



Relationship Between use of Dating apps and Sociodemographic Variables, Sexual Attitudes, and Sexual risk Behaviors

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Abstract

Introduction Although some studies have found a link between dating apps and sociodemographic variables, sexual attitudes, and sexual risk behaviors, few studies in Spain have explored these relationships. This study analyzes the relationship between the use of dating apps and these variables in this country.

Method A total of 2288 people aged between 18 and 35 years completed a questionnaire, which, in addition to sociodemographic variables, contained questions on the use of dating apps, a measure of attitudes toward online sexual behaviors, and indicators of sexual risk behaviors.

Results The percentage of men using dating apps is higher than that of women, and the percentage of LGB users is higher than that of heterosexuals. In addition, users have more positive attitudes toward online sexual behavior than non-users. In general, users are also found to have more sexual partners than non-users, although they more frequently use condoms for vaginal intercourse and anal sex.

Conclusion The present study provides evidence for the relationship between the use of dating apps and certain variables in Spain.

Policy Implications Dating apps do not have to be equated with sexual risk, but condom use should continue to be encouraged, especially among those who have multiple sexual partners.

Keywords Dating apps · Sexual attitudes · Sexual partners · Condom use

The use of dating apps has increased in recent years, which has led to a change in the way people communicate with each other and, specifically, find sexual and romantic partners (Anzani et al., 2018). Dating apps allow people to connect and find sexual partners easily and quickly (David & Cambre, 2016; Timmermans & De Caluwé, 2017).

The percentage of people using dating apps typically ranges from 40 to 50% (e.g., Botnen et al., 2018; Shapiro et al., 2018; Sumter & Vandenbosch, 2019). However, the reported estimates are higher in those studies that include only men who have sex with men (e.g., Badal et al., 2018; Boonchutima & Kongchan, 2017; Lehmilller & Ioerger, 2014). The most commonly used dating apps are Tinder for heterosexual people (Castro & Barrada, 2020; Griffin et al.,

2018) and Grindr for men who have sex with men (Badal et al., 2018; Filice et al., 2019).

Dating apps have been linked to different variables, including sociodemographic variables (e.g., Castro & Barrada, 2020), sexual attitudes (e.g., Sumter & Vandenbosch, 2019), and sexual risk behaviors (e.g., Badal et al., 2018). The sociodemographic variables related to the use of these apps include gender, sexual orientation, and age. Regarding gender, some studies have found that a higher percentage of men than women use dating apps (e.g., Barrada & Castro, 2020; Castro & Barrada, 2020), while other studies have found similar rates of app use (Sawyer et al., 2018; Shapiro et al., 2017). In terms of sexual orientation (Sawyer et al., 2018; Shapiro et al., 2017), some studies indicate that a higher percentage of LGB people than heterosexuals use dating apps (Barrada & Castro, 2020; Sumter & Vandenbosch, 2019). Age has also been associated with the use of dating apps. For example, Barrada and Castro (2020) found that the mean age of Tinder users is higher than that of non-users in college students aged 18–26 years. Moreover, some

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studies have found that the age subgroup with a higher prevalence of use of dating apps is between 24 and 30 years of age (Castro & Barrada, 2020).

In addition to sociodemographic variables, dating apps have also been linked to psychological variables such as sexual attitudes (e.g., Konings et al., 2022; Sumter & Vandenbosch, 2019). The constructs that have been used to measure sexual attitudes include sexual permissiveness, sexual conservatism-liberalism, and erotophobia-erotophilia (Blanc & Rojas, 2017). The construct of socio-sexuality has also been used when measuring sexual attitudes (Simpson & Gangestad, 1991). While some studies have found that dating app users have more permissive sexual attitudes than non-users (Shapiro et al., 2017; Sumter & Vandenbosch, 2019), Gatter & Hodkinson, (2016) found no such relationship when controlling for age. The use of dating apps has also been related to the socio-sexuality construct. Although Barrada and Castro (2020) found that users obtained higher scores than non-users, Botnen et al. (2018) found no such relationship. Finally, Lehmiller and Ioeberger (2014) found no relationship between dating app use and erotophilia.

In general, attitudes are an effective way of predicting behaviors (Harmon-Jones et al., 2018). However, the association between dating app use and sexual attitudes is unclear. The relationship between attitudes and behavior is stronger when measures of attitudes and behavior are matched in terms of target, context, and time (Harmon-Jones et al., 2018). Thus, a measure focused on attitudes toward online sexual behaviors might be more closely related to dating app use than a measure of general sexual attitudes.

However, despite the various advantages of dating apps, numerous studies have shown that their use is related to an increase in risky sexual behaviors (Dai, 2023; Mignault et al., 2022; Rogge et al., 2020). Although there is no consensus on the definition of this term (Blanc & Rojas, 2018), in the field of health, risky sexual behaviors are thought to be those behaviors that increase the probability of negative consequences, such as sexually transmitted infections (Mirzaei et al., 2016). The main sexual risk behaviors include unprotected sex with multiple sexual partners (Ashenhurst et al., 2017).

Studies focused on the number of sexual partners also indicate that users have more sexual partners than non-users (e.g., Garga et al., 2021), both in men who have sex with men (Badal et al., 2018; Gibson et al., 2022; Lehmiller & Ioeberger, 2014) and heterosexuals (Sawyer et al., 2018). However, when it comes to condom use, the results are inconsistent. While some research has found a positive relationship between app use and frequency of condom use (e.g., Wu, 2019), others have found a negative relationship where app users show less frequent use of condoms (e.g., Choi et al., 2016; Dai, 2023; Gibson et al., 2022; Sawyer et

al., 2018). The frequency of app use has also been related to the frequency of condom use. For example, Luo et al. (2019), in a sample of users consisting of men who had sex with men, found that those who used dating apps used condoms more frequently for anal sex than those who did not use it. On the other hand, some studies have found no relationship between dating app use and condom use (Lehmiller & Ioeberger, 2014; Shapiro et al., 2017).

Although some studies have found a link between dating apps and sociodemographic variables (gender, sexual orientation, and age), sexual attitudes, and sexual risk behaviors (number of sexual partners and condom use), few studies in Spain have explored these relationships. Furthermore, those studies that relate the use of dating apps with sociodemographic variables (Castro et al., 2020) or with the socio-sexuality construct (Barrada & Castro, 2020; Barrada et al., 2021) have focused only on university students. In addition, the one study that relates the use of dating apps with sexual risk behaviors did not control for sexual orientation (Wu et al., 2019). In contrast, the number of sexual partners and frequency of condom use was not estimated according to different sexual behaviors.

Therefore, the general objective of this study was to analyze the relationship between the use of dating apps and sociodemographic variables, sexual attitudes, and sexual risk behaviors in a Spanish sample. The specific objectives and their corresponding hypotheses were as follows:

Specific objective 1. To explore the association between the use of dating apps (yes/no) with the sociodemographic variables of gender and sexual orientation.

Hypothesis 1. According to previous studies (e.g., Barrada & Castro, 2020; Castro et al., 2020; Sumter & Vandenbosch, 2019), the percentage of people who have used a dating app is expected to be higher in men than in women and in LGB people than heterosexuals.

Specific objective 2. To explore the association between the use of dating apps (yes/no) and attitudes toward online sexual behaviors.

Hypothesis 2. According to previous studies (e.g., Barrada & Castro, 2020; Harmon-Jones et al., 2018; Shapiro et al., 2017; Sumter & Vandenbosch, 2019), dating app users are expected to have more positive attitudes toward online sexual behaviors than non-users.

Specific objective 3. To explore the association between the use of dating apps (yes/no) with the number of sexual partners and the frequency of condom use in vaginal intercourse, oral sex, and anal sex.

