [-0.07, 0.14]$), and partner choice overload (H5c; $b = 0.03, p = .480, 95\% \text{ CI } [-0.06, 0.12]$).

5. Discussion

While extant research linked compulsive dating app use to anxiety, depression, and decreased life satisfaction (Her & Timmermans, 2020; Obarska et al., 2020), it was unclear by which mechanism dating app use relates to adverse outcomes. Starting from the assumption that the mere time spent online seems not directly related to well-being (Coyne et al., 2020), it is an open question which specific activities (or experiences) on dating apps decrease users' well-being. We contribute to the literature by investigating the specific activity of swiping (i.e., profile browsing on a dating app) in a sample of transition age girls and boys of all sexual orientations (and of diverse educational backgrounds). Based on theories and findings of social comparison (Festinger, 1954; Vogel et al., 2014) and on the choice overload literature (Chernev et al., 2015), we expected excessive swiping (i.e., a lack of control over and a mental preoccupation with swiping) to mediate associations of frequent dating app use with a) upward social comparison, b) fear of being single, and c) partner choice overload.

First, we found that the effect of frequent dating app use on excessive swiping was highly significant (H1). This finding is in line with research showing that frequent smartphone users engage more in non-communicative consumption behaviors than social uses on the smartphone (Elhai et al., 2017a; Noë et al., 2019). It is worth noting that we replicated this effect on a media platform that is nominally intended to make users meet in person and advertises with enabling in-person encounters quickly and efficiently. As opposed to this claim, our results show that users may end up browsing hundreds of options and get lost in in-app activities. However, the moderate effect size ($b = 0.17$) suggests that there are also circumstances in which (or users who) do not get lost in swiping – just as compulsive smartphone use and its effects depend on user characteristics (Panda & Jain, 2018). It would have practical relevance for users to shed light on pragmatic strategies of dating app use. Those users who are seriously interested in face-to-face meetings should be careful to restrict their swiping and not get distracted by in-app gratifications, especially if they have a tendency for compulsive behaviors.

One explanation for excessive swiping could be risk-free reward seeking: Understandably, users turn to swiping because it is not only fascinating and potentially rewarding but the only action connected to (online) dating that can provide gratifications but – by

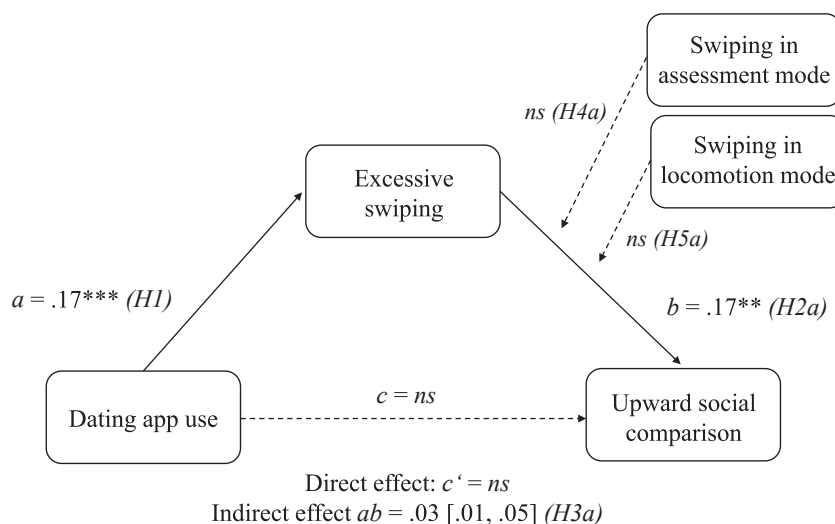


Fig. A1. Effect of dating app use and excessive swiping on upward social comparison. Notes. *Ns* non-significant. * $p < .05$. ** $p < .01$. *** $p < .001$. 95 % confidence intervals in brackets.

