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Online and face-to-face flirting skills

Associated factors to online and face-to-face self-perceived flirting skills

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Authors contributions

Duban Romero: Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Writing - Review & Editing. **David L. Rodrigues:** Conceptualization, Writing - Review & Editing. **Moisés R. Mebarak:** Investigation, Methodology, Resources, Writing - Review & Editing. **Martha Martinez:** Investigation, Methodology.

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Factors Associated with Perceived Self-Efficacy in Online and Face-to-Face Flirting Skills

Abstract

Research typically examines the effectiveness of different hook-up strategies used by people to attract potential partners. And yet, only a limited number of studies have addressed self-perceptions regarding flirting skills and which variables contribute to those perceptions. To address this research gap, we developed the Perceived Flirting Self-Efficacy (PFSE) scale and assessed its psychometric properties and individual correlates in a sample of Colombian young adults ($N = 857$). Results showed the validity and reliability of this measure in assessing perceived self-efficacy for flirting in both social media (PFSE-SM) and face-to-face contexts (PFSE-F2F). Multiple regression analyses showed that higher PFSE-SM scores were associated with being younger, sociosexually unrestricted, and more connected to social networks. Higher PFSE-F2F scores were associated with being more extroverted, more open to experiences, sociosexually unrestricted, and more connected to social networks. Our findings highlight the importance of distinguishing flirting behaviors in different contexts, emphasizing the importance of future research to delve deeper into self-perceptions when examining flirting dynamics.

Keywords: Flirting skills; Personality; Sociosexuality; Social media; Validation.

Factors Associated with Perceived Self-Efficacy in Online and Face-to-Face Flirting Skills

Research focused on flirting behavior typically seeks to examine which strategies favor mating success (e.g., Croskey & Ayala, 2021; Whitty, 2004). Past studies have shown that people use different flirting strategies to get the attention from, attract, and meet potential partners, by showing their intelligence, friendliness, cheerfulness, and presenting themselves well physically (Apostolou & Christoforou, 2020), or use specific emojis to convey their intentions (Rodrigues et al., 2022). A smaller subset of studies took a different approach, aiming to understand how perceived flirting skills influence mating outcomes (e.g., Apostolou, 2021a; Apostolou et al., 2019, Apostolou et al., 2023). Findings from these studies have shown poorer self-perceived flirting skills among people who are involuntarily single. In a mating context, people who use flirting strategies successfully tend to have higher lifetime number of sexual partners (Schmitt & Jonason, 2019) and be more satisfied with their lives (Dush & Amato, 2005). However, when flirting strategies are ineffective and cause oneself to be rejected, people are more likely to develop negative perceptions about their ability to meet potential partners (Kavanagh et al., 2010, 2014). Consequently, people who perceive themselves as having poorer flirting skills are less likely to approach others, may struggle to establish romantic relationships, are more likely to be involuntarily single, and tend to experience negative emotions and dissatisfaction with life (Apostolou, 2019; Apostolou et al., 2019, 2021; Apostolou & Wang, 2019).

Regardless of how successful people perceive their flirting skills to be, the strategies they use differ when people flirt face-to-face or in online contexts such as social media (see Apostolou & Christoforou, 2020; Rodrigues et al., 2022). Social media facilitates meeting and approaching new people, with research indicating that young adults use the internet to meet new people and flirt with others (Smith & Duggan, 2013; Steinfield et al., 2008), and

even start romantic relationships (Hall, 2014). Social media allows people to obtain preliminary information about potential partner(s) (Fox et al., 2013), which can reduce the chances of being rejected (Ciocca et al., 2020; Hallam et al., 2018; Hance et al., 2018). Research shows that the characteristics of people with high social media flirting skills are not necessarily the same as those of people with high face-to-face flirting skills. For example, online flirting is preferred by people with lower extraversion, higher rejection sensitivity, and negative emotionality (Blackhart et al., 2014; Danielsbacka et al., 2019; Pernokis, 2018), whereas face-to-face flirting success is greater among people with higher narcissism and emotional intelligence, and lower psychopathy and jealousy (Apostolou, Paphiti et al., 2019). Despite the research currently being done in this topic, studies with Latin American samples are still very scarce (for exceptions, see Rodríguez, 2012; Rincón, 2014; Bautista, 2018; Croskey and Ayala, 2021, Apostolou et al., 2023). This clearly highlights the need for further research in these countries, to understand the generalizability (or lack thereof) of existing knowledge on perceived flirting skills to different socio-cultural contexts.