Hypothesis 3. According to previous studies (e.g., Badal et al., 2018; Garga et al., 2021; Gibson et al., 2022; Lehmiller & Ioeberger, 2014; Sawyer et al., 2018; Shapiro et al., 2017), dating app users are expected to have had more sexual partners across the three behaviors than non-users.

Specific Objective 4. To explore the relationship between the frequency of dating app use, the number of times using dating apps, the number of sexual behaviors performed with users, and the sociodemographic variables of gender and sexual orientation.

Hypothesis 4. According to previous studies (Badal et al., 2018; Barrada & Castro, 2020; Timmermans & Courtois, 2018), it is expected that men and LGB people will report using dating apps more frequently and engaging in a greater number of different sexual behaviors with people they met through these apps.

Specific Objective 5. To relate the frequency of dating app use, the number of times dating apps are used, and the number of sexual behaviors performed with users to attitudes toward online sexual behaviors.

Hypothesis 5. Users with more positive attitudes toward online sexual behaviors are expected to have used dating apps more frequently, more often, and engaged in a greater number of different sexual behaviors with people they met through these apps.

Method

Participants

A total of 2312 people accessed the questionnaire. Of the total, four did not give their informed consent and did not complete the questionnaire, 12 were excluded because they identified with another gender and eight were excluded because they identified with another sexual orientation or were not clear about it. The final sample included 2288 participants aged between 18 and 35 years ($M=23.23$; $SD=3.87$). Of the sample, 60.3% were women ($n=1380$), and 39.7% were men ($n=908$). Concerning education level, 58.9% had completed vocational training or high school studies ($n=1358$), 33.5% had completed university studies ($n=767$), 6.7% had completed compulsory secondary studies ($n=153$), and 0.9% had completed no studies or only primary studies ($n=20$). Concerning sexual orientation, 74.9% were heterosexual ($n=1714$), 9.2% homosexual ($n=210$), and 15.9% bisexual ($n=364$).

Instruments and Variables

The questionnaire included the following variables and instruments:

Sociodemographic Variables gender, age, educational level, and sexual orientation. *Items related to the use of dating*

apps (only people who had used dating apps answered from question 2 onwards).

1. Have you ever used a dating app (Tinder, Badoo, Lovoo, Grindr, etc.)? Response options were “yes” and “no”.
2. Which app(s) do you use, or have you used? Response options were “Tinder”, “Badoo”, “Meetic”, “Lovoo”, “Grindr” and “other: (specify)”.
3. How many times have you used a dating app? Response options ranged from 1 to more than 10.
4. How often do you use, or have you used, the dating app(s)? Response options ranged from 0 (never) to 7 (more than once per day).
5. Have you engaged in the following sexual behaviors with the person(s) you met through the app(s)? The following nine response options were used to assess sexual behaviors: caressing in intimate areas, vaginal intercourse, masturbation, oral sex, anal sex, sending images or messages with sexual content (sexting), sex through the network (cybersex), threesome, and group sex (orgy). To obtain the total score for the number of different sexual behaviors performed, all items were summed except for vaginal intercourse and anal sex, which people of all sexual orientations do not perform. The scores could range from 0 to 7, where a higher score indicates a greater number of different sexual behaviors performed with people met through dating apps. The reliability estimate using Cronbach’s alpha coefficient was .84 for the total sample and ranged from 0.79 to .86 for the different sex and sexual orientation groups.

Indicators of sexual risk behaviors (Blanc & Rojas, 2018):

1. Questions on the number of partners in vaginal intercourse, oral sex, and anal sex were included. Response options ranged from 1 to more than 10.
2. We gathered information regarding the frequency of condom use in vaginal intercourse, oral sex, and anal sex. Response options ranged from 1 (*never*) to 5 (*always*).

Attitudes toward Online Sexual Behaviors Subscale. This instrument is part of the Scale of Attitudes toward Sexual Behaviors (Blanc et al., 2020). It consists of 4 items with a Likert-type format with five response options from 1 (*very negative*) to 5 (*very positive*). The total score on the subscale is obtained by summing all the items and can range from 4 to 20. The higher the score, the more positive attitudes toward online sexual behaviors. The reliability values estimated by Cronbach’s alpha coefficient were 0.87 for the total sample and .86 to .88 in the different gender and sexual orientation groups.

Procedure

The information about the study was disseminated to university students of different courses and degrees in Spain so that they could spread it. Students from different universities in the Community of Andalusia (University of Huelva, University of Cordoba, and University of Almeria) were given the information about the study both through the university mail and in class during school hours. Students were encouraged to share the information and link to participate in the study through Instagram, Facebook, as well as WhatsApp. The online questionnaire was administered via Google Forms. The participants were told that the study was about people's sexual relationships. People had to give their informed consent before participating and were provided with preliminary information about the study, including the requirements for participation, its anonymous nature, data protection regulations, and the approximate duration of the study. The inclusion criteria were being between 18 and 35 years old and residing in Spain. The questionnaire was conducted from February 2021 to March 2022. The study was approved by the bioethics committee of the Junta de Andalusia.

Data Analysis

First, the percentage of people who had used a dating app and the frequency of use of the various dating apps were calculated. We also analyzed and compared the percentage of users and non-users who had used a dating app according to gender and sexual orientation. In addition, the chi-square test was used to explore the association between the use of dating apps and the variables of gender and sexual orientation. Effect sizes were estimated using Cramer's V and pairwise comparisons were performed correcting p-values using the Bonferroni method. Second, descriptive statistics (M and SD) are provided on attitudes toward online sexual behaviors, the number of sexual partners, and frequency of condom use in vaginal intercourse, anal sex, and oral sex, distinguishing between users and non-users. Finally, the mean scores were compared using Student's t-test for

independent samples, and effect sizes were calculated using Cohen's d.

Binary logistic regression was also conducted to analyze the variables related to using dating apps (yes/no). Multiple linear regression analyses were performed to determine whether using dating apps (yes/no) was related to the number of sexual partners and the frequency of condom use in vaginal intercourse and oral and anal sex. Finally, multiple linear regression analyses were performed to analyze the variables related to the frequency and number of times participants reported using dating apps and the number of sexual behaviors performed with users. For the analyses, homosexual and bisexual participants were assigned to the same group, called *LGB people*. Possible interaction effects between the use of dating apps and the other variables were explored through factorial ANOVAs. To control for all variables, the remaining variables were included as covariates in these ANOVAs. Simple effects analyses were conducted and plotted to better interpret interaction effects, and effect sizes were calculated using partial eta squared (η^2_p). The data were analyzed using Version 25 of the SPSS statistical program.

Results

Of the sample, 38.5% reported having used a dating app ($n=881$). The most frequently used dating app was Tinder. Of the users, 57.2% reported only using Tinder ($n=504$), and 88.9% have used Tinder in addition to other apps ($n=783$).

