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FULL-LENGTH REPORT

Development, psychometric validation, and cross-cultural comparison of the "Instagram Motives Questionnaire" (IMQ) and the "Instagram Uses and Patterns Questionnaire" (IUPQ)

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ABSTRACT

Background and aims: Social network use is widespread, and the study of Instagram seems to have captured more attention in recent years. However, scale development and validation in the field has fallen short of providing sound scales of Instagram motives and usage patterns that consider the uniqueness of Instagram-related behavior. This paper describes the development, psychometric and cross-cultural validation of two new measurement instruments: the "*Instagram Motives Questionnaire*" (IMQ) and the "*Instagram Uses and Patterns Questionnaire*" (IUPQ). *Methods and results:* A preliminary set of items was developed for each questionnaire based on a previous qualitative interview study on Instagram motives, uses, and consequences. In the first study, the questionnaires were distributed to a sample of 312 participants aged 18–35 years (M = 23.81; SD = 4.49), and an exploratory factor analysis was performed. A parsimonious and interpretable 6-factor solution that

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displayed adequate factor loadings and adequate Omega coefficients for both instruments were found. In a second study, the two instruments and other measures of known social network usage correlates and mental health consequences were administered online to 1,418 English-speaking participants aged 18–34 years (M = 21.35; SD = 3.89). Both scales showed good psychometric properties and the factor structure identified in study 1 was reproduced through confirmatory factor analysis. Omega reliability coefficients were adequate. Finally, when performing multi-group CFA along with a French (n = 1,826) and a Spanish (n = 3,040) sample, language and gender invariance were supported. Correlations with other relevant measures indicate good convergent validity of both scales. *Conclusions:* The present research provides psychometrically sound instruments for further investigations on Instagram use behaviors.

KEYWORDS

Instagram, youths, motives, patterns of use, consequences, psychometric study, cross-cultural study, measurement invariance

INTRODUCTION

Social networking sites (SNS) have been gaining popularity over the years. This popularity has grown exponentially during the COVID-19 pandemic, with at least 1.3 million users joining networks in the year 2020 globally (Kemp, 2021). As social distancing measures and quarantines to prevent the spread of the pandemic drastically limited in-person interaction, the use of SNS allowed people, especially youths, to maintain contact with others (Ellis, Dumas, & Forbes, 2020; Pandya & Lodha, 2021). Yet while SNS have been welcomed as a good alternative for traditional social contacts, their usage might become excessive and associated to negative outcomes. Several studies have linked intensive use of SNS to lower well-being and poorer mental health, and some evidence exists of a relationship between SNS use and depression, anxiety, and stress (Faelens, Hoorelbeke, Cambier, et al., 2021; Huang, 2017; Keles, McCrae, & Grealish, 2020; Yoon, Kleinman, Mertz, & Brannick, 2019). Importantly, recent research also cautions to not over-interpret the (often relatively small) relationships found between self-reported SNS use and well-being (Orben, Przybylski, Blakemore, & Kievit, 2022; Satchell et al., 2021), and suggests to also consider other variables to account for these links (Aalbers, McNally, Heeren, de Wit, & Fried, 2019). In particular, it has recently been suggested that the assessment of SNS use needs to be improved from a psychometric perspective (Cataldo, Billieux, Esposito, & Corazza, 2022; Satchell et al., 2021).

One of the SNS that attracted attention of researchers and clinicians in the last years is Instagram, which is a photo-sharing application and a social network platform that relies uniquely on visuals and image-based content. Currently, it has 1.2 billion active users worldwide, and data from October 2021 reveal that it is the fourth most popular social platform after Facebook, Youtube, and Whatsapp (Chaffey, 2021; Statista, 2021a). It is particularly popular among younger people, with 63% of its users aged between 18 and 34 years (Statista, 2021b). Consequently, the literature that examines the potential negative effects of Instagram use has been growing steadily. Intensive Instagram use has thus been linked to social comparison processes, fear of missing out (FoMO), low self-esteem, and feelings of loneliness (Barry, Reiter, Anderson, Schoessler, & Sidoti, 2019; Faelens, Hoorelbeke, Fried, De Raedt, & Koster, 2019; Kircaburun & Griffiths, 2018; Mackson, Brochu, & Schneider, 2019; Ponnusamy, Iranmanesh, Foroughi, & Hyun, 2020; Schmuck, Karsay, Matthes, & Stevic, 2019; Sherlock & Wagstaff, 2019; Yang, 2016; Yurdagül, Kircaburun, Emirtekin, Wang, & Griffiths, 2019). Recent reviews also found strong evidence for the relationship between Instagram use, negative body image, low self-esteem, and disordered eating (Faelens, Hoorelbeke, Cambier, et al., 2021; Ryding & Kuss, 2020).

One classical explanation that has been used to account for the negative mental health effects of SNS use is the "addictive potential" of technology-mediated behaviors (Alter, 2017; Center for humane technology, 2021; Kuss & Griffiths, 2017). This approach typically assumes that symptoms such as loss of control over SNS use or withdrawal-like symptoms (in case of deprivation) reflect a genuine addictive disorder (Andreassen, 2015). This practice, however, has been criticized for merely recycling substance abuse criteria and applying them to SNS use, thus essentially focusing on the potential similarities with addictive disorders and ignoring the unique features of the behavior investigated (Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015; Kardefelt-Winther et al., 2017; Starcevic, 2016). Moreover, recent research suggests that several of the criteria that are borrowed from substance use disorders (e.g., tolerance-like phenomena), when applied to online behaviors, fail to distinguish high – but healthy – involvement from problematic use, thus pathologizing normal behavior (Billieux, Flayelle, Rumpf, & Stein, 2019; Castro-Calvo et al., 2021; Cataldo et al., 2022; Flayelle et al., 2022; Satchell et al., 2021). To understand the impact of internet-related behaviors on mental health, these behaviors need to be investigated separately, and their unique features recognized. For instance, Instagram engagement depends on the users' underlying motives, which define the ways in which the platform is used. Since Instagram has specific functionalities, the effects on the well-being of users may be influenced by specific psychological factors, such as self-comparison, fear of missing out or enhanced self-consciousness. As these factors can differ from those of other SNS (Baker & Algorta, 2016; Faelens, Hoorelbeke, Soenens, et al., 2021), more research is needed to shed light on whether the results of previous research on the mental health impact of other SNS can be extended to Instagram.

The importance of examining individual motives for media use for understanding their potential effects has been recognized by media psychology for a long time. One of the predominant theories of this field is the Uses and

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Gratifications Theory (U&G; Katz, Blumler, & Gurevitch, 1973; Rubin, 2009; Ruggiero, 2000). This theory asserts that media use is goal-directed or motivated and mediated by social and psychological factors, that people use media to satisfy their personal needs or desires, and that media use is related to interpersonal communication (Katz et al., 1973; Kircaburun, Alhabash, Tosuntaş, & Griffiths, 2018; Rubin, 1993). In the past fifteen years, U&G has been applied to study media consumption behavior in the context of computer-mediated communication (Phua, Jin, & Kim, 2017; Sheldon & Bryant, 2016), resulting in the addition of new types of gratifications to the list of reasons why people use social media. Some of these needs include self-expression, developing and maintaining relationships, information exchange, recreation, following fashion and trends, expression of affection, personal identity, convenience, opinion expression, and surveillance (Kircaburun et al., 2018; Orchard, Fullwood, Galbraith, & Morris, 2014; Quan-Haase & Young, 2010; Sheldon & Bryant, 2016; Xu, Ryan, Prybutok, & Wen, 2012). For Instagram in particular, motivations such as entertainment, convenience, self-expression, appeal, interpersonal/social interaction, surveillance, documentation/archiving, coolness, creativity, escapism, and peeking have been identified as important (Alhabash & Ma, 2017; Huang & Su, 2018; Lee, Lee, Moon, & Sung, 2015; Sheldon & Bryant, 2016).

In the past years, several assessment instruments have been used to conceptualize and assess the *motives* that underly Instagram use. Based on existing measures of Internet use, SNS use, and blogging, Lee et al. (2015) developed a 28-item scale that measured five motives for Instagram use: social interaction, archiving, self-expression, escapism, and peeking. Sheldon and Bryant (2016) relied on focus group discussions to develop a 20-item scale measuring four distinct motives: surveillance, documentation, coolness, and creativity. Subsequently, subsets of items extracted from this initial version were used along with new ones and subjected to exploratory factor analysis, which led to different instruments (Sheldon & Newman, 2019; Sheldon, Rauschnabel, Antony, & Car, 2017). Other scholars used motivational scales that had been developed for assessing other social networks (e.g., Alhabash & Ma, 2017) or that had been derived from previous research (e.g., Huang & Su, 2018). While building on concepts or measures developed for other platforms may seem advantageous, these approaches may neglect the unique features of Instagram use (see Cataldo et al., 2022, for a critical approach). As such, there is a need to develop and validate new measurement instruments that assess the unique motivational factors involved in using this specific SNS.

Similarly, with regard to the *use* of Instagram, research practices also vary significantly across studies. A review by Faelens, Hoorelbeke, Cambier et al. (2021) revealed that typical measures of Instagram usage include one or two of the following indicators: membership (yes/no), profile characteristics (e.g., number of posts, followers, and followees), frequency and intensity of use (e.g., the number of hours per day spent on Instagram), type of use (e.g., browsing, posting, interacting, liking, selfie taking-behavior), and type of content to which one is exposed. To measure Instagram (over)involvement, some researchers have used questionnaires that were designed to measure Facebook use intensity, Facebook addiction, or Internet addiction (see Cataldo et al., 2022 for a review), such as the *Instagram Addiction Scale* (Kirkabarun & Griffiths, 2018), which was developed by modifying Young's *Internet Addiction Test* (1998) by changing the word "Internet" with "Instagram" for all items, or the *Instagram Intensity Scale* (Stapleton, Luis, & Chatwin, 2017; Teo & Collinson, 2019), developed from the *Facebook Intensity scale* (Ellison, Steinfield, & Lampe, 2007). Given the specific functionalities of Instagram, and the conceptual problems of using the addiction framework to assess involvement in online behaviors (Flayelle, Schimmenti, Starcevic, & Billieux, 2022; Satchell et al., 2021), this approach is not the most suited to assess Instagram usage.