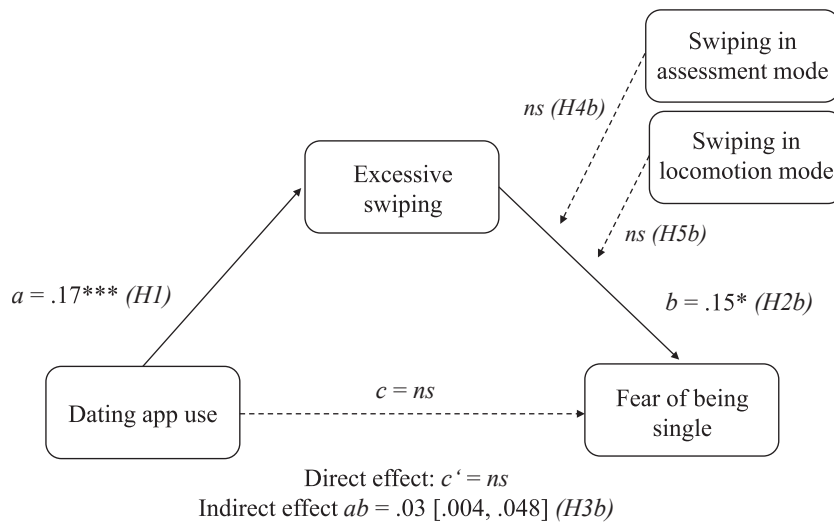


Fig. A2. Effect of dating app use and excessive swiping on fear of being single. Notes. *Ns* non-significant. * $p < .05$. ** $p < .01$. *** $p < .001$. 95 % confidence intervals in brackets.

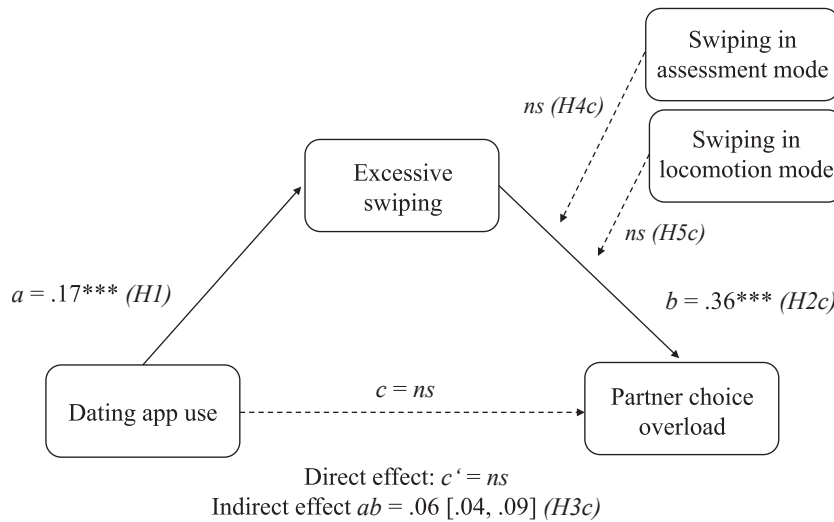


Fig. A3. Effect of dating app use and excessive swiping on partner choice overload. Notes. *Ns* non-significant. * $p < .05$. ** $p < .01$. *** $p < .001$. 95 % confidence intervals in brackets.

design – not lead to visible rejection. This makes the activity of swiping an ideal candidate for a compulsive behavior. Yet another potential mechanism would be *maximizing*. Research on product choices showed that more options trigger more searching (Iyengar & Lepper, 2000). People do not stop searching as soon as they have found a sufficing option, they try to maximize their gains which requires extensive searching. Future research should examine why and for whom dating app use may lead to excessive swiping. If risk-free reward seeking is a mechanism, traits such as (romantic) rejection sensitivity or dating anxiety will be moderators; if maximizing is a mechanism, excessive swiping may be a result of high expectations of the dating partner.