Variables Related to the use of Dating apps (yes/no)

Within the male group, 49.3% reported using a dating app ($n=460$), and within the female group, this was 30.5% ($n=421$). Within the heterosexual group, 31.6% reported using a dating app ($n=541$), and within the LGB group, this was 59.2% ($n=340$). Within the LGB group, 76.8% of the men reported using a dating app ($n=156$). Table 1 shows the percentages of users and non-users according to gender and sexual orientation. Results of the Chi-square test

Table 1 Percentages of users and non-users of dating apps according to gender and sexual orientation, chi-square test, and Cramer's V

Gender	Users of dating apps	Heterosexual % (n)	Homosexual % (n)	Bisexual % (n)	χ^2	Cramer's V
Women	Yes	23.5% (237)	51.9% (42)	49.0% (142)	87.458**	0.252
	No	76.5% (772)	48.1% (39)	51.0% (148)		
Men	Yes	43.1% (304)	82.2% (106)	67.6% (50)	75.739**	0.289
	No	56.9% (401)	17.8% (23)	32.4% (24)		
	χ^2	74.050**	21.982**	8.185**		
	Cramer's V	0.208	0.324	0.150		

** $p < .01$

Table 2 Descriptive statistics for attitudes toward online sexual behaviors, number of sexual partners, and frequency of condom use in users and non-users of dating apps, and comparison of the mean scores

	Users of dating apps (n = 881)		Non- users of dating apps (n = 1407)		Comparison of the mean scores	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	Cohen's <i>d</i>
AOSB	13.22	4.12	10.91	4.20	-12.92**	0.56
<i>Number of sexual partners</i>						
Vaginal intercourse	6.98	3.65	4.58	3.43	-13.56**	0.68
Oral sex	6.59	3.72	3.76	3.05	-17.69**	0.83
Anal sex	3.48	3.34	1.79	1.63	-9.68**	0.64
<i>Frequency of condom use</i>						
Vaginal intercourse	3.58	1.06	3.49	1.11	-1.65	
Oral sex	1.43	0.84	1.36	0.84	-1.63	
Anal sex	2.84	1.66	2.03	1.48	-7.93**	0.51

Note. AOSB = attitudes toward online sexual behaviors; Bonferroni correction: $0.05/7 = 0.007$; ** $p < .007$

Table 3 Logistic regression to analyze the variables related to using dating apps (yes/no)

	B	SE	Wald	Exp(B)	95% CI
Gender	0.818	0.098	69.573	2.267**	[1.870; 2.748]
Sexual Orientation	1.266	0.110	132.545	3.546**	[2.858; 4.399]
Age	0.121	0.012	95.656	1.129**	[1.102; 1.157]
AOSB	0.099	0.012	71.931	1.104**	[1.079; 1.129]

Note. Gender: women = 0 and men = 1; Sexual Orientation: heterosexuals = 0 and LGB people = 1; AOSB = attitudes toward online sexual behaviors; ** $p < .01$

revealed that app use is related to gender and sexual orientation. Pairwise comparisons show that the percentage of men who have used a dating app is higher than that of women in all sexual orientations. Also, pairwise comparisons show that the percentage of people (men and women) who have used a dating app is also higher in homosexual and bisexual people than in heterosexual people. The differences between homosexual and bisexual people were not statistically significant.

Table 2 shows the descriptive statistics (*M* and *SD*) for attitudes toward online sexual behaviors, number of sexual partners, and frequency of condom use in vaginal intercourse, oral sex, and anal sex in users and non-users of dating apps, allowing for a comparison of the mean scores. The results show statistically significant differences in all variables except condom frequency in

vaginal intercourse and oral sex. Users have more positive attitudes toward online sexual behaviors, have had more sexual partners in vaginal intercourse, oral sex, and anal sex, and have used condoms more frequently in anal sex than non-users.

Table 3 displays the logistic regression results where variables related to dating apps are also analyzed. The results indicate that being male, being a LGB person, and having positive attitudes toward online sexual behaviors are associated with a higher likelihood of using dating apps. Although this association is greater with gender and sexual orientation than with age and those attitudes.

Table 4 shows the results of the multiple linear regression analyses where it can be observed that the use of dating apps is related to the number of partners in vaginal intercourse, oral sex, and anal sex. However, some interaction effects were also found. Figure 1 shows the interaction effects between gender and apps for the number of sexual partners in vaginal intercourse ($F_{(1, 1790)} = 9.943$, $p = .002$, $\eta^2_p = 0.006$), oral sex ($F_{(1, 2004)} = 4.068$, $p = .044$, $\eta^2_p = 0.006$), and anal sex ($F_{(1, 943)} = 14.390$, $p < .001$, $\eta^2_p = 0.002$).

In vaginal intercourse, analysis of the simple effects shows that while in non-users, there are no differences between men and women ($p = .364$), such gender differences were found in users ($p = .001$). Female users have had more sexual partners in vaginal intercourse ($M = 7.21$,

Table 4 Multiple linear regression analyses to determine whether using dating apps (yes/no) was related to the number of sexual partners

Sexual Partners	Vaginal intercourse			Oral sex			Anal sex		
	B	SE	β	B	SE	β	B	SE	β
Gender	-0.209	0.177	-0.027	0.557	0.153	0.076**	1.416	0.156	0.262**
Sexual Orientation	-0.362	0.213	-0.039	0.676	0.175	0.082**	1.909	0.173	0.325**
Age	0.176	0.021	0.186**	0.139	0.019	0.150**	0.110	0.019	0.165**
AOSB	0.097	0.020	0.112**	0.117	0.018	0.140**	0.037	0.018	0.058*
User of dating apps	1.987	0.181	0.257**	2.077	0.163	0.281**	0.559	0.167	0.104*

Note. Gender: women = 0 and men = 1; Sexual Orientation: heterosexuals = 0 and LGB people = 1; AOSB = attitudes toward online sexual behaviors; User of dating apps: no = 0 and yes = 1. * $p < .05$; ** $p < .01$

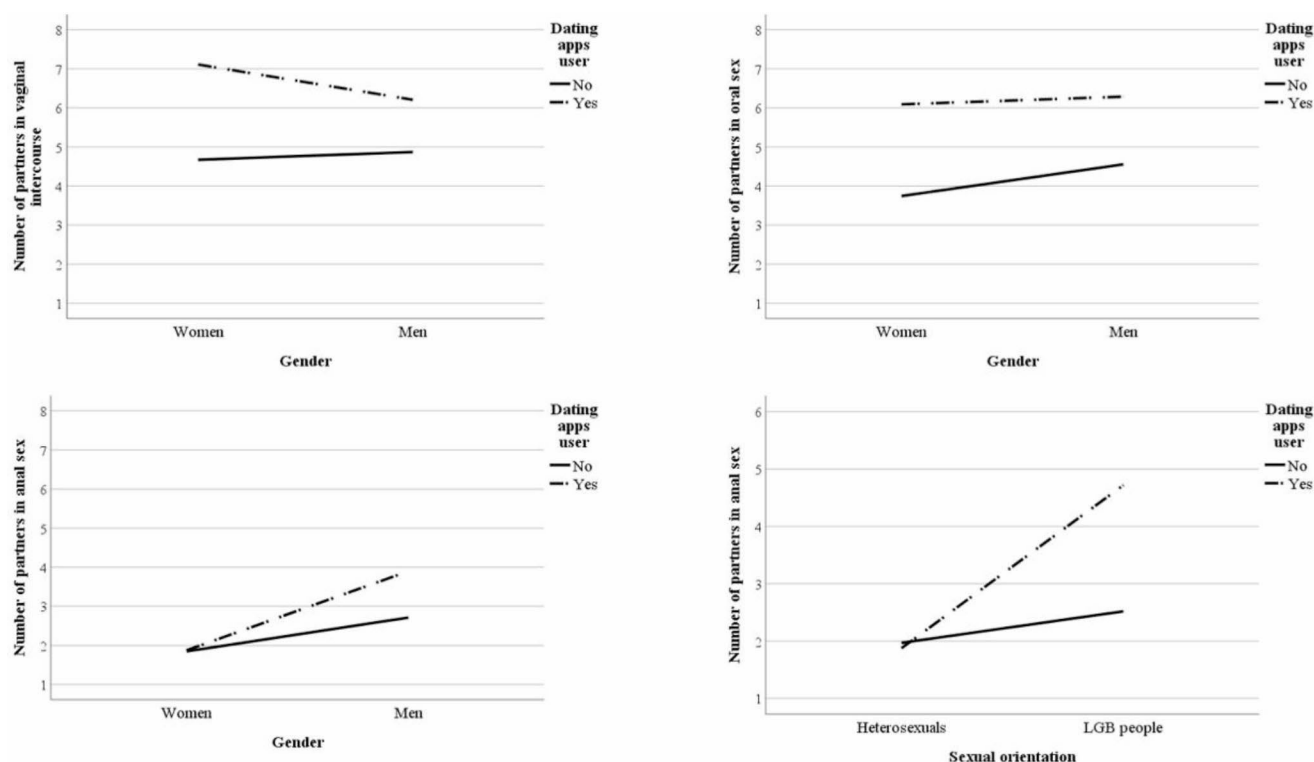


Fig. 1 Interaction effects between gender and app use for the number of partners in vaginal intercourse, oral sex, and anal sex, and between sexual orientation and app