In light of this, research on Instagram use would benefit from having valid and reliable measures of specific Instagram motives and usage patterns that can be used consistently across studies and different cultures. To that effect, the present study aimed to develop and validate two scales, one measuring the motives of Instagram use (*Instagram Motives Questionnaire* – IMQ), and one measuring Instagram usage and engagement patterns (*Instagram Uses and Patterns Questionnaire* – IUPQ). Both scales were developed following a qualitative inquiry into the motives, usage and consequences of Instagram use among emerging adults (see Romero, Van den Broucke, & Van Beggelaer, 2022). Similar approaches have been successfully implemented to develop scales for emerging online problematic behaviors (e.g., binge-watching, see Flayelle et al., 2019, 2020). Two separate studies were conducted. Study 1 describes the development of the scales and the pilot testing of the items, based on exploratory factor analysis conducted in an English-speaking sample. Study 2 further investigates the psychometric properties of the scales by conducting confirmatory factor analysis and exploring measurement invariance in different cultures and across gender in three different language-based samples (English, Spanish and French). In this study, construct validity was also established by analyzing the relationships of the scale scores with established correlates of social network use behavior.

STUDY 1

Methods

Scale development. A preliminary set of items was developed, drawing on the results from a qualitative study in which participants were interviewed in-depth about their motivations and current Instagram use (Romero et al., 2022). The following motives for Instagram use were listed: self-expression, curiosity, documenting, entertainment, connection, following trends, coping with emotions, need to be seen, information, professional use, and impact on others.

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In addition, the following distinctive but inter-related usage patterns were identified: urge and craving, passive use, anxious posting, social approval, and social comparison. Two distinct provisional scales were developed to include these dimensions, incorporating the wording that Instagrammers use: the *Instagram Motives Questionnaire* (IMQ), consisting of 53 initial items, and the *Instagram Uses and Patterns Questionnaire* (IUPQ), consisting of 55 initial items. Both scales have a 5-point Likert-style response format (IMQ: does not describe me at all – describes me extremely well; IUPQ: never – always). The items were formulated in English and reviewed by four qualified psychologists. The item wording was improved after receiving suggestions, and then a pilot test was conducted with 15 participants. Further minimal improvements were made before the final study was launched.

Procedure. Both preliminary questionnaires were administered using the *Qualtrics* software. Data collection was conducted online in April 2021 via Prolific Academic allowing for an equal representation of men and women, since men are usually underrepresented in online survey samples. They were presented with a short demographic questionnaire and questions regarding their use of Instagram and other social networks, followed by the two provisional Instagram questionnaires. A small compensation of €1.40 was given to the participants who finished the survey.

Participants. To be invited to participate in the study, participants had to meet the following criteria: (a) being aged 18–35, (b) having an Instagram profile, (c) having completed high school, and (d) being fluent in English. The inclusion criteria were intentionally broad since the study was exploratory. The sample was composed of 312 participants (50% men, 49% women, 1% non-binary gender). Their mean age was 23.81 years ($SD = 4.49$). Further demographic and Instagram use information can be found in Table 1.

Statistical analysis. In this study, both IBM SPSS Statistics 24 (IBM Corp, 2015) and RStudio (R Development Core Team, 2013) were used to perform the statistical analyses.

First, descriptive statistics regarding the demographic variables and social networks and Instagram use were conducted. Data were then inspected for missing values and outliers, both univariate and multivariate, by examining box plots and running Kolmogorov-Smirnov tests (Massey, 1951) and Mardia's (1970) test for multivariate normality. The statistical assumptions for performing an exploratory factor analysis (EFA) were checked using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Kaiser, 1970, 1974) and Bartlett's test of sphericity (1951, 1954). As recommended, KMO was considered acceptable if above 0.70, and Bartlett's test when significant at $P < 0.05$. Each scale's factor structure was examined through exploratory factor analysis (EFA) using the procedures recommended by Fabrigar, Wegener, MacCallum, and Strahan (1999), Howard (2016), and by Costello and Osborne (2005). The number of factors to retain was determined by performing a parallel analysis (Horn, 1965). Competing solutions were executed based on parallel and normality analysis results.

Given the limitations of Cronbach's alpha coefficient as an estimator of reliability (Kelley & Preacher, 2012; Raykov, 1997a, 1997b; Revelle & Zinbarg, 2009; Viladrich, Angulo-Brunet, & Doval, 2017) on account of its reliance on assumptions that are hardly ever met in practice, especially tau-equivalence and multivariant normality (Dunn, Baguley, & Brunsden, 2014), reliability was calculated using the *Omega coefficient* (McDonald, 1999). To calculate the Omega coefficient and its 95% confidence intervals, we used the MBESS version 4.8 package on *R* (Kelley, 2020), as suggested by Dunn et al. (2014).

Ethics. This study received approval from the IPSY Ethics Committee of the Université catholique de Louvain. Prior to being invited to complete the survey, participants were asked to state their agreement to take part in the study via an online Informed Consent form.

Results

No missing values were found, nor were there univariate or multivariate outliers. All K–S tests were significant ($P < 0.05$), thus violating the univariate normality assumption. Mardia's (1970) multivariate skewness and kurtosis tests rejected the null hypothesis ($P < 0.05$), suggesting that the data from both the IMQ and the IUPQ did not follow a normal distribution. Consequently, the Principal Axis Factoring (PAF) method, which does not make assumptions on the normality of the data, was used for factor extraction. Moreover, Oblimin oblique rotation was chosen as it was not assumed that the motives or the patterns of use would be orthogonal.

Instagram Motives Questionnaire (IMQ). For the IMQ, the KMO test was 0.91, which is well above the recommended value of 0.70. Bartlett's test was significant ($\chi^2 = 6{,}287.35$, $df = 496$, $P < 0.01$), suggesting that the data were suitable for factor analysis. Parallel analysis performed in *R* and the scree plot suggested retaining either 6 or 7 factors. Therefore, two different solutions were computed. Following the suggestion of Howard (2016), items with low communalities (<0.30), with cross-loadings, or with low factor loadings (<0.40) were dropped leading to eliminating 22 items. The final IMQ solution, which was both parsimonious and interpretable, was thus composed of 32 items. The six factors together explained 59.51% of the variance.

The item descriptive statistics, factor loadings and communalities can be found in the Supplementary material (Tables S1 and S2).

Factor 1 was labeled *Social Impact Seeking*. It includes nine items that capture the person's motivation to use Instagram to promote themselves, show their skills and creativity and make an impact by inspiring people through their content. This factor explained 32.98% of the variance, and factor loadings were between 0.59 and 0.81. The Omega coefficient was 0.93 [CI (0.91, 0.94)] and item-test correlations varied between 0.62 and 0.82.

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Table 1. Sociodemographic and Instagram use characteristics in the different samples

	Study 1 (n = 312)	Study 2 (n = 6,284)	English Sample (n = 1,418)	French Sample (n = 1,826)	Spanish Sample (n = 3,040)
Age in years, M(SD)	23.81 (4.49)	23.03 (4.63)	21.35 (3.89)	25.08 (4.29)	22.59 (4.71)
Range	18–35	18–34	18–34	18–34	18–34
Gender *n* (%)					
Men	156 (50)	1,521 (24.2)	350 (24.7)	154 (8.4)	1,017 (33.5)
Women	153 (49)	4,675 (74.4)	1,046 (73.8)	1,654 (90.6)	1,975 (65)
Third gender	3 (1)	88 (1.4)	22 (1.5)	18 (1)	48 (1.6)
Education level (%)					
High school	21.8	5.1	13	5.8	1
Technical	9.6	6.1	0.8	10.1	6.2
Undegraduate	36.9	67.7	70.4	44.9	80.3
Graduate	31.7	21	15.8	39.2	12.5
Social Networks Used other than Instagram (% Yes)					
Facebook	72.1	77.8	76.2	83	75.4
Messenger	64.1	58.4	63	83.5	41.2
Snapchat	28.5	39.9	76.2	62.6	9.4
TikTok	35.9	48	65.4	30	50.6
Whatsapp	69.9	80.9	44.4	80.9	98
Twitter	41.7	41.1	44.9	26.5	48
Youtube	89.1	81.4	81	78.5	83.3
Others	14.4	8	6.8	6.3	9.6
Instagram Profile status (%)					
Public	42.9	37.9	40.4	30.1	41.5
Private	57.1	62.1	59.6	69.6	58.5
Years Using Instagram (%)					
Less than a year	2.6	0.6	0.5	0.5	0.8
1–2 years	9.6	10.7	4.4	11.5	13.2
2–5 years	37.8	38.6	28.6	29.1	25.3
More than 5 years	50	50.1	66.5	58.9	60.7
Number of Instagram profiles (%)					
One	59.9	61.1	55.1	67.6	60.1
More than one	40.1	38.8	44.9	32.4	39.9
Time of Instagram use per day M(SD)	65.1 (56–55)	82.30 (72.31)	68.78 (68.48)	25.09 (4.29)	22.58 (4.75)
Range	0–360	0–960	0–960	0–600	0–720
Use for business or self-promotion					
No	77.4	79.2	80.8	82.2	76.6
Yes	22.6	20.8	19.2	17.8	23.4
Time spent since COVID-19 outbreak (%)					
Decreased	12.2	8.2	16.2	3.6	7.2
Increased	58	71.3	64.7	70.2	75.1
No change	29.8	20.5	19.1	26.2	17.7

Factor 2, *Emotional Escape,* explained 10.92% of the variance and consists of seven items with factor loadings between 0.55 and 0.73. It concerns the use of Instagram as an escape mechanism for dealing with uncomfortable emotions such as boredom, stress, anxiety, and passing the time between activities doing something interesting. In terms of reliability, the Omega coefficient was 0.84 with a 95% CI [0.82, 0.87] and item-test correlations varied between 0.53 and 0.68.

