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Article

Assessing Positive Digital Experiences: A Spanish Validation of the Digital Flourishing Scale for Adolescents

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ABSTRACT

Background: Adolescents are immersed in digital communication, which can benefit or harm their well-being. Digital flourishing captures positive perceptions of this communication—connectedness, authentic self-presentation, positive social comparison, civil participation, and self-control—and how it contributes to well-being. In Spain there is still no validated instrument for adolescents. **Method**: We adapted and validated the Digital Flourishing Scale for Adolescents (DFSA) for Spanish adolescents. Study 1 involved a pilot survey (n = 13) and cognitive interviews (n = 10) to improve clarity and cultural relevance. Study 2 used a cross-sectional survey (n = 1,786) to examine the DFSA's latent structure, measurement invariance by gender and age, internal reliability of scores, and validity evidence based on relationships to other variables. Study 3 assessed test-retest reliability of scores and longitudinal measurement invariance over six weeks (n = 289). **Results**: Study 1 improved item clarity and cultural relevance through linguistic adjustments. Study 2 confirmed a five-factor model, showing strict age invariance and metric gender invariance. All subscales correlated with well-being indicators. Study 3 showed poor to moderate temporal stability of scores but supported scalar longitudinal invariance. **Conclusions**: The Spanish DFSA is a promising tool for assessing adolescents' digital flourishing in the Spanish context.

Evaluando las Experiencias Digitales Positivas: Validación Española de la Escala de Florecimiento Digital para Adolescentes

Palabras clave:
Florecimiento digital
Adolescentes
Adaptación de escala
Teoría de la autodeterminación
Comunicación digital

RESUMEN

Antecedentes: Los adolescentes están inmersos en la comunicación digital, con efectos positivos y negativos en su bienestar. El florecimiento digital describe percepciones positivas de dicha comunicación—conectividad, autoexpresión auténtica, comparación social positiva, participación cívica y autocontrol—y su aporte al bienestar. En España no existe un instrumento validado para adolescentes. **Método:** Adaptamos y validamos la Escala de Florecimiento Digital para Adolescentes (DFSA) españoles. Estudio 1: incluyó encuesta piloto (n = 13) y entrevistas cognitivas (n = 10) para mejorar claridad y adecuación cultural. Estudio 2: encuesta transversal (n = 1.786) examinando estructura latente de DFSA, invarianza métrica por sexo y edad, fiabilidad interna de las puntuaciones y evidencia de validez basada en las relaciones con otras variables. Estudio 3 evaluó fiabilidad test-retest de las puntuaciones e invariancia longitudinal en seis semanas (n = 289). **Resultados:** Estudio 1: mejoró claridad y relevancia cultural. Estudio 2: confirmó un modelo de cinco factores, con invariancia estricta por edad e invariancia métrica por género. Todas las subescalas se correlacionaron con indicadores de bienestar. Estudio 3: mostró estabilidad temporal de las puntuaciones baja-moderada, confirmando invariancia longitudinal escalar. **Conclusiones:** La DFSA española es una herramienta prometedora para evaluar el florecimiento digital de los adolescentes en España.

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Contemporary adolescents grow up fully immersed in digital communication technologies, significantly transforming how they spend their time and interact with their environment (Holly et al., 2023). While early research emphasized the potential risks of digital communication, recent scholarship has called for a more nuanced understanding that includes the positive aspects of digital communication (Vanden Abeele, 2021). One such approach is the emerging construct of digital flourishing, which emphasizes that beneficial use of digital communication can satisfy adolescents' developmental needs and promote both hedonic and eudaimonic well-being (Gudka et al., 2023; Janicke-Bowles et al., 2023).

Digital flourishing refers to positive perceptions of digital communication experiences and behaviours contributing to well-being and fulfilment (Janicke-Bowles et al., 2023). To operationalize this construct, Janicke-Bowles et al. (2023) developed the Digital Flourishing Scale (DFS) for adults, which was later adapted for adolescents (DFSA) (Rosič et al., 2022). This instrument captures five interrelated dimensions: connectedness (feeling socially connected online), authentic self-presentation (expressing one's true self online), positive social comparison (feeling inspired after socially comparing online), civil participation (engaging respectfully and constructively online), and self-control (managing time spent online).