SD=3.58) than male users ($M=6.70$, $SD=3.72$). The simple effects analysis also shows statistically significant differences in the number of partners in vaginal intercourse, both in women ($p < .001$) and men ($p < .001$) and in users and non-users. In vaginal intercourse, female users have had fewer sexual partners ($M=7.21$, $SD=3.58$) than non-users ($M=4.46$, $SD=3.38$), while male users have had more partners ($M=6.70$, $SD=3.72$) than non-users ($M=4.85$, $SD=3.52$).

In oral sex, the analysis of simple effects shows that while in users there are no differences between men and women ($p = .402$), in non-users, these gender differences were significant ($p < .001$). Male non-users have had more oral sex partners ($M=4.38$, $SD=3.40$) than female non-users ($M=3.47$, $SD=2.83$). The simple effects analysis also shows statistically significant differences in the number of partners in oral sex, both in women ($p < .001$) and men ($p < .001$), users and non-users. For oral sex, both female ($M=6.40$, $SD=3.60$) and male users ($M=6.76$, $SD=3.83$) have had more partners than non-users (female: $M=3.47$, $SD=2.83$; male: $M=4.38$, $SD=3.40$).

For anal sex, the analysis of simple effects shows differences between men and women in both users ($p < .001$) and non-users ($p < .001$). Male users have had more partners ($M=4.39$, $SD=3.79$) than female users ($M=2.19$,

$SD=1.91$), and male non-users have had a greater number of partners ($M=2.37$, $SD=2.36$) than female non-users ($M=1.49$, $SD=0.97$). The simple effects analysis also reveals differences between users and non-users for men ($p < .001$) but not for women ($p = .901$). Male users have had a greater number of anal sex partners ($M=4.39$, $SD=3.79$) than non-users ($M=2.37$, $SD=2.36$).

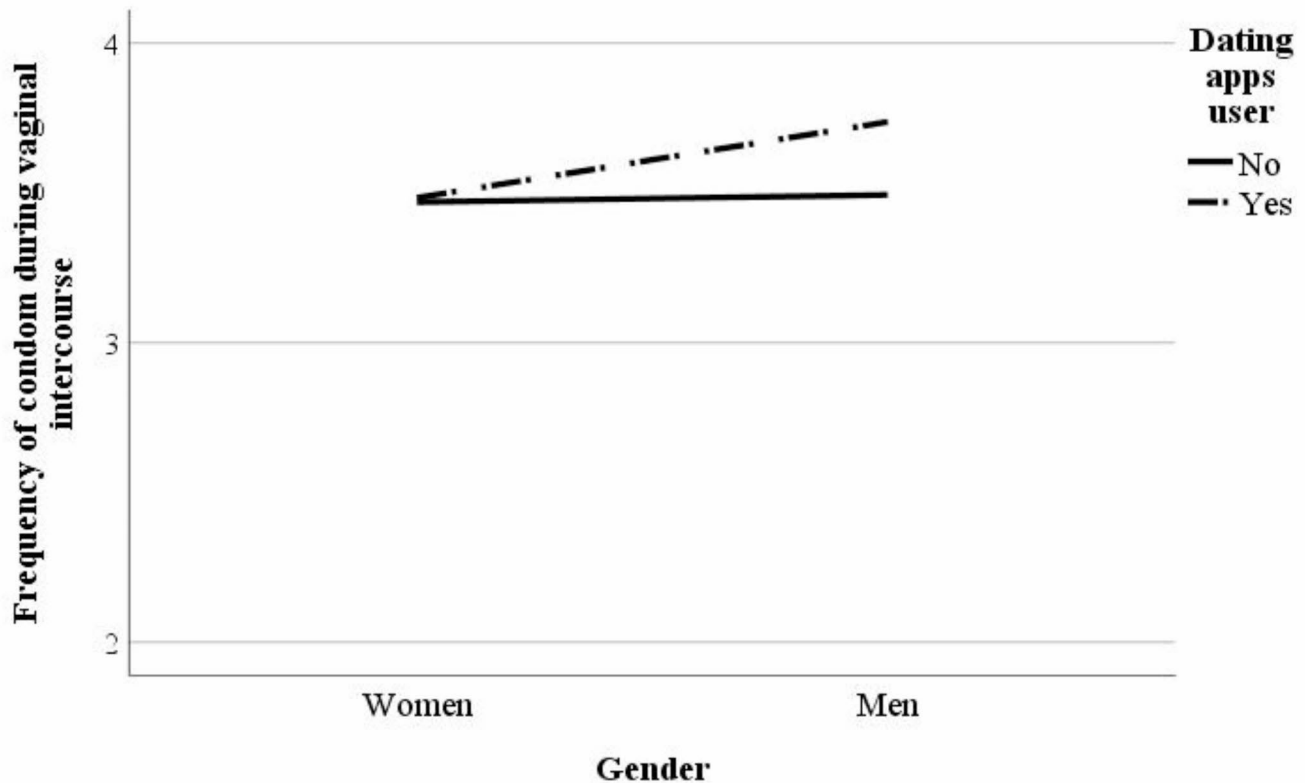
Figure 1 also shows the interaction effects between sexual orientation and app use for the number of anal sex partners ($F_{(1, 943)} = 46.050$, $p < .001$, $\eta^2_p = 0.047$). The simple effects analysis shows differences between heterosexuals and LGB people among both users ($p < .001$) and non-users ($p = .036$). For anal sex, LGB non-users have reported having more partners ($M=2.14$, $SD=2.06$) than heterosexual non-users ($M=1.71$, $SD=1.52$), and LGB users have had more partners ($M=5.00$, $SD=3.95$) than heterosexual users ($M=2.24$, $SD=2.01$). The simple effects analysis also shows differences between non-users and users among LGB people ($p < .001$) but not heterosexuals ($p = .619$). LGB users have had more partners ($M=5.00$, $SD=3.95$) than LGB non-users ($M=2.14$, $SD=2.06$).

Table 5 shows the results of the multiple linear regression analyses where it can be observed that the use of dating apps is related to the frequency of condom use in anal sex. Users

Table 5 Multiple linear regression analyses to determine whether using dating apps (yes/no) was related to the frequency of condom use

Frequency of condom use	Vaginal intercourse			Oral sex			Anal sex		
	B	SE	β	B	SE	β	B	SE	β
Gender	0.109	0.056	0.048	-0.005	0.040	-0.003	0.713	0.103	0.220**
Sexual Orientation	0.080	0.068	0.029	0.120	0.045	0.062*	0.670	0.114	0.190**
Age	0.003	0.007	0.009	0.025	0.005	0.116**	0.021	0.013	0.051
AOSB	-0.025	0.006	-0.095**	-0.010	0.005	-0.051*	-0.022	0.012	-0.058
User of dating apps	0.108	0.058	0.047	0.019	0.042	0.011	0.463	0.110	0.143**

Note. Gender: women=0 and men=1; Sexual Orientation: heterosexuals=0 and LGB people=1; AOSB=attitudes toward online sexual behaviors; User of dating apps: no=0 and yes=1. * $p < .05$; ** $p < .01$

**Fig. 2** Interaction effects between gender and app use for the frequency of condom use during vaginal intercourse

more frequently use condoms than non-users when engaging in this behavior.