Factor 3, *Souvenir Keeping*, explained 5.51% of the variance and has four items with factor loadings that ranged between 0.72 and 0.90. It captures the use of Instagram as a gallery or tool to keep a visual record of important moments. The reliability of this factor was 0.89 with a 95% CI [0.87, 0.91], and the item-test correlations varied between 0.72 and 0.82.

Factor 4, *Social Connection,* explained 3.90% of the variance and contains four items with factor loadings varying between 0.66 and 0.78, capturing the motive to develop, maintain or reactivate relationships with others. The omega reliability value was 0.84 with a 95% CI [0.80, 0.87] and item-test correlations varied between 0.61 and 0.70.

Factor 5, *Attention Seeking,* explained 3.39% of the variance and contains four items measuring the user's need for attention and validation from others via Instagram. The factor loadings ranged between 0.46 and 0.64. The omega coefficient is 0.87 with a 95% CI [0.84, 0.89] with item-test correlations ranging between 0.64–0.78.

Finally, factor 6, named *Information Seeking,* explained 2.80% of the variance and consists of four items with factor loadings between 0.46 and 0.74, dealing with the use of Instagram to stay up to date, keep an eye on what the contacts

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are doing and what is happening in the world. The reliability value was sufficient (0.79) with a 95% CI [0.74, 0.83], and item-test correlations varied between 0.55 and 0.69.

The correlations among the six factors were positive, moderate to high, and significant ($P < 0.01$), with the highest correlation being noted between Social Impact Seeking and Attention Seeking ($r_s = 0.682$), Social Impact Seeking and Souvenir Keeping ($r_s = 0.567$), and Souvenir Keeping and Attention Seeking ($r_s = 0.538$). The correlations can be found in Table S3.

Instagram Patterns of Use Questionnaire (IUPQ). For the IUPQ, both the KMO test (0.93) and Bartlett's test ($\chi^2 = 7{,}166.65$, $df = 666$, $P < 0.01$) indicated that it was possible to proceed with the EFA. As the parallel analyses performed in *R* and the scree plot suggested that 5 or 6 factors could be retained, two different solutions were tested. After eliminating the items with either low communalities, cross-loadings, or low factor loadings (<0.40), 37 items remained with a clear 6-factor structure that explained 56,36% of the variance. In total, 18 items were eliminated. The descriptive statistics for each item are presented in Table S4. The factor loadings and the communalities for the IUPQ are provided in Table S5.

Factor 1, which explained 33.97% of the variance, is named *Loss of Control*. It consists of eleven items that measure behaviors such as the urge to open Instagram, losing track of time when engaged in the behavior, wishing that the time spent on Instagram was better controlled, etc. Their factor loadings varied between 0.50 and 0.83. The reliability value was high (0.93) with a 95% CI [0.91, 0.94], and item-test correlations varied between 0.69 and 0.82.

The second factor, *Anxious Posting,* explained 8.32% of the variance and comprises five items that refer to the experience of feeling vulnerable, insecure, and afraid of being judged when posting or sharing something on Instagram. Their factor loadings varied between 0.61 and 0.69. In terms of reliability, the Omega coefficient was 0.91 with a 95% CI [0.90, 0.93], and item-test correlations varied between 0.74 and 0.83.

The third factor, *Passive Use,* explained 5.98% of the variance and comprises four items that refer to less interactive use of Instagram. Participants with high scores on this factor might check posts and stories but do not post, react, like or comment themselves often. They are spectators more than active users. The factor loadings varied between 0.45 and 0.74. The Omega coefficient was 0.68 with a 95% CI [0.64, 0.72], and item-test correlations varied between 0.39 and 0.57.

The fourth factor, named *Social Approval*, explained 3.86% of the variance and comprises six items that evidence the behavior of editing and crafting posts or stories on Instagram and the positive feelings that participants experience when they receive reactions, comments, and likes. The factor loadings vary between 0.40 and 0.79. The Omega coefficient was 0.84 with a 95% CI [0.81, 0.87], and the item-test correlations varied between 0.62 and 0.74.

Factor 5 was called *Feelings of Discomfort* and explained 2.41% of the variance. It consists of five items indicating behaviors or consequences of being on Instagram that reflect disappointment, suffering, disconnection, and discomfort. The factor loadings range between 0.51 and 0.64, the Omega coefficient was 0.76 with a 95% CI [0.71, 0.81], and the item-test correlations were between 0.50 and 0.55.

Factor 6, *Self-deprecating Comparison,* explained 1.82% of the variance and has six items that convey the feeling of discomfort experienced when one compares his or her life to others they see on Instagram. The factor loadings varied between 0.43 and 0.88. The Omega coefficient was 0.87 with a 95% CI [0.85, 0.89], and the item-test correlations were between 0.55 and 0.77.

STUDY 2

Methods

Procedure. To determine the measurement equivalence of the IMQ and IUPQ in different cultures and across gender, a second study was performed for which both questionnaires were used in three different language-based samples (English, Spanish and French). This study was also conducted to test the construct validity of the two scales developed through an analysis of their links with other psychometric scales measuring established correlates of SNS use. The original English versions of the IMQ and the IUPQ were translated into French and Spanish by two psychologists who were native speakers of the second language, and back translated by an independent translator. Any discrepancies that arose between the back-translated and the original English versions were discussed between the authors until a consensus agreement was reached. Next, the three language versions of the questionnaire were hosted on *Qualtrics*, along with an online Informed Consent form, questions on the demographic characteristics, and a series of questionnaires measuring potential effects of Instagram use (see below: measures), presented in identical order in the three languages. Validated versions of these measures in French and Spanish were available for most of the additional questionnaires. If this was not the case, translations were made by the authors, and reliability was tested in the three subsamples before conducting any analyses.

Measures. To reach the objectives described above, the following questionnaires were included into an online survey.

Instagram Motives Questionnaire (IMQ). The final 32-item version of the questionnaire obtained from Study 1 was used for this study.

Instagram Usage Patterns Questionnaire (IUPQ). The final 37-item version of the questionnaire obtained from Study 1 was used for this study.

Compulsive Internet Use Scale (CIUS-5). The CIUS-5 is a short version of the CIUS (Meerkerk, Van Den Eijnden, Vermulst, & Garretsen, 2009) which assesses critical aspects

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of Internet Use addiction. This 5-item version, available in eight languages (Lopez-Fernandez et al., 2019), measures addictive and compulsive Internet use through five items reflecting aspects such as loss of control ("Do you find it difficult to stop using the Internet when you are online?"), conflict or negative consequences ("Do you neglect your daily obligations [work, school, or family life] because you prefer to go on the Internet?"), and mood regulation ("Do you go on the Internet when you are feeling down?"). Items are scored on 5-point Likert scales ranging from Never (0) to Very often (4) and then added up to obtain a total score. The Cronbach's Alpha reliability coefficient for this sample ranged between 0.73 and 0.79 for the three language groups.

Self-esteem. A single item to measure self-esteem was used (Robins, Hendin, & Trzesniewski, 2001). This item ("I have a high self-esteem") measures global self-esteem via a 7-point Likert scale ranging from Not very true of me (1) to Very true of me (7). In that study, evidence of convergent validity with Rosenberg's scale was found, with correlations ranging between 0.73 and 0.80 in three studies with different samples. It has also been used in other studies focusing on problematic online behaviors (e.g., Billieux, Thorens et al., 2015).

Revised Self-consciousness Scale (SCS-R, Scheier & Carver, 1985). Following the example of other studies investigating problematic social network use (Lee, Moore, Park, & Park, 2012; Lee-Won, Shim, Joo, & Park, 2014), only the seven items of the original 23-item instrument which measure public self-consciousness (an excessive concern about the self as an object) were used (e.g., "I am self-conscious about the way I look," "I usually worry about making a good impression"). The items were scored using a 4-point Likert-type response format (1 – not like me at all to 4 – a lot like me). The alpha reliability coefficient for this sample ranged between 0.82 and 0.85.

Self-reflection and Insight Scale (SRIS, Grant, Franklin, & Langford, 2002). Of this 20-item scale measuring private self-consciousness in the form of self-reflection and insight, only the Insight dimension (8 items) was used for this study since it has previously performed adequately (DaSilveira, DeCastro, & Gomes, 2012; Nakajima, Takano, & Tanno, 2017). The items (e.g., "I am usually aware of my thoughts") are scored on a 6-point Likert scale ranging from strongly disagree (1) to strongly agree (6). In this sample, it had an Alpha coefficient ranging from 0.81 to 0.82.

Iowa-Netherlands Comparison Orientation Measure (INCOM, Gibbons & Buunk, 1999). This instrument has 11 items that measure the orientation to social comparison or the tendency of people to compare themselves to others in terms of their abilities and opinions (e.g., "I often compare how I am doing socially, e.g., social skills or popularity, with other people"). The items are scored on Likert scales ranging from 1 (totally disagree) to 5 (totally agree). For this study, Cronbach's alphas ranged from 0.82 to 0.86.

Fear of Missing Out Scale (FoMOs scale, Przybylski, Murayama, DeHaan, & Gladwell, 2013). Fear of missing out (FoMO) has been defined as a pervasive apprehension that others might be having rewarding experiences from which one is absent. The unidimensional FoMO scale has ten items (e.g., "I get worried when I find out my friends are having fun without me") to be scored on a 4-point Likert-type response scale (1 – not at all true of me, 4 – very true of me). It has been used in numerous studies showing a relationship with problematic social network use. In this study, it had Cronbach's Alphas ranging between 0.79 and 0.89.

UCLA Loneliness Scale. This unidimensional scale is one of the most often-used measures of the experience of loneliness. The short version (Hays & DiMatteo, 1987) has eight items (e.g., "There is no one I can turn to," "I lack companionship") to be scored on a 4-point Likert scale (1 – never; 4 – always) and has shown to correlate highly with the more elaborate ULS20 and ULS4 (r = 0.82 to 0.87). The alpha reliability coefficient for this sample ranged between 0.85 and 0.87.