The theoretical foundation of digital flourishing draws significantly from Self-Determination Theory (SDT; Deci & Ryan, 2000). According to SDT, the satisfaction of the basic psychological needs for relatedness, autonomy, and competence is essential for well-being. Digital flourishing builds on this framework by proposing that digital communication can support these needs. Empirical studies have consistently found that adolescents who report higher levels of digital flourishing also experience greater psychological need satisfaction and related well-being outcomes (Janicke-Bowles et al., 2023; Janicke-Bowles, 2024; Rosič et al., 2022).

To the best of our knowledge, the DFSA is currently the only validated instrument specifically designed to assess digital flourishing in adolescence. It is currently available in English, Slovenian (Rosič et al., 2022), Dutch (Schreurs & Vandenbosch, 2024), and Chinese (Yao et al., 2025). However, it has not yet been adapted to widely spoken languages such as Spanish. While other frameworks have assessed general flourishing in Spanish among adults (e.g. De la Fuente et al., 2017), the DFSA provides a unique tool to evaluate adolescents' positive digital communication. This study aims to adapt the DFSA for Spanish-speaking adolescents using a multimethod approach (i.e. cognitive interviewing, a cross-sectional and longitudinal study) to evaluate its psychometric properties, evidence of validity based on the relationship with other variables, measurement invariance, and temporal reliability.

Digital flourishing is theorized to support basic psychological needs, namely relatedness, competence, and autonomy (Janicke-Bowles et al., 2023). During developmental period of adolescence these needs become more salient and therefore, digital flourishing is especially relevant. Regarding relatedness, adolescents increasingly prioritize peer relationships for identity validation and emotional support, decreasing compliance with parents (Berk, 2022; Girelli et al., 2019). For competence, adolescents prefer independent decisions and complex tasks, seeking challenges that foster achievement and mastery (Berk, 2022). Autonomy needs manifest as adolescents actively pursue independence through self-determined decisions and activities (Girelli et al., 2019).

Moreover, adolescents are among the highest users of digital media (Boer et al., 2020). Digital media use plays a vital role during adolescence, providing platforms for socialization, learning and self-expression (Holly et al., 2023). The positive interactions adolescents have while using digital media are part of the context that can contribute to the satisfaction of basic psychological needs and shape their development (Holly et al., 2023).

Digital communication with peers may provide adolescents with a sense of belonging, satisfying their need for relatedness by making them feel connected and less lonely (Rosič et al., 2024). This virtual context offers flexibility in choosing what to share, who to interact with, and when, supporting the fulfilment of relational needs (O'Keeffe et al., 2011). When adolescents learn to interact responsibly online and navigate online communication challenges like presenting themselves authentically in spaces shaped by "positivity bias" and idealized portrayals, digital communication also contributes to the need for competence (Schreurs & Vandenbosch, 2024). Positive social comparisons online, especially in areas like academics, sports, and relationships, offer insights into their perceived competence and can evoke motivation, inspiration, and benign envy (Meier & Schäfer, 2018). Civil participation online is also relevant for competence, as adolescents' psychosocial and cognitive development fosters prosocial and civil engagement in online discussions (Lysenstøen et al., 2021). Finally, as their cognitive abilities mature, adolescents gain greater self-control over digital interactions, an important aspect of autonomy in a context of constant connectivity (Hoareau et al., 2021; Rosič et al., 2022). These dimensions of connectedness, civil participation, authentic self-presentation, positive social comparison, and self-control, form the core of digital flourishing and have been theorized and empirically proven to relate to the basic psychological needs' satisfaction (Janicke-Bowles et al., 2023).

Previous studies measuring digital flourishing using the DFSA have consistently supported a better fit for multidimensional model with five-factor structure than high-order structure among adolescent (Rosič et al., 2022) and adult samples (Janicke-Bowles et al., 2023), although both structures were acceptable. Therefore, digital flourishing can be investigated either through a composite score or by analysing its five dimensions separately, as each dimension captures distinct but complementary aspects of positive digital experiences. This study examines whether the five-factor structure replicates in a new cultural context, namely Spain, which presents a distinctive setting in terms of digital engagement. Spain represents a unique environment, ranking seventh worldwide in active social media use (83.6%), notably above the global average (62.3%) and higher than the United States (70.1%) and Slovenia (76.9%) (DataReportal, 2024), where the DFS(A) have previously been applied. Consequently, Spanish adolescents navigate unique demands from ubiquitous connectivity (Vanden Abeele, 2021).