Figure 2 shows the interaction effects found between gender and app use for the frequency of condom use during vaginal intercourse ($F_{(1, 1790)} = 4.225, p < .040, \eta^2_p = 0.002$). The simple effects analysis shows that while condom use does not differ between male and female non-users of dating apps ($p = .719$), gender differences were found among users ($p < .001$). Male users used condoms more frequently in vaginal intercourse ($M = 3.69, SD = 1.04$) than female users ($M = 3.49, SD = 1.06$). The simple effects analysis also shows a difference in condom use between users and non-users among men ($p = .005$) but not women ($p = .843$). Male users used condoms more frequently in vaginal intercourse ($M = 3.69, SD = 1.04$) than non-users ($M = 3.47, SD = 1.14$).

Variables Related to Frequency, Number of Times Using Dating apps, and Number of Sexual Behaviors Performed with Users

Table 6 shows the results of the multiple linear regression analyses, which analyzed the variables related to frequency, the number of times dating apps were used, and the number of sexual behaviors performed with users. Gender was related to the number of times dating apps were used and the number of sexual behaviors performed with users. In contrast, sexual orientation and age were related to all three variables. LGB people use dating apps more frequently and have engaged in more different sexual behaviors with people they have met through these apps than heterosexuals. Attitudes toward online sexual behaviors were related to the

Table 6 Multiple linear regression analyses to examine the variables related to the frequency and number of times participants reported using dating apps and the number of sexual behaviors performed with users of dating apps

	Frequency using dating apps			Number of times using dating apps			Number of sexual behaviors		
	B	SE	β	B	SE	β	B	SE	β
Gender	0.227	0.154	0.049	1.406	0.262	0.169**	0.309	0.132	0.073*
Sexual Orientation	0.938	0.161	0.197**	2.465	0.273	0.289**	1.250	0.138	0.290**
Age	0.109	0.019	0.187**	0.292	0.033	0.278**	0.107	0.017	0.202**
AOSB	-0.002	0.019	-0.003	0.008	0.032	0.008	0.093	0.016	0.181**

Note. Gender: women=0 and men=1; Sexual Orientation: heterosexuals=0 and LGB people=1; AOSB=attitudes toward online sexual behaviors; * $p < .05$; ** $p < .01$

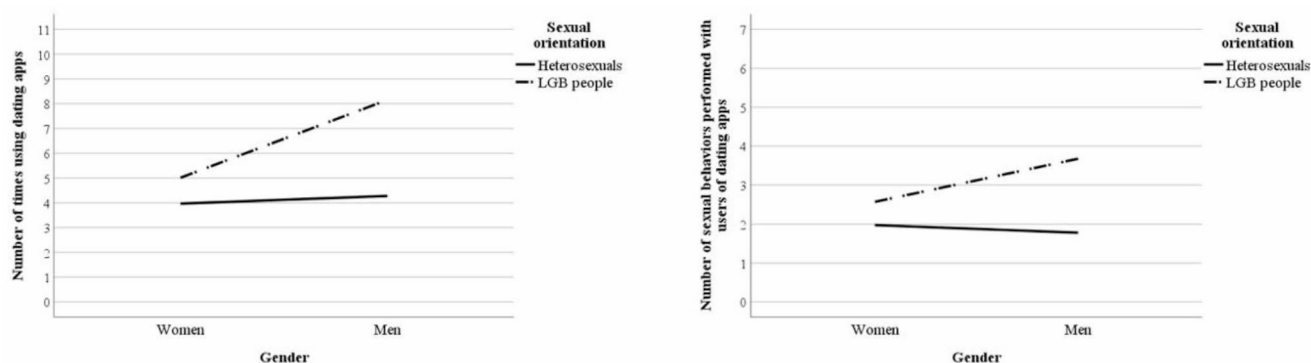


Fig. 3 Interaction effects between gender and sexual orientation for the number of times apps are used and the number of sexual behaviors performed with users of

number of sexual behaviors reported by users. Users with more positive attitudes toward sexual behaviors reported engaging in more different sexual behaviors with people they met through these apps.

Figure 3 shows the interaction effects between gender and sexual orientation for the number of times apps are used ($F_{(1, 877)} = 29.416$, $p < .001$, $\eta^2_p = 0.033$) and the number of sexual behaviors performed ($F_{(1, 875)} = 24.206$, $p < .001$, $\eta^2_p = 0.027$). The simple effects analysis shows differences in the LGB group between men and women in the number of times of use ($p < .001$) and the number of behaviors ($p < .001$), but not between heterosexual men and women ($p = .344$ and $p = .241$). In the LGB group, men used the apps a greater number of times and performed a greater number of sexual behaviors ($M = 3.78$, $SD = 2.15$) than women ($M = 2.47$, $SD = 1.98$). Differences were also found between LGB people and heterosexuals in both men ($p < .001$ and $p < .001$) and women ($p = .005$ and $p = .002$). Homosexual and bisexual women reported using apps a greater number of times and performed a greater number of sexual behaviors ($M = 2.47$, $SD = 1.98$) than heterosexual women ($M = 1.90$, $SD = 1.75$). Finally, homosexual and bisexual men have used apps more times and performed a greater number of sexual behaviors ($M = 3.78$, $SD = 2.15$) than heterosexual men ($M = 1.85$, $SD = 2.06$).

Discussion

The rise of dating apps has significantly changed how we search for sexual and romantic partners (Anzani et al., 2018). This change has prompted studies to explore the relationship between dating apps and several variables, including sociodemographic variables (e.g., Castro & Barada, 2020), sexual attitudes (e.g., Shapiro et al., 2017), and sexual risk behaviors (e.g., Choi et al., 2016; Dai, 2023; Macapagal et al., 2019). However, few studies in Spain have been conducted to address this issue (for an exception, see, for example, Castro et al., 2020 or Wu, 2019). Therefore, the overall aim of this study was to analyze the relationship between dating app use and sociodemographic variables (gender, sexual orientation, and age), sexual attitudes (attitudes toward online sexual behaviors), and sexual risk behaviors (number of sexual partners and condom use) in this country.

Concerning the percentage of users of dating apps in the present sample, this is generally higher than that found in Spanish university students (Castro et al., 2020), lower than that found in studies conducted in other countries with people of different sexual orientations (e.g., Choi et al., 2016; Sumter & Vandenbosch, 2019), and similar to that found in other countries studies of heterosexual people (Griffin et al., 2018; Sawyer et al., 2018). Tinder was the most widely

used dating app, as found in other studies (e.g., Griffin et al., 2018).

Our first specific objective was to explore the relationship between the use of dating apps (yes/no) and the sociodemographic variables of gender and sexual orientation. As expected (Hypothesis 1), and according to previous studies (e.g., Barrada & Castro, 2020; Castro et al., 2020; Sumter & Vandenbosch, 2019), the percentage of people who have used a dating app is higher in men than in women and higher in LGB people than heterosexuals. The first finding runs counter to other studies (Sawyer et al., 2018; Shapiro et al., 2017) where similar rates of app use were reported for men and women. The higher percentage of LGB users than heterosexual users could be due to the possibility that LGB people have more difficulty expressing their sexuality and finding a partner (Gibson et al., 2022).