Depression, Anxiety and Stress Scale (DASS-21, Henry & Crawford, 2005). This short version of a scale measuring stress, anxiety, and depression symptoms has 21 items reflecting the core symptoms of each of the three mental health problems, to be scored on a 4-point Likert scale ranging from 1 – not at all/never to 4 – very much/most of the time. For this study, we found Cronbach's alphas ranging between 0.82 and 0.87 for Anxiety, 0.90 to 0.92 for Depression, and 0.86 to 0.88 for Stress.

Life satisfaction scale (SWLS, Diener, Emmons, Larsen, & Griffin, 1985) is the most often-used scale to measure global life satisfaction. It has five items to be scored on a 7-point Likert scale ranging from 1 – Totally disagree to 7 – Totally agree. In this study, it reached Cronbach's Alphas between 0.86 and 0.88.

Data collection. Data were collected by distributing the survey links through social networks and English, French, and Spanish-speaking universities. Each collaborator was responsible for distributing the link through advertisements, emails, university participant pools, and social media. A motivating text accompanied dissemination. Participants could enter a raffle for winning one of ten €15 vouchers (or the equivalent in their local currency). Some partner universities gave credits to students completing the survey as an alternative. Data collection took place between late June and October 2021. Inclusion criteria were the same as for Study 1. Only the records of the participants who went past the informed consent and the demographic questions were recorded on Qualtrics. Of the total 6,284 responses received, only those with complete data for the IMQ and the IUPQ were used to analyze psychometric properties. The number of cases used is provided for each statistical analysis.

Participants. The total sample was composed of 6,284 participants (24.2% men, 74.4% women, 1.4% non-binary gender). Their mean age was 23.03 years (SD = 4.63). In terms of language, n = 1,418 were English-speaking, n = 1,826 French-speaking, and n = 3,040 Spanish-speaking. For the English sample, the most frequent countries of the participants residence were the United States (39.1%), the United Kingdom (19.5%), and Australia (22.1%). For the Spanish sample, most participants were

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from Perú (85.3%) and Spain (10.8%), and for the French sample, most participants lived in France (71.7%), Belgium (15.8%), and Switzerland (8.7%). All the demographics and Instagram use information are reported in Table 1.

Statistical analysis. Both SPSS and *R* were used to perform the statistical analyses, which involved the following packages: *haven, tidyverse, dplyr, lavaan, semTools*. First, descriptive statistics were computed for the demographic characteristics. To conduct Confirmatory Factor Analyses (CFA), the Likert-type response format of the scale scores had to be treated as ordinal. A three-step procedure was applied to analyze ordered categorical variables in the SEM framework: estimate thresholds, estimate the polychoric correlation matrix and then fit them to a hypothesized model using an estimation method. For the latter, the mean and variance-adjusted weighted least squares (WLSMV) estimator was applied, which is the most popular method to address ordinal categorical data (Li, 2016; Mindrila, 2010; Rhemtulla, Brosseau-Liard, & Savalei, 2012; Savalei & Rhemtulla, 2013; Shi & Maydeu-Olivares, 2020; Xia & Yang, 2019) and recommended over Maximum Likelihood Robust (MLR) analyses. Since chi-square is known to be sensitive to sample size, other goodness of fit measures were used to determine the acceptability of the proposed models, namely the Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMSR), the Comparative Fit Index (CFI), and the Tucker-Lewis index (TLI). A non-strict approach was taken for the interpretation of these indices, whereby values of RMSEA <0.08, RMSEA CI < 0.10, SRMR < 0.09, CFI, and TLI > 0.90 were considered as acceptable goodness of fit (Chen, Curran, Bollen, Kirby, & Paxton, 2008; Hu & Bentler; 1999; Kline, 2010; Lai & Green, 2016; Rudnev, Lytkina, Davidov, Schmidt, & Zick, 2018). Scaled fit indices (which are functions of the scaled chi-square statistic used in DWLS) were also obtained and reported for transparency, although we did not find enough justification for using robust chi-square in calculating the fit indices (Xia & Yang, 2019). The literature suggests using both scaled and non-scaled fit indices with caution, as their value depends on the chosen estimation method. As cutoff points were created to be used with the ML estimator, extending their interpretation to other methods can be problematic (Beauducel & Herzberg, 2006; Li, 2016; Shi & Maydeu-Olivares, 2020; Xia & Yang, 2019). Individual CFAs were conducted first for the English data to assess the construct validity of the original IMQ and the IUPQ, after which CFAs in the other languages and for the whole sample were performed.

As already mentioned, the Cronbach's alpha coefficient is limited as an estimator of reliability. Thus, the reliabilities for the IMQ and the IUPQ were calculated using the *Omega coefficient* and its 95% CI (McDonald, 1999) using the MBESS version 4.8 package on *R* (Kelley, 2020), as suggested by Dunn et al. (2014). Omega is a form of composite reliability index (Hayes & Coutts, 2020; Padilla & Divers, 2016). Reliability coefficients between 0.70 and 0.79 can be considered acceptable, between 0.80 and 0.89 as good, and above 0.90 as excellent (Hunsley & Mash, 2008). To assess convergent validity, composite reliability and average variance extracted (AVE) were examined together. Composite reliability over 0.70 and AVE greater than 0.50 indicate convergent validity (Fornell & Larcker, 1981; Hair, 2009). To assess discriminant validity, the square root of the AVE was contrasted with the correlations between each pair of variables. If it was higher, then discriminant validity is supported (Fornell & Larcker, 1981; Henseler, Ringle, & Sarstedt, 2015). Spearman correlations were used to assess the correlations between the IMQ and IUPQ scales and the other variables. For their interpretation, Cohen's criteria (1988) were applied, whereby $r \geq 0.10$ represents a "small" effect size, $r \geq 0.30$, a "medium" effect size, and $r \geq 0.50$, a large effect size. Also, the Benjamini–Hochberg procedure (1995) was used to adjust the *P* values to hold the false discovery rate at 5% for all the correlations.

Finally, to assess gender and language equivalence for the IMQ and the IUPQ and establish *construct comparability* (Wu, Li, & Zumbo, 2007), multi-group CFAs were conducted using the WLSMV estimator. Measurement invariance in scale scores means that a person's probability of getting an observed score does not depend on their membership in a specific group (Meredith, 1993). In this case, we hypothesized that the scores in the IMQ and IUPQ would not depend on the language or the gender of the participants. For language equivalence, we considered English, Spanish, and French. For gender invariance, we only considered two groups, men and women, due to the low percentage of respondents who identified themselves as belonging to the third gender. Measurement invariance is typically tested in four different levels: configural, weak (metric), strong (scalar), and strict (residual) (Putnick & Bornstein, 2016). When indicators are ordinal in nature, such as Likert-type response formats, the parameters for invariance testing are the factor loadings, the thresholds, and the residual variance. The levels are the same, but the thresholds are the focus of the scalar invariance test instead of intercepts. There is no consensus in the literature on whether each indictor's loadings and thresholds should be constrained and freed simultaneously since they jointly define item functioning. Weak and strong invariance are thus tested in a single step (Millsap & Yun-Tein, 2004; Muthén & Muthén, 2012; Sass, 2011). The adequacy of the models was assessed by computing the difference or the change (delta Δ) between pairs of nested models in the RMSEA, CFI, TLI, RNI, and SRMR. A ΔRMSEA $\geq$ 0.015, ΔCFI $\geq$ 0.01, ΔTLI $\geq$ 0.01, ΔRNI $\geq$ 0.01, and ΔSRMR $\geq$ 0.03 would indicate a significant decrease in the model fit when testing for measurement invariance according to different authors (Beaujean, 2014; Chen, 2007; Rudnev et al., 2018; Wu et al., 2007).

Ethics. The study received approval from the IPSY Ethics Committee of the Université catholique de Louvain and ethical clearance from the Institutional Review Boards of the partner universities in Australia, the United States, and Perú. Participants were asked to give their informed consent

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online prior to participating and were informed that anonymity and confidentiality were guaranteed. No personal data were collected that could potentially identify participants, except for email addresses or student codes when incentives were offered.

Results

Confirmatory factor analysis of the IMQ and the IUPQ. Table S6 shows the descriptive statistics of the study variables for the entire sample and the samples in English, French, and Spanish. Table 2 shows the fit indices for the two proposed models for the IMQ and the IUPQ in the whole sample and the three subsamples. As it was assumed that motivations to use Instagram and usage patterns are not independent, a six-factor model was fitted for each scale, drawing on the EFA results. Both models produced acceptable fit indices for the English sample, thus validating the proposed models. The fit indices for the French and Spanish subsamples and the whole sample proved acceptable. Since modification indices did not show any articulable changes that could significantly increase the model's fit, these are considered the final models. The final versions of the scales in English, Spanish and French language are provided in the supplementary material.

For the IMQ, all items had positive factor loadings in their theoretical dimension, ranging between 0.58 and 0.96 (Table 3). Also, Omega reliability values showed adequate internal consistency, ranging from 0.78 to 0.91.

For the IUPQ, all items had positive factor loadings on their theoretical dimensions, ranging between 0.47 and 0.93 (Table 4). Omega reliability values showed adequate internal consistency for all the subscales of the IUPQ, ranging from 0.76 to 0.92. Significant correlations were observed among the six factors of the IMQ (see Table 5). Effect sizes were medium and large, with the highest ones seen between Social Impact Seeking and Attention Seeking (r_s = 0.639), Emotional Escape and Information Seeking (r_s = 0.592), and Social Connection and Information Seeking (r_s = 0.518). For the IUPQ, the correlations among the six factors were significant, with the highest ones noted between Anxious Posting and Self-deprecating Comparison (r_s = 0.703). Passive Use showed marginal to small effects with the rest of the usage patterns.