Second, we examined the effects of excessive swiping on transition age youth. In line with social comparison theory (Festinger, 1954), the positivity bias on social media and on dating app profiles (Reinecke & Trepte, 2014; Toma et al., 2008), and with findings on different social media (Schmuck et al., 2019), we found excessive profile browsing on dating apps to be related to upward social comparison (H2a). This is in line with prior studies in (mostly female) undergraduates showing links between compulsive Tinder use and self-conscious social comparisons (Her & Timmermans, 2020) as well as with decreased self-esteem following exposure to a high number of profiles (Thomas et al., 2022). We replicated this effect controlling for gender and education in a balanced sample.

Social comparison on (heterosexual) dating apps deserve future scholarly attention because there is a large body of literature on intrasexual comparison and competition during mating (e.g., men comparing themselves to other men and competing for female attention). Yet, we lack research on heterosexuals comparing themselves to the other sex because heterosexual men and women do not

compete for the same potential partners and thus should not be threatened by attractive other-gender profiles on dating apps.

Due to gendered bodies, heterosexuals may not necessarily compare their concrete physical features to the other sex. Looking at other-gender faces and bodies probably does not activate social comparison based on concrete gendered physical features (e.g., feminine or masculine body shape). However, in line with earlier studies on cross-gender social comparison (Buunk & van der Laan, 2002; Hudders & De Jans, 2021; Thai et al., 2016), we found that excessively browsing through (often other-gender) profiles seems to trigger not only desire but also cross-gender comparison processes. Probably more abstract dimensions of social comparison are salient when assessing other-gender pictures. Examples could be overall physical attractiveness, popularity, or self-worth – dimensions that are often matched in romantic partners (Garcia & Khersonsky, 1996; Shaw Taylor et al., 2011). While ego-protective mechanisms are at work in later stages of romantic involvement (Pinkus et al., 2008), a realistic assessment is necessary in early stages of (pre-)dating so as to avoid wasting energy on individuals who are *out of their league* according to conventional standards (van Straaten et al., 2009).

Future studies should inquire, perhaps using qualitative methods, whether users compare themselves with (same-gender) competitors or with potential (other-gender) partners. Future research should also investigate if dating app users interpret matches rather as an indicator of sexual attention by potential partners or as a general indicator of peer popularity.

Moreover, we found excessive swiping to aggravate fear of being single (H2b). In transition age youth, we replicated an effect earlier found in undergraduates showing that, counterintuitively, not only extreme partner scarcity but also extreme partner abundance evokes fear of being single (Taylor, 2013; Thomas et al., 2022). This effect can be explained with what Schwartz called the “tyranny of choice” (2000, p. 81). When exposed to hundreds of profiles, users report they feel like having to screen all options and sort out unsuitable ones (Best & Delmege, 2012). Instead of relieving pressure, the availability of plenty alternatives may exert pressure on singles to finally find a partner and trigger dispositional attribution of failure (Thomas et al., 2022). Excessively swiping through many alternatives may also overwhelm those who are in a relationship. In case of problems with the current partner, the presence of many alternatives may similarly evoke self-blame and dispositional attribution of failure. It is worth noting that the control variable relationship status neither affected excessive swiping, nor fear of being single: Partnered individuals swiped as excessively and suffered as much from adverse outcomes as single individuals. Prior research already showed that a higher availability of alternatives was in fact related to a *lower* intention to meet someone from a dating app in person and commit infidelity (Alexopoulos et al., 2020). This suggests that even those *not* looking for a serious relationship get paralyzed – contrasting research that labelled relationship seeking on dating apps a risk factor (Her & Timmermans, 2020). Thus, users are ill-advised to spend their time on dating apps with excessive swiping because this can induce fears – even though they are not aware of it and prefer large numbers of options in online dating (Lenton et al., 2008).