Despite finding that the percentage of people who have used a dating app is higher in men than in women and in LGB people compared with heterosexuals, the percentage of men, women, heterosexuals, and LGB users is higher than that found in Spanish university students (Castro et al., 2020). The difference in the percentage of users in this sample and the study with a Spanish sample could be due to the timing of the studies. While the study by Castro et al. (2020) was conducted before the COVID 19 pandemic, the present study was conducted during the pandemic. The pandemic forced many social venues (e.g., pubs) to close, and people have had to resort to non-traditional avenues for flirting, such as apps (Wiederhold, 2021). The restricted social interaction in certain venues during the pandemic has also increased reliance on dating apps. The difference in the percentage of users may also be due to the age range. While in the study by Castro et al. (2020), the sample ranged from 18 to 26 years, in the present study, the age range of the participants was 18 to 35 years.

Within the heterosexual group, the percentage of dating app users is lower than that found in studies conducted in other countries (Botnen et al., 2018; Sawyer et al., 2018). This lower percentage of users could be because in the present study, within the heterosexual group, the percentage of men is lower than in studies conducted in other countries. Within the LGB group, the percentage of men users is similar to that found in studies conducted in other countries with men who have sex with men (e.g., Boonchutima & Kongchan, 2017). However, it is also higher than in studies conducted in other countries with men who have sex with men (e.g., Lehmillier & Ioerger, 2014; Macapagal et al., 2018). The differences in the percentage of users between this study and that of Macapagal et al. (2018) could be due to the age of the participants. In the study by Macapagal et al. (2018), the participants were adolescents between 14

and 17 years old. Previous studies have found evidence that dating app use is higher in young adults (LeFebvre, 2018).

Our second specific objective was to explore the link between the use of dating apps (yes/no) and attitudes toward online sexual behaviors. As expected (Hypothesis 2) and consistent with other studies (e.g., Barrada & Castro, 2020; Harmon-Jones et al., 2018; Shapiro et al., 2017; Sumter & Vandenbosch, 2019), dating app users have more positive attitudes toward online sexual behaviors than non-users. This result points in the same direction as found in other studies where users had more permissive sexual attitudes than non-users (Shapiro et al., 2017; Sumter & Vandenbosch, 2019). However, this finding is not consistent with results found in other studies where the use of dating apps was not related to attitudes toward casual sex (Botnen et al., 2018) or erotophilia (Lehmillier & Ioerger, 2014). This discrepancy in results could be due to differences in the measures used. In particular, people use dating apps for various reasons, including the opportunity to engage in casual sex (Griffin et al., 2018; Ranzini & Lutz, 2017; Sumter et al., 2017; Timmermans & De Caluwé, 2017). Therefore, the absence of associations among these measures could be because people — especially women — use dating apps for other purposes such as looking for friends or self-validation (Ranzini & Lutz, 2017).

Our third specific objective was to relate dating apps (yes/no) to the number of sexual partners and frequency of condom use in vaginal intercourse, oral sex, and anal sex. As expected (Hypothesis 3), and in accord with other studies (e.g., Badal et al., 2018; Garga et al., 2021; Gibson et al., 2022; Lehmillier & Ioerger, 2014; Sawyer et al., 2018; Shapiro et al., 2017), dating app users reported having more sexual partners in all three sexual behaviors than non-users. The only exceptions were observed when comparing female users and non-users, and heterosexual users and non-users, with no differences being found in the number of partners in anal sex. These results suggest the need to differentiate between different sexual behaviors and control for sexual orientation when studying the relationship between the use of dating apps and the number of sexual partners. On the other hand, although using dating apps is related to the number of sexual partners, it should be noted that this is not the only variable that shows such a relationship. For example, age and attitudes toward online sexual behaviors are also related to the number of sexual partners across all three sexual behaviors.

The use of dating apps is related to the frequency of condom use in vaginal intercourse and anal sex. Male dating app users show more frequent condom use for vaginal intercourse than non-users. Furthermore, regardless of gender and sexual orientation, app users use condoms more frequently than non-users during anal sex. While these findings

coincide with those of another study with a Spanish sample (Wu, 2019), they contradict the results of studies conducted in other countries where users reported less frequent use of condoms during vaginal intercourse and anal sex (e.g., Gibson et al., 2022; Sawyer et al., 2018) or where no relationship was found between app use and condom use (Lehmiller & Ioegeer, 2014; Shapiro et al., 2017). The discrepancy in these results could be due to differences in how condom use is measured. While in the present study, the responses for frequency are measured on a scale from never (1) to always (5), other studies use a dichotomous measure (Sawyer et al., 2018; Shapiro et al., 2017) or assess the number of times they have not used a condom by specifying a time interval (Lehmiller & Ioegeer, 2014). The inconsistency in results could rely on the influence of motives for using dating apps. The literature highlighted that the influence of motives for using dating apps is associated with different patterns of association between dating app use and certain behaviors, including sexual risk behavior (e.g., Flesia et al., 2021a) or other risk behavior (e.g., Flesia et al., 2021b).

Our fourth objective was to relate the frequency of app use, the number of times dating apps were used, and the number of sexual behaviors performed with users to the sociodemographic variables of gender, sexual orientation, and age. As expected (Hypothesis 4), in addition to finding a relationship between the use of apps (yes/no) and certain sociodemographic variables, the results show that among users, there is also a relationship between these variables and the frequency of dating app use, the number of times these apps are used, and the number of sexual behaviors performed with users. LGB people have used dating apps more frequently, more times, and performed a greater number of sexual behaviors than heterosexual people. Homosexual and bisexual men have used apps a greater number of times and performed a greater number of sexual behaviors than homosexual and bisexual women. These results are consistent with those found by Barrada and Castro (2020). LGB people had more sexual relationships with Tinder users than heterosexual people. They also align with other studies where LGB people — especially men — used the apps more frequently than heterosexual people (Badal et al., 2018; Timmermans & Courtois, 2018).

Contrary to our expectations (Hypothesis 4), we did not find differences between men and women in the frequency of dating apps and between heterosexual men and women in the number of times they used dating apps and the number of sexual behaviors performed with users. These results indicate that, among users, the most active are homosexual and bisexual men. This finding might explain the significant number of studies conducted on dating app use in men who have sex with men (Wang et al., 2018).

Our fifth objective was to relate the frequency of dating app use, the number of times dating apps are used, and the number of sexual behaviors performed with users to attitudes toward online sexual behaviors. As expected (Hypothesis 5), in addition to finding that users have more positive attitudes toward online sexual behaviors than non-users, among users we also found that such attitudes carry considerable weight. Specifically, users who have more positive attitudes have engaged in a greater number of sexual behaviors with people they have met through these apps. These results align with the findings reported in the literature showing that attitudes toward sexual behaviors are positively related to the number of different behaviors performed (e.g., Blanc, 2021; Blanc et al., 2018). These findings are also consistent with another study (Sevi et al., 2018) showing that participants with higher scores on socio-sexuality reported higher motivation to use Tinder for casual relationships. However, contrary to our expectations (Hypothesis 5), no relationship was found between the frequency and number of times using dating apps and attitudes toward online sexual behaviors.

Limitations

The present study has certain limitations that must be considered when interpreting the results. The first limitation to note is that the sample was not randomly selected. This is related to a second limitation: more women than men participated in the study. Both limitations mean that the generalization of some of the results obtained should be made with some caution. For example, due to the gender imbalance of the sample, it would be appropriate to differentiate between men and women when reporting the percentages of dating app users.

Another limitation of most studies is that the participants do so voluntarily. Therefore, the characteristics of the sample could also influence some of the results. For example, previous studies (Wiederman, 1999) have shown that in sexuality, people who voluntarily participate in studies have less conservative sexual attitudes than those who do not. Therefore, assuming that dating app users have more permissive sexual attitudes than non-users, the percentage of users in the present study could have been overestimated. Other limitations of the current study include not differentiating between current dating apps users and former dating apps users, not having evaluated sexual risky behaviors with people met through the apps, and not asking about relational status. Finally, another limitation is that of self-reports. It could be that some people do not remember exactly what is being asked (recall bias).