Correlations between the IMQ and the IUPQ dimensions. The correlations between the motives for Instagram use and the use patterns are shown in Table 5. Significant correlations between all the IMQ and IUPQ dimensions were found. Most of these were positive and small to medium, with some exceptions worth noting: There was a strong relationship between the Emotional Escape motive and the Loss of Control use pattern (r_s = 0.536) and between the Attention Seeking motive and the Social Approval pattern (r_s = 0.692). Furthermore, three of the six motivations were inversely correlated with the Passive Use pattern, i.e., Social Impact Seeking (r_s = −0.252), Souvenir Keeping (r_s = −0.219), and Attention Seeking (r_s = −0.215), while

Table 2. Fit indices for CFA models of the IMQ and the IUPQ

Model	Sample	*n*	χ^2	*df*	*P*	CFI	CFI scaled	TLI	TLI scaled	NNFI	NNFI scaled	SRMR	RMSEA	RMSEA scaled
IMQ – Six correlated factors	Full sample	6,284	21,104	449	<0.001	0.978	0.908	0.976	0.898	0.976	0.898	0.070	0.086	0.089
	English	1,418	5,217.57	449	<0.001	0.980	0.910	0.979	0.901	0.979	0.901	0.069	0.087	0.091
	French	1,826	7,664.17	449	<0.001	0.956	0.897	0.950	0.887	0.950	0.887	0.091	0.094	0.086
	Spanish	3,040	9,710.37	449	<0.001	0.984	0.923	0.982	0.915	0.982	0.915	0.060	0.082	0.087
IUPQ – Six correlated factors	Full sample	5,115	22,729.6	614	<0.001	0.975	0.896	0.973	0.887	0.973	0.887	0.069	0.084	0.083
	English	1,337	7,138.61	614	<0.001	0.970	0.887	0.970	0.878	0.976	0.878	0.074	0.089	0.089
	French	1,406	6,605.4	614	<0.001	0.966	0.902	0.963	0.893	0.963	0.893	0.074	0.083	0.077
	Spanish	2,372	10,206.9	614	<0.001	0.979	0.906	0.978	0.898	0.978	0.898	0.066	0.081	0.082

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Table 3. Factor loadings and Omega reliability coefficient (95% CI) of the IMQ (English sample, n = 1,418)

Item number	Items	Standardized factor loadings	Omega reliability [CI 95%]
	Social Impact seeking		0.90 [0.89; 0.91]
1	I share content on Instagram hoping to inspire other people.	0.745	
7	I am on Instagram to uplift and make an impact on others.	0.822	
13	I share content on Instagram to promote myself.	0.826	
16	I use Instagram to engage people to take part in important matters.	0.812	
19	I use Instagram to show how creative I am.	0.825	
22	I use Instagram to show others how skillful I am.	0.804	
25	I am on Instagram to promote my work/my business.	0.687	
30	I share content on Instagram to enlarge my follower base.	0.867	
32	I am on Instagram to raise awareness on important matters.	0.761	
	Emotional Escape		0.86 [0.85; 0.87]
2	I use Instagram to escape my responsibilities for a while.	0.706	
8	I use Instagram to pass the time in between activities.	0.750	
14	Instagram allows me to pass the time in a fun way.	0.798	
17	I use Instagram to get away from reality for a little while.	0.830	
20	I use Instagram to escape from boredom.	0.801	
23	I use Instagram to relieve my negative emotions (stress, anxiety, etc.).	0.697	
28	You can always find something interesting happening on Instagram.	0.700	
	Souvenir keeping		0.91 [0.90; 0.92]
3	I use Instagram as a gallery of the moments that I cherish the most	0.884	
9	I use Instagram to keep a visual record and remember important moments of my life.	0.955	
15	I use Instagram as a tool to keep a visual record and remember good and fun moments.	0.942	
24	I post on Instagram to store my pictures.	0.811	
	Social connection		0.83 [0.81; 0.84]
4	I use Instagram to chat, catch up with people and make plans with them.	0.583	
10	Instagram enables me to develop my relationships with other people.	0.882	
18	Instagram helps me to keep in touch with meaningful people in my life.	0.827	
26	Using Instagram has allowed me to reconnect with people I had not seen in a while.	0.800	
	Attention seeking		0.87 [0.86; 0.88]
6	I enjoy the validation I feel when I get likes, comments, or reactions to my content.	0.844	
11	I enjoy the attention I get on Instagram.	0.867	
27	I share content on Instagram to get attention/reactions from others.	0.862	
31	I enjoy Instagram because I can be seen by many people.	0.887	
	Information seeking		0.78 [0.76; 0.80]
5	Instagram allows me to be up to date with what's happening in the world/my community.	0.733	
12	I am on Instagram because that way I can stay up to date.	0.759	
21	I scroll through the Insta stories to see what people are up to.	0.715	
29	I use Instagram to keep an eye on what others are doing.	0.797	

Emotional Escape and Information Seeking were positively correlated with this use pattern (r_s = 0.181 and r_s = 0.118, respectively).

Convergent and disciminant validity. Table 5 also shows the average variance extracted values, which ranged from 0.481 to 0.727 for the IMQ and from 0.564 to 0.809 for the IUPQ. Taken together with the composite reliability coefficients (Tables 3 and 4), which range between 0.78 to 0.91 for the IMQ and from 0.76 to 0.92 for the IUPQ, there was enough support for convergent validity for both scales. With regard to discriminant validity, Table 5 shows the squared root of the AVE for all the dimensions of the IMQ and the IUPQ, which ranged between 0.693 and 0.900. All the values in the diagonal were higher than the correlations between the IMQ and the IUPQ and the relationships with other variables (Table 6), which supports the discriminant validity of the scales.

Relationships with other relevant variables. Table 6 shows the correlations between the IMQ and IUPQ and other selected variables for the English sample. Negligible tendencies were found regarding the associations between age and gender and some of the motives and patterns of Instagram use. The relationships between gender and Souvenir Keeping (r_s = 0.229) and gender and Self-deprecating comparison (r_s = 0.217) were low. Compulsive internet use was more strongly associated with the patterns of use than the motives of use, with medium effects of Loss of Control (r_s = 0.474) and Self-deprecating comparison (r_s = 0.400). Self-consciousness showed correlations and small to medium effect sizes with all the motives and usage patterns.

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Table 4. Factor loadings and Omega reliability coefficient (95% CI) of the IUPQ (English sample, n = 1,337)

Item number	Items	Standardized factor loadings	Omega reliability [CI 95%]
	Loss of control		0.92 [0.91; 0.93]
1	I feel like I'm on Instagram more than I should.	0.774	
5	I wish I could control the time I spend on Instagram better.	0.810	
8	I wish I could spend less time on Instagram and more time living the present moment.	0.775	
12	I am procrastinating due to hanging out on Instagram too much.	0.785	
15	While being on Instagram, I lose track of time.	0.766	
18	I spend time mindlessly scrolling on Instagram.	0.695	
22	Opening Instagram and checking stories has become like a reflex (something I do automatically)	0.776	
25	Instagram is an essential part of my daily life.	0.728	
29	I feel a need to enter Instagram and see what is happening.	0.785	
32	I open Instagram many times during the day to see what is new.	0.765	
35	I open Instagram in between activities automatically.	0.785	
	Anxious Posting		0.91 [0.89; 0.92]
2	I tend to get anxious after posting something on Instagram because I fear people will not like it.	0.855	
9	When I post something on Instagram, I feel insecure and tense, waiting to see people's reactions.	0.893	
16	When I post something on Instagram, I am afraid of being judged.	0.893	
23	When I share something on Instagram, I tend to feel vulnerable and exposed.	0.862	
33	I refrain from posting something others may not like.	0.755	
	Passive use		0.76 [0.73; 0.78]
10	I enjoy checking out content on Instagram but I don't like sharing content myself.	0.817	
17	I do not post stuff on Instagram, but I watch other people's content.	0.749	
24	I would probably watch stories or posts on Instagram without liking or reacting to them.	0.752	
34	I check stories and posts, but I hardly react, like or comment them.	0.715	
	Social approval		0.81 [0.79; 0.82]
3	I get excited when my posts and stories receive likes and reactions.	0.857	
7	When I get likes or comments on a post, I feel happy and uplifted.	0.831	
14	I edit my videos and pictures so they look good on Instagram.	0.619	
19	If someone comments or reacts to my stories, I will answer them back.	0.474	
26	I put a lot of effort into crafting beautiful posts and stories for my followers.	0.730	
30	I feel disappointed when the content I create does not get the reactions I expect.	0.927	
	Feelings of discomfort		0.77 [0.74; 0.79]
4	My relationships are suffering due to my Instagram addiction.	0.581	
11	If I am not on Instagram, I feel disconnected from others.	0.752	
20	I get annoyed when I can't access Instagram for any reason.	0.721	
27	I remove a post or a story when they don't get the reaction I expect.	0.737	
37	I check other people's posts and stories to feel better about myself.	0.663	
	Self-deprecating comparison		0.88 [0.87; 0.89]
6	When I see certain posts or stories on Instagram, I feel envious.	0.804	
13	Some of the content I see on Instagram makes me feel bad about myself.	0.863	
21	I can't help but compare myself to others on Instagram.	0.877	
28	I wish I could have the life of some of the people on Instagram.	0.759	
31	Being on Instagram gives me mixed feelings.	0.715	
36	I believe the bar set by the influencers on Instagram is too high for me to achieve.	0.656	

Insight showed negative associations with small to medium effect sizes on most use patterns, except Passive use. Fear of missing out showed the largest effect sizes when correlated to the motives and usage patterns. Comparison orientation showed positive associations with most motives and usage patterns and had the largest effect when correlated with the Self-deprecating comparison pattern (r_s = 0.522). When correlating the IMQ and the IUPQ with mental health indicators, the associations were stronger between patterns of use and loneliness, anxiety, depression, and stress, while the effect was negligible for some of the motives. Although relatively small, most usage patterns were inversely correlated with life satisfaction. Supplementary information on the correlations between the IMQ and the IUPQ for the different subsamples in French, Spanish, and the total sample can be found in Table S7.