From an SDT perspective, broader social systems shape the opportunities adolescents have to pursue and satisfy their basic psychological needs. In highly connected environments, digital communication may both enable and constrain these opportunities, depending on how access is regulated. For example, recent restrictions on smartphone use in Valencian schools (see resolution of 17 April 2024 DOGV - Generalitat Valenciana) may impact digital flourishing by creating tension between institutional regulations and widespread peer smartphone use. Thus, adapting an instrument assessing positive

digital communication perceptions among Spanish adolescents requires an understanding of their specific context.

In addition to contextual relevance, examining the DFSA's associations with theoretically and empirically grounded constructs allows for a more comprehensive validation of the instrument within the Spanish adolescent population.

First, previous research has shown that all five dimensions of digital flourishing are significantly associated with the satisfaction of basic psychological needs (i.e. relatedness, competence, autonomy) (Rosič et al., 2022). The connectedness subscale was significantly associated with all three needs, showing the strongest correlation with relatedness. The civil participation and self-control subscales were most significantly related to autonomy, while the positive social comparison and authentic self-presentation demonstrated the strongest associations with competence (Rosič et al., 2022). We expected positive correlations between DFSA dimensions and basic psychological needs satisfaction.

In terms of broader well-being, satisfaction with life is a personal evaluation of life quality based on the alignment between individual aspirations and actual circumstances (Kjell & Diener, 2021). The dimensions of digital flourishing have been associated with higher levels of overall well-being, including life satisfaction (Janicke-Bowles et al., 2023). Therefore, we expected that higher levels of digital flourishing will be positively correlated with greater satisfaction with life.

Conversely, loneliness is a subjective experience of distress from a lack of social connection or belonging (Beutel et al., 2017). Digital communication (i.e. texting, group chatting) can foster the development of social connections and a sense of belonging among adolescents (Vincent, 2016). However, many adolescents report feelings of loneliness and isolation when communicating on social media, which can harm their sense of belonging and subsequently diminish their well-being (Smith et al., 2021). Consequently, higher loneliness was expected to negatively correlate with connectedness.

Authenticity can be defined as perceiving one's actions as self-authored and is achieved by acting in accordance with one's values, preferences, and needs (Ryan & Ryan, 2019), is another construct related to digital flourishing. Digital communication provides new opportunities for authentic self-expression, such as spontaneously and informally sharing daily activities and thoughts (Manning et al., 2017), which many adolescents do through apps such as BeReal or Instagram. Being authentic has been linked to higher well-being (Smallenbroek et al., 2017). Higher authenticity on social media was expected to positively correlate with authentic self-presentation.

Although much research links online social comparison to lower well-being, recent studies suggest that positive (or upward) comparison, which evokes benign envy, can inspire and enhance well-being (Meier & Schaefer, 2018; Meier et al., 2020). This process of inspiration is also considered in relation to digital flourishing. Specifically, content that is either creative, transformative in nature or portrays human's moral nature, is especially powerful to elicit inspiration (Chang, 2022). In turn, the experience of inspiration from online content or interactions has been found to increase love and compassion over time (Janicke-Bowles et al., 2022). We hypothesised that higher social media-induced inspiration would be positively related to positive social comparison.

On the negative side of digital interactions, Internet aggression includes harmful behaviours toward others online such as cyberbullying (Ybarra & Mitchell, 2004). Although most adolescents experience positive social interactions online, a significant minority are affected by negative interactions, either as perpetrators, targets, or both (Werner et al., 2010). These aggressive behaviours can include rude, threatening, harassing comments, unwanted sexual remarks, and social exclusion (Ybarra & Mitchell, 2004). Adolescents who engage more frequently in respectful online discourse and civil participation are significantly less likely to engage in aggressive or harmful digital communication (Jones & Mitchell, 2015). We hypothesised that higher rates of Internet aggression would be negatively related to civil participation.

Finally, problematic social media use (PSMU) refers to users' perceptions that their social media use cannot be controlled and is overused, characterized by the presence of various symptoms: preoccupation, tolerance, withdrawal, relapse, mood modification, detrimental consequences in important life domains and displacement of activities due to social media use (Boer et al., 2020). Such problematic use has been associated with a range of mental health problems (Huang, 2020). Research highlights that individuals with lower self-control dispositions are more likely to present PSMU (Osatuyi & Turel, 2018). Thus, we expected higher PSMU to negatively correlate with self-control.