Conclusions

Despite the limitations, the present study shows that dating app use relates to sociodemographic variables and attitudes toward online sexual behaviors. For example, the percentage of people who have used a dating app is higher in men than in women and in LGB people than in heterosexuals. In addition, men who have sex with men have used these apps more and have engaged in a greater number of different sexual behaviors with people they have met through these apps. Users have more positive attitudes toward online sexual behavior than non-users. Likewise, among users, those who have more positive attitudes toward online sexual behaviors have engaged in a greater number of different sexual behaviors with people they have met through the apps.

The present study also provides evidence for the relationship between dating app use and certain sexual risk behaviors. Overall, dating app users have had more sexual partners in vaginal intercourse, oral sex, and anal sex. However, although dating app users have had more sexual partners, they have adopted more prevention behaviors, especially in vaginal intercourse and anal sex, reporting more frequent condom use than their non-user counterparts.

Although it was not the aim of this study, the relationship between the use of apps and the number of sexual partners and the frequency of condom use could depend on the reasons for which they are used. That is, the reasons could moderate the relationship between the use of apps and risky sexual behaviors. In this line, Flesia et al. (2021a) found that installing dating apps to find sexual partners predicted higher odds of unprotected sexual activity and sexually transmitted infections diagnoses. Other studies also showed that motives for using the dating apps and intensity of use moderate the association between using the dating apps and other behavior such as smoking (Flesia et al., 2021b).

Policy Implications

The results of this study are highly relevant and can be very useful in campaigns for the prevention and promotion of sexual health. This study has shown that dating apps do not have to be equated with sexual risk. Therefore, their use can be encouraged since they are a quick and easy way to meet other people and find a romantic partner (David & Cambre, 2016; Timmermans & De Caluwé, 2017). However, the use of condoms should continue to be encouraged in certain sexual behaviors (vaginal intercourse, oral sex and anal sex), especially in those people who use dating apps frequently with the objective of having casual sex.

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Declarations

Conflict of Interest The author declare that she has no conflict of interest.

Ethical Approval The study was approved by the Bioethics Committee of the Junta de Andalucía.

Informed Consent The informed consent was obtained from all participants.

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References

- Anzani, A., Di Sarno, M., & Prunas, A. (2018). Using smartphone apps to find sexual partners: A review of the literature. *Sexologies*, 27, e61–e65. <https://doi.org/10.1016/j.sexol.2018.05.001>.
- Ashenhurst, J. R., Wilhite, E. R., Harden, K. P., & Fromme, K. (2017). Number of sexual partners and relationship status are associated with unprotected sex across emerging adulthood. *Archives of Sexual Behavior*, 46, 419–432. <https://doi.org/10.1007/s10508-016-0692-8>.
- Badal, H. J., Stryker, J. E., DeLuca, N., & Purcell, D. W. (2018). Swipe right: Dating website and app use among men who have sex with men. *AIDS and Behavior*, 22, 1265–1272. <https://doi.org/10.1007/s10461-017-1882-7>.
- Barrada, J. R., & Castro, A. (2020). Tinder users: Sociodemographic, psychological, and psychosocial characteristics. *International Journal of Environmental Research and Public Health*, 17, 8047. <https://doi.org/10.3390/ijerph17218047>.
- Barrada, J. R., Castro, A., del Fernández, E., & Ramos-Villagrasa, P. J. (2021). Do young dating app users and non-users differ in mating orientations? *Plos One*, 16, e0246350. <https://doi.org/10.1371/journal.pone.0246350>.
- Blanc, A., & Rojas, A. (2017). Instrumentos de medida de actitudes hacia la sexualidad: Una revisión bibliográfica sistemática. *Revista Iberoamericana de Diagnóstico y Evaluación – e Avaliação Psicológica*, 1, 17–32. https://doi.org/10.21865/RIDEP43_17.
- Blanc, A., & Rojas, A. J. (2018). Uso del preservativo, número de parejas y debut sexual en jóvenes en coito vaginal, sexo oral y sexo anal. *Revista Internacional de Andrología*, 16, 8–14. <https://doi.org/10.1016/j.androl.2017.02.009>.
- Blanc, A., Sayans-Jiménez, P., Ordóñez-Carrasco, J. L., & Rojas, A. J. (2018). Comparison of the predictive capacity of the erotophobia-erotophilia and the attitudes toward sexual behaviors in the sexual experience of young adults. *Psychological Reports*, 121, 815–830. <https://doi.org/10.1177/0033294117741141>.