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Table 5. Correlations between IMQ and IUPQ dimensions, average variance extracted and discriminant validity (English sample)

	AVE	1	2	3	4	5	6	7	8	9	10	11	12
1. IMQ – Social Impact Seeking	0.633	0.794†											
2. IMQ – Emotional Escape	0.572	0.312**	0.755†										
3. IMQ – Souvenir Keeping	0.809	0.480**	0.310**	0.900†									
4. IMQ – Social Connection	0.610	0.487**	0.404**	0.481**	0.781†								
5. IMQ – Attention Seeking	0.750	0.639**	0.421**	0.479**	0.424**	0.866†							
6. IMQ – Information Seeking	0.564	0.352**	0.592**	0.369**	0.518**	0.458**	0.748†						
7. IUPQ – Loss of Control	0.590	0.284**	0.536**	0.217**	0.341**	0.356**	0.453**	0.768†					
8. IUPQ – Anxious Posting	0.727	0.218**	0.295**	0.149**	0.242**	0.397**	0.333**	0.506**	0.854†				
9. IUPQ – Passive Use	0.571	0.252**	0.181**	−0.219**	−0.042	−0.214**	0.118**	0.221**	0.219**	0.761†			
10. IUPQ – Social Approval	0.570	0.494**	0.358**	0.463**	0.361**	0.692**	0.435**	0.521**	0.604**	−0.058*	0.754†		
11. IUPQ – Feelings of Discomfort	0.481	0.430**	0.324**	0.223**	0.327**	0.456**	0.341**	0.609**	0.577**	0.063*	0.555**	0.693†	
12. IUPQ – Self-deprecating Comparison	0.613	0.180**	0.341**	0.173**	0.240**	0.361**	0.367**	0.526**	0.703**	0.240**	0.554**	0.502**	0.781†

**$P < 0.01$, *$P < 0.05$, †The values in the diagonal are the square root of the AVE.
Note: Spearman correlations. *P* values adjusted using the false discovery procedure.
Only complete cases were used, $n = 1{,}290–1{,}418$

Table 6. Correlations between the IMQ and IUPQ sub-scales and other relevant variables (for the English sample)

	Age	Gender	Compulsive Internet Use	Self-esteem	Self-Consciousness	Insight	FoMO	Comparison Orientation	Loneliness	Anxiety	Depression	Stress	Life Satisfaction
IMQ – Social Impact Seeking	−0.05	0.12**	0.15**	0.13**	0.15**	−0.13**	0.29**	0.06	0.08**	0.27**	0.17**	0.24**	0.07**
IMQ – Emotional Escape	−0.06	0.15**	0.34**	−0.07**	0.31**	−0.07**	0.31**	0.31**	0.10**	0.14**	0.15**	0.20**	0.01
IMQ – Souvenir Keeping	0.01	0.23**	0.07**	0.08**	0.14**	−0.02	0.23**	0.17**	−0.07**	0.10**	0.02	0.12**	0.17**
IMQ – Social Connection	−0.10**	0.13**	0.15**	0.05	0.19**	−0.05	0.27**	0.18**	0.01	0.15**	0.10**	0.15**	0.07*
IMQ – Attention Seeking	−0.01	0.13**	0.25**	0.06*	0.29**	−0.12**	0.42**	0.24**	0.08**	0.17**	0.14**	0.20**	0.06*
IMQ – Information Seeking	−0.08**	0.15**	0.21**	−0.04	0.33**	−0.03	0.36**	0.30**	0.01	0.06*	0.05	0.12**	0.12**
IUPQ – Loss of control	0.05	0.09**	0.47**	−0.08**	0.27**	−0.15**	0.46**	0.33**	0.20**	0.21**	0.26**	0.30**	−0.06*
IUPQ – Anxious Posting	−0.10**	0.13**	0.38**	−0.32**	0.46**	−0.31**	0.54**	0.43**	0.37**	0.36**	0.38**	0.38**	−0.19**
IUPQ – Passive Use	0.03	−0.02	0.19**	−0.23**	0.12**	−0.05	0.06*	0.20**	0.21**	0.06*	0.16**	0.10**	−0.11**
IUPQ – Social Approval	0.00	0.18**	0.33**	−0.04	0.38**	−0.13**	0.51**	0.37**	0.16**	0.23**	0.21**	0.28**	0.02
IUPQ – Feelings of Discomfort	−0.06*	0.04	0.37**	−0.10**	0.24**	−0.26**	0.54**	0.23**	0.29**	0.36**	0.32**	0.34**	−0.10**
IUPQ – Self-Deprecating Comparison	−0.03	0.22**	0.40**	−0.38**	0.45**	−0.27**	0.58**	0.52**	0.40**	0.35**	0.41**	0.42**	−0.20**

*$P < 0.05$; **$P < 0.01$
Note: Spearman correlations. *P* values adjusted using the false discovery procedure.
Only complete cases were used, $n = 1{,}290–1{,}418$

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Measurement invariance. Table 2 also shows the results of the individual CFAs conducted for the subsamples in the three languages and the total sample. All the CFAs showed acceptable goodness of fit indices. The results of the multigroup CFAs by language and gender to test measurement invariance are presented in Table 7. For the IMQ, language and gender configural invariance were supported (for language RMSEA CI = [0.086–0.088], SRMR = 0.071, CFI = 0.979, TLI = 0.977, RNI = 0.979; for gender RMSEA CI = [0.084–0.086], SRMR = 0.068, CFI = 0.978, TLI = 0.976, RNI = 0.978). When estimating models with increasing levels of constraints to test for invariance at the other levels, changes in the fit indices did not produce a significant reduction of the model fit for language or gender, as indicated by the deltas in the goodness of fit indices and the criteria displayed in the data analysis section (ΔRMSEA < 0.015, ΔCFI/TLI/RNI < 0.01, and ΔSRMR <0.03). Similarly, strict invariance was also supported for both language and gender.

Internal consistency. Reliability coefficients for both the IMQ and the IUPQ across languages and AVE are shown in Table 8. Both Cronbach's alpha (α) and McDonald's Omega (ω) and their confidence interval are displayed. For the IMQ, all coefficients were well above the cutoff point of 0.70. For the IUPQ, most coefficients were above 0.70, with a few exceptions. The Feelings of Discomfort sub-scale had an α = 0.65 for the French sample but performed well for the other subsamples and the full sample. Passive Use had an α = 0.69 for the Spanish sample and had the lowest reliability range across samples (α = 0.72–0.75; ω = 0.72–0.76). For the full sample, IMQ and IUPQ Alpha reliability coefficients ranged from 0.79 to 0.90 and from 0.72 to 0.91, respectively, and Omega coefficients ranged from 0.79 to 0.91 and from 0.74 to 0.92. Accordingly, the IMQ and the IUPQ can be considered reliable measures of motives and patterns of Instagram use, respectively. The average variance extracted was satisfactory across languages, except for Feelings of discomfort, which showed specific lower AVE for the French sample.

Discussion

Our purpose was to develop and validate the IMQ and the IUPQ to provide sound instruments suitable for research targeting the assessment of Instagram specifically. As such, we address the need for valid and reliable measures of specific Instagram motives and usage patterns that can be used consistently across studies as an alternative to the current ones, which mostly focus on symptoms that parallel those of substance addictions and do not include some key features that are unique to Instagram use. Furthermore, we also aimed to test the measurement invariance of both scales in three different languages and across gender in order to promote cross-cultural investigations of Instagram use and misuse.

Regarding the IMQ, the EFA and subsequent CFA analyses resulted in six correlated and conceptually sound factors that fit the data well. The identified motives were: Social Impact Seeking, Emotional Escape, Souvenir Keeping, Social Connection, Attention Seeking, and Information Seeking. Although most of these motives have been evidenced in one form or another in previous Instagram and SNS studies (Alhabash & Ma, 2017; Huang & Su, 2018; Kircaburun et al., 2018; Lee et al., 2015; Orchad et al., 2014; Quan-Haase & Young, 2010; Sheldon & Bryant, 2016; Xu et al., 2012), the IMQ presents an advantage by covering each motive broadly. For instance, the Social Impact Seeking factor, while similar to the *self-promotion* motive found in other U&G studies (Dumas, Maxwell-Smith, Davis, & Giulietti, 2017; Sheldon & Bryant, 2016), seems to cover simultaneously a complex motivation reflecting self-promotion, self-expression, a tendency to try inspiring others, and a desire to raise awareness or engaging others in important matters. Also, the Emotional Escape factor portrays a positive form of escapism, in which the platform is used both for its potential exciting and fun content and the possibility to use it to relieve and regulate some negative emotions and evade them (for a discussion of positive forms of escape/escapism in online activities, see Giardina et al., 2022). Our findings also align with the numerous studies that have shown that SNS and the Internet can be used as a form of mood management and coping with emotional distress, depression, anxiety, and loneliness (Cauberghe, Van Wesenbeeck, De Jans, Hudders, & Ponnet, 2021; Greenwood & Long, 2009; Hormes, Kearns, & Timko, 2014; Kardefelt-Winther, 2014; Kuss et al., 2017; Tang et al., 2014; Whang, Lee, & Chang, 2003). Furthermore, there is evidence that diversion accounts for much social media use (Sheldon & Newman, 2019).