The present research adapted the DFSA (Rosič et al., 2022) to the digital communication experiences of Spanish adolescents, following standard scale development procedures (Carpenter, 2018). In Study 1, a pilot survey and cognitive interviews with adolescents were conducted to assess clarity of the scale translated to Spanish. In Study 2, a cross-sectional survey was conducted to replicate the latent structure of the DFSA, evaluate measurement invariance for gender and age, and assess the scale's validity evidence based on its relationships to other variables. In Study 3, a longitudinal survey was conducted with a subsample of the participants from Study 2 to explore the temporal reliability and longitudinal measurement invariance of the scale. For the final Spanish DFSA version with the adaptations made after the study, see the OSF document 'DFSA'.

This study received approval from the University of [blinded] ethics committee (2039883). Prior to participation, all individuals were fully briefed on the study's objectives and gave their informed consent. For participants > 14 years, parental consent was obtained. Those ≥ 14 years could choose to provide their birth date and initials for a follow-up conducted 6 weeks later, which was done to explore the temporal reliability and longitudinal measurement invariance of the scale in Study 3. The responses of participants under 14 remained entirely anonymous. The database has also been used in other articles [Blinded].

This study was preregistered in November 2023 before the data analysis on the Open Science Framework (OSF) at https://osf.io/be4wh/?view_only=bc0e99ccd6334f66aaf463ccd7b0403b. Data, scripts, supplementary materials, and other resources are available on the same OSF page.

Method

Study 1: Pilot Survey and Cognitive Interviews

Participants

A total of 20 adolescents were initially recruited through the researchers' personal networks to participate in a pilot survey. The final sample consisted of 13 adolescents (12-18 years, M_{age} = 15.62, SD_{age} = 2.04, 69.2% girls). For the cognitive interview phase, 10 adolescents participated across two group sessions: one conducted in person (n = 8) and another online (n = 2) due to logistical constraints.

Instruments

In the pilot survey, participants rated each item's clarity on a 3-point scale (*1 = I don't understand anything; 2 = I understand it well, but not completely; 3 = I understand it perfectly*) and answered an open-ended question about any comprehension issues or suggestions. These measures collected both quantitative and qualitative feedback on the clarity and cultural relevance of the translated DFSA items.

Procedure

The original English version of the DFSA was translated into Spanish using a forward-backward translation procedure by two bilingual researchers. The resulting versions were reviewed by native Spanish speakers, and discrepancies were resolved to ensure semantic, idiomatic, experiential, and conceptual equivalence, resulting in a preliminary Spanish version.

A pilot survey was then administered using Qualtrics between September 2023 and May 2023. Based on reported comprehension issues, semi-structured cognitive interviews were conducted to assess validity based on response processes (Ryan et al., 2012). Following a hybrid model, both think-aloud and verbal probing techniques were employed (Padilla & Benítez, 2014). Details on the sample and specific changes made to the DFSA can be found in the OSF folder *'Cognitive Interview'*.

To ensure the methodological rigor of the adaptation process, we evaluated the Spanish version of the DFSA against the International Test Commission (ITC) guidelines for test adaptation (Hernández et al., 2020). A checklist documenting compliance with each criterion is available in the OSF document 'ITC adaptation checklist'.

Data Analysis

For quantitative pilot survey data, the percentage of participants for the three response options was calculated for each item to assess item clarity. Items were flagged for revision if over 25% of participants indicated partial or no understanding. Open-ended responses were analysed thematically, and researcher notes and observations of cognitive interviews were examined to identify common interpretation issues and improvement suggestions.

Results

According to the OSF document 'Pilot Survey Comprehensibility', 14 of 21 items were well understood by over 75% of participants. However, four items raised concerns, with nearly half indicating limited understanding, prompting cognitive interviews.

Based on this feedback, a series of changes were implemented across the scale. The introductory text was revised using more familiar and age-appropriate terminology (e.g. replacing "online applications" with "online activities") and updated to reflect the platforms most used by Spanish adolescents (e.g. replacing Viber with Telegram and including BeReal, Twitter, and gaming chats). Wording across items was adjusted to enhance specificity and personal meaning. For instance, some item content was also rephrased to better align with adolescents' digital communication experiences. For example, in the civil participation dimension, the item referring to "politics" was reworded to "current affairs (such as sports, politics, or celebrities)," as the original formulation was perceived as abstract or detached from participants' online interactions. All changes are available in the OSF under the files 'DFSA Changes' and 'DFSA Comparative'.