- Blanc, A., Byers, S. E., & Rojas, A. J. (2020). Attitudes toward sexual Behaviors Scale. In R. Milhasuen, J. D. Sakaluk, C. M. Davis, & W. L. Yarber (Eds.), *Handbook of sexuality-related measures* (4th ed., pp. 423–426). Routledge.
- Boonchutima, S., & Kongchan, W. (2017). Utilization of dating apps by men who have sex with men for persuading other men toward substance use. *Psychology Research and Behavior Management, 10*, 31–38. <https://doi.org/10.2147/PRBM.S121480>.
- Botnen, E. O., Bendixen, M., Grøntvedt, T. V., & Kennair, L. E. O. (2018). Individual differences in sociosexuality predict picture-based mobile dating app use. *Personality and Individual Differences, 131*, 67–73. <https://doi.org/10.1016/j.paid.2018.04.021>.
- Castro, A., & Barrada, J. R. (2020). Dating apps and their sociodemographic and psychosocial correlates: A systematic review. *International Journal of Environmental Research and Public Health, 17*, 6500. <https://doi.org/10.3390/ijerph17186500>.
- Castro, A., Barrada, J. R., Ramos-Villagrasa, P. J., & del Fernández, E. (2020). Profiling dating apps users sociodemographic and personality characteristics. *International Journal of Environmental Research and Public Health, 17*, 3653. <https://doi.org/10.3390/ijerph17103653>.
- Choi, E. P. H., Wong, J. Y. H., Lo, H. H. M., Wong, W., Chio, J. H. M., & Fong, D. Y. T. (2016). The association between smartphone dating applications and college students' casual sex encounters and condom use. *Sexual Reproductive Healthcare, 9*, 38–41. <https://doi.org/10.1016/j.srhc.2016.07.001>.
- Dai, M. (2023). The demographic and psychological moderators to the associations between geosocial networking apps (GSNA) use and risky sexual behaviors among US young adults. *Sexuality Research and Social Policy, 20*, 664–675. <https://doi.org/10.1007/s13178-022-00706-x>.
- David, G., & Cambre, C. (2016). Screened intimacies: Tinder and the swipe logic. *Social Media + Society, 1*–11. <https://doi.org/10.1177/20563305116641976>.
- Filice, E., Raoul, A., Meyer, S. B., & Neiterman, E. (2019). The influence of Grindr, a geosocial networking application, on body image in gay, bisexual and other men who have sex with men: An exploratory study. *Body Image, 31*, 59–70. <https://doi.org/10.1016/j.bodyim.2019.08.007>.
- Flesia, L., Fietta, V., Foresta, C., & Monaro, M. (2021a). What are you looking for? Investigating the association between dating app use and sexual risk behaviors. *Sexual Medicine, 9*, 100405. <https://doi.org/10.1016/j.esxm.2021.100405>.
- Flesia, L., Fietta, V., Foresta, C., & Monaro, M. (2021b). Cigarette smoking and dating app use: Findings from a survey in a sample of adults in Italy. *European Journal of Investigation in Health Psychology and Education, 11*, 557–569. <https://doi.org/10.3390/ejihpe11020040>.
- Garga, S., Thomas, M., Bhatia, A., Sullivan, A., John-Leader, F., & Pit, S. (2021). Geosocial networking dating app usage and risky sexual behavior in young adults attending a music festival: Cross-sectional questionnaire study. *Journal of Medical Internet Research, 23*, e21082. <https://doi.org/10.2196/21082>.
- Gatter, K., & Hodkinson, K. (2016). On the differences between Tinder™ versus online dating agencies: Questioning a myth. An exploratory study. *Cogent Psychology, 3*, 1162414. <https://doi.org/10.1080/23311908.2016.1162414>.
- Gibson, L. P., Kramer, E. B., & Bryan, A. D. (2022). Geosocial networking app use associated with sexual risk behavior and pre-exposure prophylaxis use among gay, bisexual, and other men who have sex with men: Cross-sectional web-based survey. *JMIR Formative Research, 6*, e35548. <https://doi.org/10.2196/35548>.
- Griffin, M., Canevello, A., & McAnulty, R. (2018). Motives and concerns associated with geosocial networking app usage: An exploratory study among heterosexual college students in the United States. *Cyberpsychology Behavior and Social Networking, 21*, 268–275. <https://doi.org/10.1089/cyber.2017.0309>.
- Harmon-Jones, E., Armstrong, J., & Olson, J. M. (2018). The influence of attitudes on behavior. In D. Albarracín & B. T. Johnson (Eds.), *The handbook of attitudes, Volumen I: Basic Principles* (2nd edition, pp. 404–450). Routledge.
- Konings, F., Sumter, S. R., Vranken, I., Dredge, R., & Vandenbosch, L. (2022). Behind the screens: A systematic literature review of quantitative research on mobile dating. *Archives of Sexual Behavior, 51*, 2969–3020. <https://doi.org/10.1007/s10508-022-02312-9>.
- LeFebvre, L. E. (2018). Swiping me of my feet: Explicating relationship initiation on Tinder. *Journal of Social Personal Relationship, 35*, 1205–1229. <https://doi.org/10.1177/0265407517706419>.
- Lehmiller, J. J., & Ioerger, M. (2014). Social networking smartphone applications and sexual health outcomes among men who have sex with men. *Plos One, 9*, e86603. <https://doi.org/10.1371/journal.pone.0086603>.
- Luo, Q., Wu, Z., Chen, Z., Ma, Y., Mi, G., Liu, X., Liu, X., Xu, J., Rou, K., Zhao, Y., & Scott, S. R. (2019). App use frequency and condom less anal intercourse among men who have sex with men in Beijing, China: A cross-sectional study. *International Journal of STD & AIDS, 30*, 1146–1155. <https://doi.org/10.1177/0956462419860293>.
- Macapagal, K., Moskowitz, D. A., Li, D. H., Carrión, A., Bettin, E., Fisher, C. B., & Mustanski, B. (2018). Hookup app use, sexual behavior, and sexual health among adolescent men who have sex with men in the United States. *Journal of Adolescent Health, 62*, 708–715. <https://doi.org/10.1016/j.jadohealth.2018.01.001>.
- Macapagal, K., Kraus, A., Moskowitz, D. A., & Birnholtz, J. (2019). Geosocial networking application use, characteristics of app-met sexual partners, and sexual behavior among sexual and gender minority adolescents assigned male at birth. *The Journal of Sex Research, 57*, 1078–1087. <https://doi.org/10.1080/00224499.2019.1698004>.
- Mignault, L., Vaillancourt-Morel, M-P., Ramos, B., Brassard, A., & Daspe, M-E. (2022). Is swiping right risky? Dating app use, sexual satisfaction, and risky sexual behavior among adolescents and young adults. *Sexual and Relationship Therapy. https://doi.org/10.1080/14681994.2022.2078804*. Advance online publication.
- Mirzaei, M., Ahmadi, K., Saadat, S. M., & Ramezani, M. A. (2016). Instruments of high risk sexual behavior assessment: A systematic review. *Materia Sociomédica, 28*, 46–50. <https://doi.org/10.5455/msm.2016.28.46-50>.
- Ranzini, G., & Lutz, C. (2017). Love at first swipe? Explaining Tinder self-presentation and motives. *Mobile Media & Communication, 5*, 80–101. <https://doi.org/10.1177/2050157916664559>.
- Rogge, R., Crasta, D., & Legate, N. (2020). Is tinder-grindr use risky? Distinguishing venue from individuals' behavior as unique predictors of sexual risk. *Archives of Sexual Behavior, 49*, 1263–1277. <https://doi.org/10.1007/s10508-019-01594-w>.
- Sawyer, A. N., Smith, E. R., & Benotsch, E. G. (2018). Dating application use and sexual risk behavior among young adults. *Sexuality Research and Social Policy, 15*, 183–191. <https://doi.org/10.1007/s13178-017-0297-6>.
- Sevi, B., Aral, T., & Eskenazi, T. (2018). Exploring the hook-up app: Low sexual disgust and high sociosexuality predict motivation to use Tinder for casual sex. *Personality and Individual Differences, 133*, 17–20. <https://doi.org/10.1016/j.paid.2017.04.053>.
- Shapiro, G. K., Tatar, O., Sutton, A., Fisher, W., Naz, A., Perez, S., & Rosberger, Z. (2017). Correlates of Tinder use and risky sexual behaviors in young adults. *Cyberpsychology Behavior and Social Networking, 20*, 727–734. <https://doi.org/10.1089/cyber.2017.0279>.
- Simpson, J., & Gangestad, S. (1991). Individual differences in sociosexuality: Evidence for convergent and discriminant validity.

- Journal of Personality and Social Psychology*, 60, 870–883. <https://doi.org/10.1037/0022-3514.60.6.870>.
- Sumter, S. R., & Vandenbosch, L. (2019). Dating gone mobile: Demographic and personality-based correlates of using smartphone-based dating applications among emerging adults. *New Media & Society*, 21, 655–673. <https://doi.org/10.1177/1461444818804773>.
- Sumter, S. R., Vandenbosch, L., & Ligtenberg, L. (2017). Love me Tinder: Untangling emerging adults' motivations for using the dating application Tinder. *Telematics and Informatics*, 34, 67–78. <https://doi.org/10.1016/j.tele.2016.04.009>.
- Timmermans, E., & Courtois, C. (2018). From swiping to casual sex and/or committed relationships: Exploring the experiences of Tinder users. *The Information Society*, 34, 59–70. <https://doi.org/10.1080/01972243.2017>.
- Timmermans, E., & De Caluwé, E. (2017). To tinder or not to Tinder, that's the question: An individual differences perspective to Tinder use and motives. *Personality and Individual Differences*, 110, 74–79. <https://doi.org/10.1016/j.paid.2017.01.026>.
- Wang, H., Zhang, L., Zhou, Y., Wang, K., Zhang, X., Wu, J., & Wang, G. (2018). The use of geosocial networking smartphone applications and the risk of sexually transmitted infections among men who have sex with men: A systematic review and meta-analysis. *Bmc Public Health*, 18, 1178. <https://doi.org/10.1186/s12889-018-6092-3>.
- Wiederhold, B. K. (2021). How COVID has changed online dating—and what lies ahead. *Cyberpsychology Behavior and Social Networking*, 24, 435–436. <https://doi.org/10.1089/cyber.2021.29219.editorial435>.
- Wiederman, M. W. (1999). Volunteer bias in sexuality research using college student samples. *The Journal of Sex Research*, 36, 59–66. <https://doi.org/10.1080/00224499909551968>.
- Wu, O. (2019). Tinder y conductas sexuales de riesgo en jóvenes españoles. *Aloma: Revista de Psicologia Ciències de l'Educació i de l'Esport*, 37, 35–42. <https://doi.org/10.51698/aloma.2019.37.1.35-42>.

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