Some authors have developed measures to reliably assess perceived flirting skills, including Apostolou and colleagues (2019) who developed a flirting skill and single-detection scale (e.g., “I lose my words when I talk to someone who interests me”) and Geher and colleagues (2016) who developed a measure of mating intelligence (e.g., “I’m good at saying the right things to women I flirt with”). Not only were psychometric properties for women found to be inadequate in the latter case (Croskey & Ayala, 2021), neither of these measures consider differences in perceived flirting skills across contexts. As people use distinct strategies when flirting face-to-face or in online contexts (Apostolou & Christoforou, 2020; Rodrigues et al., 2022), we argue that perceived flirting self-efficacy might also differ. Hence, we developed a new scale to assess Perceived Flirting Self-Efficacy (PFSE) in social media (PFSE-SM) and face-to-face contexts (PFSE-F2F). We conducted psychometric

analyses in a sample of Colombian adults to determine the validity and reliability of this measure, and identify individual correlates (i.e., demographic characteristics, sociosexuality, personality traits, and social media use) of PFSE scores in each context.

Method

Participants

From the 1,005 prospective participants who assessed the online survey, we removed those who did not complete the survey ($n = 20$) and who failed the attention check item ($n = 128$). The demographic characteristics of the final sample ($N = 857$) are summarized in Table 1. Participants were, on average, 23 years old, and most identified as women, identified as heterosexual, were undergraduate students, resided in the Caribbean Colombian Coast, and were single without a romantic relationship (see table 1).

[Insert table 1]

Measures

Perceived Flirting Self-Efficacy

We developed 14 items to assess perceived self-efficacy when flirting with a potential partner, following Clark and Watson's (2019) suggestions. Specifically, items were designed to be simple, direct, and appropriate for the target population, without being obsolete over the course of time or evaluating different characteristics. From an inclusiveness perspective, items were designed to be genderless and appropriate across multiple sexual orientation identities. Moreover, and given our goals, items were designed to either highlight the social media context (e.g., "I am confident in my abilities to hook-up with someone on social media") or the face-to-face (e.g., "It's comfortable for me to flirt with someone I just met somewhere"). Responses to each item were given in 5-point scales (1 = *Strongly disagree* to 5 = *Strongly agree*). Psychometric properties of the PFSE scale are detailed in the Results section.

Social Media Use Integration Scale

We used an adapted version of the 10-item scale developed by Jenkins-Guarnieri and colleagues (2013) to assess the integration of social media in one's daily life. Using a 5-point rating scale (1 = *Strongly disagree* to 5 = *Strongly agree*), participants were asked to indicate the social integration and emotional connection with the social media (SIEC; e.g., "I feel disconnected from friends when I have not logged into social media") and how much is social media integrated in their social routines (ISR; e.g., "Using Facebook is part of my everyday routine"). The items were originally designed to assess the integration of Facebook in people's lives, but for the purposes of this research the term "Facebook" was replaced by "social media" to have a broader perspective and assess the integration of social media in people's lives (e.g., "Social media plays an important role in my social relationships"). The reliability of this measure in our sample was adequate ($\omega_{\text{global}} = .88$, $\omega_{\text{SIEC}} = .86$, $\omega_{\text{ISR}} = .79$).

Sociosexual Orientation Inventory - Revised (SOI-R)

We used the Colombian version (Romero et al., 2022) of the scale originally developed by Penke and Asendorpf (2008). We assessed sociosexual behaviors (three items, e.g., "With how many different partners have you had sexual relations with penetration in your lifetime?"), sociosexual attitudes (three items, e.g., "Sex without love is OK"), and sociosexual desire (three items, e.g., "How often do you experience sexual arousal when you are in contact with someone you are not in a committed romantic relationship with?"). Responses to each item were given in 5-point rating scales (response anchors depend on the item). This measure presented high reliability in our sample ($\omega_{\text{global}} = .94$, $\omega_{\text{behavior}} = .90$, $\omega_{\text{attitude}} = .85$, $\omega_{\text{desire}} = .87$).