Study 2: Cross-Sectional Study

Participants

Out of initial 3,464 participants, we removed participants who: (1) did not accept the informed consent (n = 82), (2) were not between 13 and 19 years old or did not answer age question (n = 511), (3) had no access or didn't use social media (n = 53), and (4) failed at least two out of the three attention check questions (e.g. "If you are reading this, select 'Agree'.") (Buchanan & Scofield, 2018) (n = 457). The final sample consisted of 1,786 participants (M_{age} = 15.22, SD_{age} = 1.20, 49.0% girls, 66% Compulsory Secondary Education, 87% Spanish nationality). For more detailed results see the OSF document "Sociodemographic Study 2".

Instruments

Demographic Variables. Adolescents reported their age and gender (*1 = boy, 2 = girl, 3 = non-binary, 4 = prefer not to say*). Responses for the option "non-binary" and "prefer not to say" were included in the analyses, except for the gender invariance testing. Adolescents' educational level was categorized as follows: compulsory secondary education (ages 12-16), post-compulsory secondary education (ages 16-18), and vocational training levels (ages 16-20). Additionally, participants indicated their nationality.

Digital Flourishing in Adolescence. The 21-item DFSA in Spanish with five factors using a scale from *1 (Not at all true of me) to 5 (Very true of me), with an option "Not applicable to me"* was used. Reliability indices: connectedness (α = .65, ω = .68), civil participation (α = .73, ω = .76), positive social comparison (α = .78, ω = .81), authentic self-presentation (α = .82, ω = .86), and self-control (α = .79, ω = .83).

The Satisfaction of Basic Psychological Needs. We used the 12-item Brief Scale Measuring Basic Psychological Needs Satisfaction (BPNS; Girelli et al., 2019) evaluated on a 5-point Likert-type scale ranging from *1 (Not true at all) to 5 (Very true)*. Since no validated Spanish version for adolescents was available, we conducted a confirmatory factor analysis (CFA) to examine the internal structure and support the validity of the interpretations derived from the scores in our sample. The analysis confirmed a three-factor structure: Relatedness (e.g., "I like the people I know") (α = .78, ω = .81), Competence (e.g., "I feel good at doing many things") (α = .84, ω = .86), and Autonomy (e.g., "I feel free to decide how to do my own things") (α = .83, ω = .87), in line with the original model. See the OSF documents "CFA BPNS" and "Construct Validity Evidence for the BPNS" for further information regarding its construct validity in this sample.

Satisfaction With Life. We used the 3-item Satisfaction with Life Scale (SWLS-3; Ortuño-Sierra et al., 2019; Kjell & Diener, 2021) (e.g., "The conditions of my life are excellent") evaluated on a 7-point Likert-type scale ranging from *1 (Strongly disagree) to 7 (Strongly agree)*. Following Kjell and Diener's (2021) recommendations, the last two items out of five were removed. Internal consistency for the scale was excellent (α = .87, ω = .87).

Loneliness. The Three-Item Loneliness Scale (TILS; Trucharte et al., 2023) was used on a 3-point Likert scale ranging from 1 (Hardly ever) to 3 (Often) (e.g. "How often do you feel that you lack company?"). Reliability indices: α = .88 and ω = .89.

Subjective Authenticity of Positive Self-Content on Social Media. One item from the Virtual Self subscale of the Psycho-Social Aspects of Facebook Use (Bodroža & Jovanović et al., 2016) was adapted ("When you posted messages on social media during the last month, did you have the impression that these messages showed who you really are?"). As this questionnaire was not available in Spanish, it was translated and adapted for the present study. Responses were given on a 5-point Likert scale ranging from *1 (Never) to 5 (Very often)*. This item obtained an association of .51 with the Authentic self-presentation factor from the DFSA (Rosič et al., 2022).

Social Media-Induced Inspiration. Two items of the Social Media-Induced Inspiration Scale (SMII; Meier & Schäfer, 2018) were used: "When I use social media, I am inspired by the posts of other users to do something [new]" and "When I use social media, I experience inspiration." The word "Instagram" was replaced with "social media". Answers ranged from *1 (Strongly disagree) to 5 (Strongly agree)* with the option "Not applicable to me". As this questionnaire was not available in Spanish, it was translated and adapted for the present study. The Spearman-Brown coefficient was .71.