Lastly, swiping excessively through a vast number of profiles related to partner choice overload (H2c). The phenomenon of choice overload has been replicated in many areas, showing that individuals are poorly equipped to cognitively handle a high number of alternatives (Iyengar & Lepper, 2000). In line with that, excessive swipers reported to be more overwhelmed by the abundant number of seemingly available partners on dating apps than moderate swipers (who may spend their in-app time with communicative uses). Future research should test if partner choice overload mediates undesired effects of swiping, for example, on fear of being single.

Supporting our third hypothesis, we found that excessive swiping fully mediated the effects of dating app use on all three adverse outcomes. In other words, with excessive swiping in the model, frequent dating app use was unrelated to any of the adverse outcomes. The finding that frequent use was not necessarily associated with decreased well-being means that there must also be (“adaptive”) user strategies unrelated to excessive swiping, upward comparison, or other undesired effects in youth. Such adaptive ways to use dating apps could be communicative uses such as chatting or sexting which we did not include in our study. Our results show that the mere time spent on dating apps had no predictive value on several indicators of well-being.

The advent of modern technologies and new media has often been accompanied by the moral panic that (young) users will be unable to disengage from or regulate their media use, so (over-) use will displace traditional offline activities and become uncontrollable (Livingstone, 2007). Similar apprehensions have been voiced for dating apps (Orosz et al., 2018; Rochat et al., 2019; Stampler, 2014). Yet, our results do not support the idea that usage frequency is necessarily problematic. This is in line with other studies findings no evidence for “Tinder addiction” (Bonilla-Zorita et al., 2021) and the decision not to formalize Internet, smartphone, or any media addiction as clinical disorders (Grant & Chamberlain, 2016). Since the construct of excessive swiping yielded significant explanatory power, it seems warranted to focus on the psychological effects of (compulsively) using specific platform elements of a medium. Furthermore, future research should disentangle swiping frequency from excessiveness, for example, by also testing effects of moderate swiping.

As moderators, we examined swiping in assessment (i.e., critically evaluating profiles) and locomotion (i.e., taking intuitive gut decisions) mode. We expected stronger adverse effects in assessment mode (H4) and weaker effects in locomotion mode (H5, Kruglanski, 2000). Although in high assessors, the effect of excessive swiping on fear of being single only closely failed to reach statistical significance ($p = .051$), we conclude that regulatory mode did not moderate effects on any of the three adverse outcomes. That is, excessive swiping seems by and large detrimental, no matter how youth swipe. At least the regulatory mode of decision-making while swiping seemed not to be the decisive moderator. However, one must keep in mind that we relied on self-formulated items. Future research should replicate this study using validated questionnaires for swiping in assessment and locomotion mode and additionally investigate other user strategies. Intraindividual differences remain a gap in the literature that is filled with individual differences.

The most blatant limitation of this study is its cross-sectional nature. Due to this design, we cannot tell whether excessive swiping was the cause or the consequence of upward social comparison or fear of being single. It remains unclear whether swiping induces upward social comparison (Thomas et al., 2022) and fear of being single or whether users try to repair their already low self-esteem with collecting matches by swiping (Sumter et al., 2017). In order to understand the directions of these relationships, longitudinal and experimental research designs are needed. A second limitation is that we assessed all variables using self-report measures which could

be biased by social desirability. Future research could, for example, test implicit associations with singledom.

6. Conclusions

Those limitations notwithstanding, we can conclude that frequent dating app use was unrelated to adverse psychological outcomes when considering the specific activity of excessive swiping. Researchers have often problematized the (over)use of digital technologies in young people; some even pathologize it as addiction. Our findings, however, show that problematizing mere overuse is unwarranted. As has been found for social media (Coyné et al., 2020), not the mere time spent on dating apps is problematic for transition age youth but the excessive use of a certain rather non-communicative platform element. In principle, digital technologies bear the potential to enhance social connectedness. Yet, if users get distracted by quick, non-communicative gratifications such as collecting 99 + matches, then dating app use will not provide that desired spark of connection.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

All data is available on OSF, please find the link in the manuscript.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.tele.2023.101949>

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