Big Five Inventory II - XS (BFI 2-XS)

We used the 15-item scale developed by Soto and John (2017b) to assess extraversion (e.g., "I am someone who is full of energy"), agreeableness (e.g., "I am someone who is

compassionate, has a soft heart”), open-mindedness (e.g., “I am someone who is original, comes up with new ideas”), conscientiousness (e.g., “I am someone who has difficulty getting started on tasks” [reverse-scored]), and negative emotionality (e.g., “I am someone who worries a lot”). Responses to each item were given in 5-point rating scales (1 = *Strongly disagree* to 5 = *Strongly agree*). This inventory was validated in different countries (Gallardo-Pujol et al., 2022; Rammstedt, et al., 2018; Vedel, et al., 2020), where different degrees of reliability were found for each dimension, however in this sample the indices were not so high ($\alpha_{\text{extraversion}} = .56$, $\alpha_{\text{agreeableness}} = .33$, $\alpha_{\text{scrupulosity}} = .41$, $\alpha_{\text{negativity}} = .66$, $\alpha_{\text{openness}} = .41$).

Procedure

This study was reviewed and approved by the Ethics Committee of Universidad del Norte (No. 237/2021). Data was collected between September 2021 and May 2022 using an online survey stored on the Question Pro platform. This study was restricted to people who were over the age of 18, lived in Colombia, and had already engaged in sexual activity. The link to the survey was shared by research assistants using a non-probabilistic snowball sampling. When accessing the survey, prospective participants were presented with ethical information and informed consent was required to proceed to the study. The survey started with standard demographic information (e.g., gender, age, location, sexual orientation, education level and marital status), followed by the main measures and other measures not relevant to the current study. We also included an attention check item (e.g., “To verify that you are reading each question please answer the “*Not at all satisfied*” option”). At the end, participants were thanked and debriefed about the objectives of the study.

Data analysis

We computed means, standard deviations, and inter-item polychoric correlations for the PFSE items. Exploratory Factor Analyses were carried out using the Unweighted Least Squares (ULS) as our estimator, and the factor solution was rotated with the promax method.

Factors were extracted considering the eigenvalues, parallel analysis, and Minimum Average Partial (MAP). After determining the factorial structure of the scale, we computed a Confirmatory Factor Analysis (CFA) and obtained the final betas of each item on the factor as well as goodness-of-fit measures. For a measurement model to have adequate goodness-of-fit, the fit indices should be: $\chi^2/df < 3$, CFI $> .95$, TLI $> .95$, RMSEA $< .06$ (Hair et al. 2014). We also computed a Multigroup Confirmatory Factor Analysis to determine the factor invariance of the instrument according to gender, age group, and marital status (see Fischer & Karl, 2019). We focused on these variables due to past research showing differences between those groups (Apostolou, 2021a; Hall, 2014; Henningsen, 2004). Changes in CFI are recommended to be low, $< .010$, as in RMSEA, $< .015$ (Hair et al. 2014; Hu & Bentler, 1999). The reliability of each factor was established by calculating the Omega coefficient (recommended for ordinal data, see Kalkbrenner, 2021).

We then computed overall scores considering a weighted average of the responses to the items. In this case, the regression betas obtained in the CFA were used as weights. Thus, the way in which the factor scores were calculated is as follows:

$$y = \frac{\sum_i^n \beta_i x_i}{\sum_i^n \beta_i}$$

where y = participant's score, n = number of items, β = weight applied to the items and x = participant's response. y was standardized using the following equation:

$$z = \frac{y - y_{max}}{y_{max} - y_{min}} 100$$

Scores between both PFSE factors were compared using a paired-samples t -test (and Cohen's d for the effect size). Lastly, we examined the correlates of PFSE scores by entering demographic variables, sociosexuality scores, personality traits, and social media usage as predictor variables. Two single and multiple linear regressions were computed for each PFSE factor.

Results

Exploratory Factor Analysis

Based on the inter-item polychoric correlation matrix, we could proceed with the analysis ($KMO = .93$). As expected, all criteria for factor extraction suggested a 2-factor structure that explained 61.5% of the total variance (see appendix A). No item had to be excluded to stabilize the final solution. As expected, the first factor included items with high loadings ($.60 < \lambda < .91$) assessing perceived flirting self-efficacy in the social media context (PFSE-SM) and explained 35.6% of the variance. The second factor also included items with high loadings ($.64 < \lambda < .89$) assessing perceived flirting self-efficacy in a face-to-face context (PFSE-F2F) and explained 25.9% of the variance. Both subscales presented high reliability indices, $\omega_{PFSE-SM} = .93$, $\omega_{PFSE-F2F} = .91$.

[INSERT FIGURE 1]

Confirmatory Factor Analysis

Once the factorial structure of the items was obtained, we proceeded to evaluate the goodness-of-fit of the 2-factor model using a CFA. We found adequate fit to our model:

$\chi^2(76) = 191.76$, $CFI = .99$, $TLI = .99$, $RMSEA = .06$. Both latent factors were related, $cov = .41$, $SE = .016$, $p < .001$ (see appendix B).