Internet Aggression. The 4-item Internet Aggression Scale (IAS; Werner et al., 2010) was used (e.g. "I used the Internet to play a joke or annoy someone I was mad at.") with a scale ranging from *1 (Never) to 4 (5 or more times) with the option "Not applicable to me"* (α = .86 and ω = .87). As this questionnaire was not available in Spanish, it was translated and adapted for the present study.

Social Media Disorder. The 9-item Social Media Disorder Scale (SMD-S; Boer et al., 2020) was used (e.g. "How often have you felt bad when you have not been able to use social networks?"). We adapted an original dichotomous Yes/No response format to a 6-point Likert scale, following Savci et al. (2018). Reliability indices in this sample are excellent (α = .90; ω = .90).

Procedure

Data collection took place in educational institutions between September 2023 and May 2024 in person, using either paper or digital formats (e.g. Qualtrics via tablet, smartphone, computer). While no monetary compensation was offered, participation was encouraged by providing a personalised report of the results and an educational workshop. Participants were recruited from schools that had collaborated in previous research and the official directory of educational institutions by the Generalitat Valenciana (GVA). School staff (e.g. counsellors, head teachers, or psychology departments) agreed to explain the study's aims and coordinate data collection within class time.

Data Analysis

First, internal consistency of the test scores was assessed using Cronbach's α and McDonald's ω, with polychoric correlation matrices. For the two-item scale (i.e. the Social Media-Induced Inspiration Scale), Spearman-Brown coefficient was calculated (Eisinga et al., 2013).

Second, multiple confirmatory factor analysis (CFA) models were tested to confirm the theoretical latent structure for the DFSA: a one-factor model, an uncorrelated five-factor model, a correlated five-factor model, and a five-factor model with a second order factor. Model fit was evaluated using the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI) (i.e. ≥ .95 = excellent and ≥ .90 = acceptable), Root Mean Square Error of Approximation (RMSEA) with confidence intervals, Standardized Root Mean Square Residual (SRMR) (i.e. ≤ .06 = excellent and ≤ .08 = acceptable) (Hu & Bentler, 1999), and the χ^2 statistic (Kyriazos, 2018).

Third, measurement invariance of the test scores was examined across gender and age groups (early adolescence [13-14 years], middle adolescence [15-16], and late adolescence [17-19 years]) using a stepwise approach: (1) a configural model was tested without any restrictions (i.e. configural invariance); next, models were tested with constrained (2) factor loadings (i.e. metric invariance); (3) item intercepts (i.e. scalar invariance); and (4) residual variances (i.e. strict invariance). Responses for the option "non-binary", "prefer not to say", and "other" were excluded for gender invariance testing due to the low number of cases, which made it unfeasible to analyse the factorial model exclusively for these groups. To assess if constraining the models resulted in a significant reduction in model fit (i.e., measurement invariance), the χ^2 test, *p*-values, changes in CFI (≤ .01) and RMSEA (≤ .015), were examined (Chen, 2007), with ΔCFI and ΔRMSEA prioritized over the χ^2 due to its sensitivity to significant differences even when they are negligible (Kyriazos, 2018). When full invariance was not supported, partial invariance was subsequently tested by freeing parameters exhibiting the largest statistically significant cross-group differences. All CFA and invariance models used Maximum Likelihood with robust correction (MLR), with missing data handled using Full Information Maximum Likelihood.

Lastly, to assess validity evidence based on relationships to other variables, a Spearman correlation matrix was computed. CFA were conducted for each measure with at least three items (McNeish, 2023). Factor scores were then computed for each subscale.

Analyses were conducted using R version 4.3.2, the packages psych (Revelle, 2023), lavaan (Rosseel, 2012), semTools (Jorgensen et al., 2021), and ggcorrplot (Kassambara, 2019).

Results

Table 1 presents descriptive statistics for the study variables and Table 2 indicates the descriptive statistics of the DFSA items.

Table 3 shows the statistical fit of the CFA models. Model 1 demonstrate poor fit according to the cut-off scores. Model 2 shows a better fit, with an acceptable RMSEA, but poor remaining fit indices. Model 3 shows the best fit, with excellent values for all fit indices and an acceptable TLI. Model 4, which considers a second-order factor encompassing the five factors, indicates an acceptable CFI and TLI and excellent RMSEA and SRMR but fits notably worse than Model 3. Therefore, Model 3 was retained in further analyses.