Souvenir Keeping is very similar to the *documentation* motive that Sheldon and Bryant (2016) identified as unique to Instagram. While *documentation* refers to the use of Instagram to store images and memories, Souvenir Keeping emphasizes the gallery/visual component and that the memories kept are good, fun, and cherished. Social Connection Seeking refers to using Instagram to keep in touch, reconnect or develop relationships, chat, catch up and make plans with others. This motive is different from Sheldon and Newman's (2019) *social interaction*, which emphasized the *peeking* or *surveillance* aspect. These latter aspects are contained in the Information Seeking motive, which integrates both the need to peek into other people's lives but also to stay up to date with what is happening in the community and the world, thus stay informed more globally, which might serve instrumental, cognitive, and hedonic purposes (Sharot & Sunstein, 2020). Finally, the Attention Seeking factor was not frequently reported in other studies but proved to be a strong motive for Instagram use in our qualitative inquiry (Romero et al., 2022); therefore, the items developed focused on the usage of the platform motivated by a need to be seen, validated and to get attention from others in the form of likes, comments, and reactions. This factor is a unique contribution of this study, and the IMQ could be used to investigate further the links between this motive and potentially problematic behaviors such as excessive selfie-

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Table 7. Multigroup CFAs for the IMQ and the IUPQ according to language and gender

	χ2	df	χ2/df	RMSEA (CI)	CFI	TLI	RNI	SRMR	Comparisons	△ RMSEA	△ CFI	△ TLI	△ RNI	△ SRMR
Instagram Motives Questionnaire (IMQ)														
Language Invariance														
Configural	22,592.05	1,347	16.77	0.087 (0.086–0.088)	0.979	0.977	0.979	0.071	NA	NA	NA	NA	NA	NA
Weak-Strong	23,161.1	1,527	15.17	0.082 (0.081–0.083)	0.978	0.979	0.978	0.071	Conf. vs. Weak-Strong	−0.005	0.000	0.002	0.000	0.000
Strict	24,935.4	1,591	15.67	0.084 (0.083–0.085)	0.977	0.978	0.977	0.073	Weak-Strong vs. Strict	−0.003	−0.002	−0.001	−0.002	0.002
Gender invariance														
Configural	21,128.29	898	23.53	0.085 (0.084–0.086)	0.978	0.976	0.978	0.068	NA	NA	NA	NA	NA	NA
Weak-Strong	21,321.65	988	21.58	0.082 (0.084–0.086)	0.978	0.978	0.978	0.068	Conf. vs. Weak-Strong	−0.004	0.000	0.002	0.000	0.000
Strict	21,664.23	1,020	21.24	0.081 (0.080–0.082)	0.978	0.978	0.978	0.069	Weak-Strong vs. Strict	−0.001	0.000	0.000	0.000	0.001
Instagram Uses and Patterns Questionnaire (IUPQ)														
Language Invariance														
Configural	23,950.89	1,842	13	0.084 (0.083–0.085)	0.976	0.974	0.976	0.070	NA	NA	NA	NA	NA	NA
Weak-Strong	24,816.66	2,052	12.09	0.081 (0.080–0.082)	0.975	0.976	0.975	0.071	Conf. vs. Weak-Strong	−0.003	−0.001	−0.002	−0.001	0.000
Strict	26,564.38	2,126	12.49	0.082 (0.072–0.074)	0.973	0.975	0.973	0.073	Weak-Strong vs. Strict	0.001	−0.002	−0.001	−0.002	0.002
Gender invariance														
Configural	23,064.59	1,228	18.78	0.084 (0.083–0.085)	0.974	0.972	0.974	0.070	NA	NA	NA	NA	NA	NA
Weak-Strong	23,276.24	1,333	17.46	0.081 (0.080–0.082)	0.974	0.974	0.974	0.070	Conf. vs. Weak-Strong	−0.003	0.000	0.002	0.000	0.000
Strict	23,910.48	1,370	17.45	0.081 (0.080–0.082)	0.973	0.974	0.973	0.071	Weak-Strong vs. Strict	0.000	−0.001	0.000	−0.001	0.001

Note. CFA = Confirmatory factor analysis, χ2 = robust chi-square, df = degrees of freedom, △ = change in the fit index compared to the previous model. All models are significant at $P < 0.001$

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Table 8. Reliability coefficients and average variance extracted (AVE) for the IMQ and IUPQ sub-scales across languages

	English			French			Spanish			Total		
	Alpha	Omega	AVE	Alpha	Omega	AVE	Alpha	Omega	AVE	Alpha	Omega	AVE
IMQ – Social Impact Seeking	0.90	0.90 [0.89; 0.91]	0.63	0.85	0.90 [0.89; 0.90]	0.60	0.91	0.91 [0.90; 0.91]	0.64	0.90	0.90 [0.90; 0.91]	0.63
IMQ – Emotional Escape	0.86	0.86 [0.85; 0.87]	0.57	0.79	0.84 [0.84; 0.85]	0.43	0.87	0.87 [0.87; 0.88]	0.57	0.84	0.84 [0.84; 0.85]	0.51
IMQ – Souvenir Keeping	0.91	0.91 [0.90; 0.92]	0.81	0.88	0.90 [0.89; 0.91]	0.76	0.90	0.90 [0.90; 0.91]	0.77	0.90	0.90 [0.90; 0.91]	0.78
IMQ – Social Connection	0.83	0.83 [0.81; 0.84]	0.61	0.81	0.84 [0.83; 0.85]	0.59	0.86	0.86 [0.85; 0.87]	0.67	0.84	0.84 [0.83; 0.85]	0.62
IMQ – Attention Seeking	0.88	0.87 [0.86; 0.88]	0.75	0.86	0.87 [0.86; 0.87]	0.71	0.88	0.88 [0.87; 0.89]	0.75	0.86	0.87 [0.86; 0.87]	0.73
IMQ – Information Seeking	0.78	0.78 [0.76; 0.80]	0.56	0.75	0.79 [0.78; 0.80]	0.60	0.83	0.82 [0.81; 0.84]	0.64	0.79	0.79 [0.78; 0.80]	0.60
IUPQ – Loss of control	0.92	0.92 [0.91; 0.93]	0.59	0.89	0.89 [0.88; 0.90]	0.51	0.91	0.91 [0.90; 0.91]	0.55	0.91	0.91 [0.90; 0.91]	0.55
IUPQ – Anxious Posting	0.90	0.91 [0.89; 0.92]	0.73	0.90	0.90 [0.89; 0.91]	0.72	0.90	0.91 [0.90; 0.91]	0.74	0.90	0.90 [0.90; 0.91]	0.73
IUPQ – Passive Use	0.75	0.76 [0.73; 0.78]	0.58	0.74	0.76 [0.74; 0.78]	0.60	0.69	0.72 [0.69; 0.74]	0.51	0.72	0.74 [0.73; 0.75]	0.54
IUPQ – Social Approval	0.81	0.81 [0.79; 0.82]	0.57	0.79	0.79 [0.77; 0.81]	0.53	0.82	0.82 [0.80; 0.83]	0.57	0.81	0.81 [0.80; 0.82]	0.56
IUPQ – Feelings of Discomfort	0.76	0.77 [0.74; 0.79]	0.48	0.65	0.67 [0.64; 0.70]	0.40	0.77	0.77 [0.75; 0.79]	0.51	0.74	0.75 [0.73; 0.76]	0.46
IUPQ – Self Dep. Comparison	0.87	0.88 [0.87; 0.89]	0.61	0.83	0.84 [0.83; 0.85]	0.55	0.86	0.86 [0.85; 0.87]	0.58	0.86	0.86 [0.85; 0.87]	0.58

taking (e.g., Charoensukmongkol, 2016) or deceptive like-seeking behaviors (such as purchasing likes, see Dumas, Maxwell-Smith, Tremblay, Litt, & Ellis, 2020).

Regarding the IUPQ, a six correlated factor structure was found, and it showed good psychometric properties and fit. The following Instagram usage patterns are covered: Loss of Control, Anxious Posting, Passive Use, Social Approval, Feelings of Discomfort, and Self-Deprecating Comparison. The IUPQ was not developed within an addictive disorder framework or intended to only focus on problematic Instagram usage behaviors (see Flayelle et al., 2020, 2021, for a similar approach related to another emerging technology-mediated problematic behavior). The items were developed drawing from a qualitative inquiry where these behaviors emerged (Romero et al., 2022). However, it is worth noting that out of the six patterns, Loss of Control and Feelings of Discomfort resemble existing scales measuring problematic or addictive forms of SNS or Internet use (e.g., IAT – Young, 1998 or the Bergen Social Networking Addiction Scale – Andreassen, Torsheim, Brunborg, & Pallesen, 2012). Content-wise, Feelings of Discomfort yields behaviors that could be more detrimental for the individual, cause more suffering, or point toward more problematic usage. It covers distinctive behaviors on Instagram that should be further researched to understand their potentially adverse effects on the individual.

The items proposed for the IUPQ consider both what the users are doing on the platform (in the form of posting or uploading stories) and how they feel when performing those behaviors (e.g., emotional response, thoughts about the displayed behavior). Consequently, Anxious Posting integrates the experience of posting something on Instagram and being afraid of being judged, waiting for the followers' reactions, refraining from posting if the content might not be liked, etc. This unique factor reveals an extended behavioral pattern of Instagram use in youth, which has the potential to become detrimental. Although little is known about anxiety that arises while using social media, a few studies showed that worry and fear around social media posting could be related to negative expectations and anticipation of disapproval, ridicule, or judgment, but the consequences of social media posting anxiety remain unknown (Alkis, Kadirhan, & Sat, 2017; Shabahang, Aruguete, & Shim, 2022). In addition, the Social Approval pattern is concerned with behaviors linked with crafting, editing, and filtering the content that the users would share to get reactions in the form of likes and comments. There is evidence that Instagram is optimized for self-presentation, building social capital, storytelling, and highlighting aspects of the self rather than building social connections (Kim & Kim, 2019; Romero et al., 2022). As such, *influence metrics* in the form of likes, comments and reactions serve as markers of popularity, likeability, approval, and acceptance (Davies, 2020; Kim & Lee, 2011; Ross, 2019; Vitak & Ellison, 2013; Vogel, Rose, Roberts, & Eckles, 2014). The Social Approval pattern captures all these aspects in a distinctive factor.