Factor Invariance Analysis

The factorial invariance analysis was performed from the MCFA in which the intercepts, loadings and means were adjusted to detect changes in the CFI and RMSEA fit indices. Results showed configural, metric, and scalar invariance according to gender, age group and marital status (see appendix C).

Perceived Flirting Self-Efficacy Between Contexts

Results showed higher scores in face-to-face self-perceived flirting skills ($M = 47.98$, $SD = 21.79$), when compared to social media self-perceived flirting skills ($M = 39.76$, $SD = 23.03$), $t(1712) = 7.59$, $p < .001$, $d = 0.37$.

Correlates of Perceived Flirting Self-Efficacy

As shown in Table 2, results from the simple linear regression analyses indicated that participants with higher PFSE-SM scores were younger, identified as men, were single, had higher social and emotional connection to social media, were more connected to social media in their daily social routines, were more sociosexually unrestricted, and were less agreeable and less conscientious. Participants with higher PFSE-F2F scores were also younger, identified as men, had higher social and emotional connection to social media, were more connected to social media in daily social routines, were more sociosexually unrestricted, were more extraverted and open-minded, and had less negative emotionality.

Result from the multiple linear regression analyses showed that higher PFSE-SM scores were associated with being younger, having a more unrestricted sociosexual orientation, and reporting a stronger social and emotional connection with social media. Results also showed that higher PFSE-F2F scores were associated with having a more unrestricted sociosexual orientation, reporting a stronger social and emotional connection to social media, being more connected to social media in daily social routines, and scoring higher on extraversion and open-mindedness.

[INSERT TABLE 2]

Discussion

The number of studies examining flirting skills have grown only in recent years, and most studies examined were conducted in European, North American, and Asian countries (Apostolou, 2019; 2021; White et al., 2018). We extended the literature by sampling Colombian adults. Moreover, we developed a new measure to assess perceived flirting self-

efficacy in social media (PFSE-SM) and face-to-face contexts (PFSE-F2F). Our analysis revealed two reliable factors with goodness-of-fit, and this model was invariant according to gender, age group, and marital status. Results showed that participants scored higher on PFSE-F2F compared to PFSE-SM, indicating that people may struggle with being spontaneous or conveying their intentions and emotions through non-verbal language when flirting online. Even though social media users can rely on pictorial cues to express and contextualize their intentions (Kaye et al., 2016; Rodrigues et al., 2017) and approach potential partners (Rodrigues et al., 2022), our results suggest that other interpersonal or communication skills add to the perception of self-efficacy when flirting in this context. In that sense, more versatility may be required in communication that involves the management of nonverbal messages to capture attention and attract potential partners.

Our results also showed that unrestricted sociosexuality, or a stronger predisposition to have casual sex, was a significant correlate of perceived flirting self-efficacy in both contexts. This is consistent with past findings showing that sociosexually unrestricted people have better sexual self-esteem and more self-perceived partner value (Barrada et al., 2018; Nascimento et al., 2018). Our findings are also consistent with the evidence that unrestricted sociosexuality is positively associated with a more frequent use of virtual dating platforms (Botnen et al., 2018). Hence, sociosexually unrestricted people are likely to flirt with potential partners in different contexts and use different flirting strategies more frequently to increase their chances of attracting potential partners and perceive to be more successful in their efforts.

Social integration and emotional connection with social media were also a correlate of perceived flirting self-efficacy in both contexts, even though the association in the face-to-face context was weak. On the one hand, these results suggest that using social media more frequently can improve the communicative skills required to flirt and hook-up with potential

partners, because it affords people more opportunities to learn and convey communication codes and signs to demonstrate their value as partners and their interest in others (e.g., use of specific emoji to convey their intentions to have sex; Rodrigues et al., 2022). On the other hand, the weaker association with face-to-face flirting could be explained by the need for socialization and the higher social networks facilitated by people flirting face-to-face (Aksar et al., 2020; Lin et al., 2017).

Higher extraversion and more openness were correlates of face-to-face perceived flirting self-efficacy. Extraversion seems to help sexual success (Liu & Zheng, 2020; Provenzano et al., 2018), likely because extroverted people are more confident when interacting with strangers and have better communication skills (Esin, 2022). According to our results, this may be only the case when flirting face-to-face. People who are more open to experiences seek a wider range of experiences and viewpoints (Soto & John, 2017a). However, and according to our results, this may extend to perceptions of having more efficacy when flirting face-to-face with potential partners. These correlates between perceived flirting and personality reflect the need to discriminate flirting in social media from face-to-face scenario.

Strengths, Limitations, and Future Studies

This study is among the first to assess self-perceived flirting skills more objectively in two distinct contexts and systematically explore some of its individual correlates. Our findings add to the discussion by highlighting the importance (and distinctiveness) of social media as a mating context. This is particularly relevant considering recent studies indicating that people are increasingly using online dating before deciding whether they want to meet potential partners face-to-face (Kinsey Institute, 2022). There are some people who are at risk of perceiving to have less efficacy in flirting, which research has shown to be associated with lower self-esteem. In that sense, our findings will serve as an input for therapists to have

valid and reliable measures to assess patients' flirting perception, which is a product of previous experiences in the dating market.

Future studies should include a longitudinal design to assess self-perceived flirting skills and contrast the variability of this self-perception according to changes in marital status. This study mainly involved heterosexual youth, so future studies could examine whether the findings of this study are generalizable to LGBTQ+ or adolescent populations. Adolescents use social media frequently so even more distant differences between the two domains of flirting self-efficacy would be expected. Similarly, the literature shows that self-esteem, self-concept, and self-efficacy are closely related, so it could be evaluated in future studies whether this also holds for the self-efficacy measure developed in this study. Finally, the BFI2-XS measures did not show sufficient reliability and it is recommended that more stable measures of personality be implemented in other studies.

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Declaration of interest statement

The authors declare that there is no conflict of interest related to this research.

Data availability: The authors declare that the study is part of a wider project with other research in progress. Data will be available in the future at: <https://osf.io/49kte/>

Table 1. Participants characteristics.

Demographics	Percentage
Gender	
Male	39.90%
Female	58.69%
Other	0.82%
No response	0.58%
Age group	
Early adulthood	95.98%
Middle adulthood	5.02%
Sexual Orientation	
Heterosexual	82.52%
Bisexual	10.28%
Homosexual	4.99%
Other	1.32%
No response	0.88%
Education	
No education	0.14%
Elemental school	0.73%
High school	30.83%
College	14.39%
Undergraduate	48.31%
Graduate	5.58%
Marital Status	
Married	8.40%
Romantic relationship	45.86%
Single	45.74%
Departamento	
Atlántico	80.51%
Bolívar	4.55%
Bogotá D.C.	2.56%
Antioquia	1.98%
La Guajira	1.19%
Santander	1.17%
Other	8.04%

Table 2. Predictors of perceived flirting self-efficacy.

	Social media		Face-to-face	
	Univariate analysis β (95% IC)	Multivariate analysis β (95% IC)	Univariate analysis β (95% IC)	Multivariate analysis β (95% IC)
Intercept	-	21.80 (15.72, 27.87) ^{***}	-	-.27 (-8.56, 8.02)
Age	-.67 (-.89, -.46) ^{***}	-.38 (-.57, -.19) ^{***}	-.28 (-.50, -.08) ^{**}	
Gender	9.54 (6.46, 12.63) ^{***}		8.60 (5.68, 11.52) ^{***}	
Marital status	6.96 (3.90, 10.02) ^{**}		2.84 (-.09, 5.76)	
SIEC	.32 (.25, .39) ^{***}	.24 (.18, .31) ^{***}	.11 (.04, .18) ^{**}	.07 (.001, .15) [*]
ISR	.28 (.20, .37) ^{***}		.20 (.12, .28) ^{***}	.09 (.01, .17) [*]
Extraversion	.031 (-.05, .12)		.30 (.23, .39) ^{***}	.30 (.23, .38) ^{***}
Agreeableness	-.12 (-.22, -.02) [*]		-.08 (-.17, .01)	
Conscientiousness	-.17 (-.27, -.09) ^{***}		.005 (-.08, .09)	
Negative emotionality	.03 (-.04, .11) [*]		-.08 (-.15, -.01) [*]	
Open-Mindedness	.06 (-.04, .16)		.16 (.07, .26) ^{**}	.10 (.01, .19) [*]
Sociosexuality	.48 (.43, .54) ^{***}	.44 (.38, .50) ^{***}	.39 (.33, .45) ^{***}	.37 (.31, .43) ^{***}

^{*} $p < .05$; ^{**} $p < .01$; ^{***} $p < .001$; Gender was coded: 1 = Male, 0 = Female; marital status was coded: 1 = Married or romantic relationship, 2 = Singlehood.