Moreover, Self-deprecating Comparison portrays a pattern of Instagram use in which individuals compare

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themselves to others, generally with adverse outcomes (i.e., feeling envious, feeling bad about themselves), and it is different from the general tendency to compare oneself to others. As shown in different studies on the matter, comparison on SNS typically results in lower subjective well-being with small to medium size effects (Faelens, Hoorelbeke, Soenens, et al., 2021; Faelens, Hoorelbeke, Cambier, et al., 2021; Liu & Ma, 2020; Verduyn, Gugushvili, Massar, Täht, & Kross, 2020). Therefore, having a measure that addresses how these comparisons occur on Instagram is of value. Finally, to our knowledge, Passive Use has not been typically included in other scales concerning social network use behavior (Trifiro & Gerson, 2019) or has been researched using very heterogeneous operationalizations (Valkenburg, van Driel, & Beyens, 2021). Therefore, the emergence of this distinctive factor is important. Passive use in this study is defined as watching or checking out others' content without liking or reacting to it and refraining from sharing content themselves. Overall, there is a growing consensus that the impact of SNS use on well-being depends on *how* social networks are used (Kross et al., 2021). Accordingly, an advantage of the IUPQ is that it proposes six different patterns of usage that go beyond the dichotomization of active vs. passive use.

Regarding the fit indices of our measures in the CFAs, most were within the optimal recommended thresholds except for RMSEA, which was consistently above 0.08 across samples. This can be explained because we did not use the modification indices to introduce changes to the proposed models, and therefore, some residuals were left unexplained, which could inflate the Chi-square statistic and, consequently, the RMSEA. Despite some modification indices suggested allowing some items to correlate to two factors, it was decided to keep them charging in their original factors to avoid artificially over-fitting the models. The proposed models are fairly articulate, theoretically sound, and informative. As for reliability, both scales consistently held high reliability coefficients (both Alpha and Omega) across subsamples. Convergent and discriminant validity were also confirmed, which implies that both the IMQ and the IUPQ are psychometrically sound instruments.

Importantly, the IMQ and the IUPQ factors were moderately to strongly correlated among and between each other. This comes as no surprise since we hypothesized that motivations and usage patterns of Instagram use are complex, interrelated, and that the same individual might exhibit a range of motivations to use a social network, use the social network in different ways, and that these may vary widely depending on multiple factors. We particularly note in our results the distinctive correlations that Passive use exhibits with the motives and the rest of the usage patterns. First, it holds inverse correlations with Social Impact Seeking, Souvenir Keeping, and Attention Seeking motives, and it did not correlate with Social Connection, which seems coherent to what participants told us in our qualitative inquiry. Those motives are more consistent with active usage of the platform in the form of reacting, liking, and posting stories. Conversely, Passive use behavior is more likely exhibited when using the platform to escape negative feelings or seek information (Verduyn, Gugushvili, & Kross, 2021), consistent with the small correlations found with those motives.

As for the construct validity evidence, it is interesting to notice negligible statistical trends linking some motives and patterns of Instagram use with age across subsamples. Some claims have been made that younger generations are more heavy social network users and place more value on online interaction while being more sensitive to critique and judgement (Chang, Choi, Bazarova, & Löckenhoff, 2015; Kuss & Griffiths, 2017; Verduyn et al., 2021). Also, these same trends were found between gender and different motives and patterns of Instagram use, potentially suggesting a differential use of the platform among men and women. This is in line with some previous studies indicating that women tend to engage with social networks more than men, tend to compare themselves with others on the platforms, use them to boost their social connections and social support, and are especially vulnerable to detrimental consequences of SNS use (Haferkamp, Eimler, Papadakis, & Kruck, 2012; Kuss & Griffiths, 2017; Tifferet, 2020; Verduyn et al., 2021). These results may point towards this, but they could also be spurious since empirical evidence on the role of age and gender on SNS use is mixed or limited, as reported by a recent empirical meta-review (Meier & Reinecke, 2021; Verduyn et al., 2021). More in-depth research about the roles of gender and age in the motives and usage of Instagram is thus required.

Previous studies on problematic internet and social network use have identified various risk factors, such as comparison orientation, fear of missing out, self-esteem, and self-consciousness (Balta, Emirtekin, Kircaburun, & Griffiths, 2018; Burnell, George, Vollet, Ehrenreich, & Underwood, 2019; Faelens et al., 2019; Kircaburun & Griffiths, 2018; Martinez-Pecino & Garcia-Gavilán, 2019; Ponnusamy et al., 2020; Stapleton et al., 2017; Verduyn, Ybarra, Résibois, Jonides, & Kross, 2017; Yang, 2016). Some of these known correlates were included in our study to demonstrate the construct validity of our scales. For example, the IMQ and IUPQ sub-scales were correlated to a measure of compulsive internet use (CIUS-5), and small to large associations were found. Moreover, the IUPQ's Loss of Control and Feelings of Discomfort displayed the largest correlations with compulsive internet use. As stated before, those usage patterns are consistent with heavier or more problematic internet use and in line with previous work on addictive and compulsive SNS use, thus supporting the validity of our instruments to assess problematic forms of Instagram involvement. Other factors such as self-consciousness, insight, FoMO, and comparison orientation showed small to large correlations with most motives and usage patterns in the expected direction, which further supports the construct validity of our scales. Out of all the variables measured, FoMO and comparison orientation were the ones that produced the strongest correlations both with motives and with patterns of Instagram use, which is consistent with other literature on SNS use, which suggests that FoMO might be a possible component or significant predictor of

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problematic SNS use (Faelens, Hoorelbeke, Cambier, et al., 2021; Kuss & Griffiths, 2017) and that comparison orientation is a crucial vulnerability factor and an explanatory mechanism (Verduyn et al., 2021). These results are also consistent with a recent meta-analysis on the effects of FoMO on internet use, which suggest that the effect of FoMO on Instagram use is high, and significantly higher than its effect on Facebook use (Akbari et al., 2021).

Finally, previous studies have found some relationships between social network use, mental health indicators, and life satisfaction (Faelens, Hoorelbeke, Soenens, et al., 2021; Faelens, Hoorelbeke, Cambier, et al., 2021; Huang, 2017; Keles et al., 2020; Yoon et al., 2019). Our study found stronger associations between loneliness, anxiety, depression, stress, and life satisfaction outcomes with the patterns of use than with the motives. This was expected as motives theoretically precede usage patterns, and it is more likely that these mental health outcomes directly result from SNS (over)use. Notably, the Souvenir Keeping and Social Connection motives show marginal to no correlation with detrimental mental health outcomes, which supports the view that certain motives are related to non-problematic usage patterns, echoing similar findings pertaining to on-demand TV series watching (Flayelle et al., 2019). Also, the highest correlations found were between the Anxious Posting, Feelings of Discomfort, and Self-deprecating Comparison patterns and the mental health outcomes, suggesting possible avenues for future research. These results show that specific Instagram usage patterns could lead to more detrimental health outcomes than others supporting the notion that SNS are not inherently good or bad, but the outcomes depend on *how* they are used (Kross et al., 2021; Verudyn et al., 2021).

Regarding the cross-cultural validation of the IMQ and the IUPQ, our findings support the measurement invariance of the scales according to language and gender, and therefore, construct comparability of the measures is confirmed. This implies that, independently of the language spoken and gender, participants interpreted the items of the IMQ and the IUPQ in a similar manner. Moreover, these results indicate that potential comparisons that could derive from these scales would express genuine differences in the measured constructs and would not be due to other factors. However, it is uncertain whether using the country of origin instead of the language to perform measurement invariance testing would produce similar results. Culture could play a role when exploring motivations behind SNS use according to U&G. For instance, it could be argued that in individualistic cultures, Information Seeking would be a predominant motive, while in collectivistic cultures, Social Connection could be a stronger motivator (Hsu, Tien, Lin, & Chang, 2015; Schaffer & Debb, 2020). Future studies should investigate this further.

It is important to note that both samples were composed of young adults (aged 18–34 years) and that the second study sample predominantly included female (73.8%) and well-educated participants. Also, they typically used Instagram in combination with other social networks, and more than 90% of the sample had been using it for at least two years, so they were familiar and habitual users of the platform. It is also worth noting that 65% of the sample reported increased Instagram use since the beginning of the COVID-19 pandemic, which is consistent with other research that was conducted in the same period (e.g., Zarco-Alpuente et al., 2021). As such, it is possible that different findings would have been obtained in samples with different sociodemographic backgrounds, ethnicities, gender, and education, especially for minorities, and that the COVID-19 pandemic may have influenced the results. Therefore, further studies with more varied and representative samples are needed to support the generalizability of our findings.

This study has some further limitations. First, the data are cross-sectional and were collected through self-reported scales, presenting some well-known biases (i.e., social desirability, lack of introspection, memory recall) that could impact the reliability and temporal stability of the findings. Second, the data were not collected using probabilistic methods but involved convenience sampling, which implies that the results cannot be generalized to the broader population. Third, to keep the questionnaire as short as possible, we did not collect sociodemographic or Internet-use-related questions in-depth. Future studies could collect more of these data to provide further insight on correlates of Instagram motives and usage. Overall, future studies should seek to gather representative data and extend data collection to other groups to augment the generalizability of these findings.

In conclusion, these results are promising and emphasize that both the IMQ and the IUPQ have good psychometric properties and are valuable tools for social network use research. They both are valid and reliable enough to assess different Instagram motives and patterns of usage that are relevant for youth and for an environment where the need for connection and connectedness continues to increase and where consequences are still elusive to research. Moreover, the IUPQ assesses different, but related usage patterns that could discriminate between a more adaptive engagement with Instagram versus behaviors that could potentially become more problematic, which opens potential routes for further investigation of Instagram use behavior and its consequences.

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Authors' contribution: Study concept and design: SMRS, SVDB; Study supervision: SMRS, SVDB, JB; Scale construction and review: SMRS, SVDB, PZ, CC; Data gathering and preparation: JB, LK, DJK, PS, CPL, MJZG, PZ, CC, DD, TPM, JRD, CAEE, FO; Statistical analysis: SMRS, JMRE; Manuscript preparation: SMRS, SVDB; Manuscript revision: SVDB, JB, LK, DJK, JMRE, PS, CPL, MJZG, DD, TPM, JRD, CAEE, FO.

Conflict of interest: The authors declare no conflict of interest.

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SUPPLEMENTARY MATERIALS

Supplementary data to this article can be found online at https://doi.org/10.1556/2006.2022.00088.

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