Figure 1 presents the measurement model from Model 3. Most factor loadings were above .50. All correlations between latent factors were statistically significant except for the correlation between Factor 3 (Positive social comparison) and Factor 5 (Self-Control), which was not significant.

Table 4 indicates gender (boys and girls) invariance models. The configural model indicates acceptable CFI and RMSEA. Although the metric model indicates a significant χ^2 change, CFI and RMSEA remain within cut-offs. However, the scalar model showed a significant reduction in goodness-of-fit exceeding the cut-off. This indicated

Table 1
Descriptive Statistics and Validity Evidence Based on Relationships with Other Variables

Variables	*n*	*M*	*SD*	*Mdn*	*MAD*	Min	Max	Skewness	Kurtosis
DFSA connectedness	1,725	2.50	0.92	2.67	0.99	0	5	-0.29	-0.05
DFSA authentic self-presentation	1,726	2.69	0.87	2.75	0.74	0	5	-0.30	0.06
DFSA positive social comparison	1,725	2.23	0.96	2.25	1.11	0	5	0.12	-0.01
DFSA civil participation	1,725	2.93	0.69	3.00	0.59	0	5	-0.42	1.01
DFSA self-control	1,786	2.58	0.84	2.75	0.74	0	5	-0.30	0.06
BSBP Relatedness	1,786	13.84	4.90	15	2.97	0	20	-1.57	2.32
BSBP Competence	1,786	13.59	4.99	15	2.97	0	20	-1.37	1.73
BSBP Autonomy	1,786	13.74	5.08	15	4.45	0	20	-1.34	1.59
Life satisfaction	1,786	5.06	1.39	5.33	1.48	1	7	-0.78	-0.01
Loneliness	1,786	4.26	2.09	4	1.48	0	9	0.10	0.09
Subjective authenticity of positive self-content on social media	1,595	3.79	1.45	4	1.48	1	6	-.40	-0.66
Social Media-Induced Inspiration Scale	1,786	5.64	2.85	6	2.97	0	12	-0.56	-0.22
Internet Aggression Scale	1,786	4.80	2.92	4	1.48	0	20	1.22	3.81
Social Media Disorder Scale	1,786	20.46	10.11	20	10.38	0	52	0.03	-0.02

Note. SD: Standard Deviation; *MAD:* Median absolute deviation.

Table 2
Descriptive Statistics and Discrimination Indices for Individual Items of the Digital Flourishing Scale

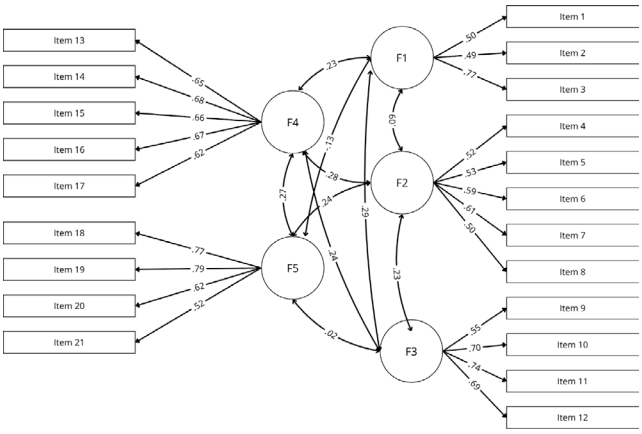
Subscale	Item	*M*	*SD*	Skewness	Kurtosis	% Floor	% Ceiling	Item-total correlation
Connectedness	1	2.71	1.32	-0.18	-0.45	6.3	10.0	0.37
Connectedness	2	2.47	1.10	-0.25	-0.40	4.5	1.4	0.36
Connectedness	3	2.31	1.28	0.07	-0.51	8.6	5.1	0.49
Authentic self-presentation	1	2.54	1.14	0.05	-0.18	3.8	5.0	0.56
Authentic self-presentation	2	2.77	1.08	-0.30	0.22	3.3	5.0	0.58
Authentic self-presentation	3	2.69	1.30	0.02	-0.46	4.9	11.2	0.58
Authentic self-presentation	4	2.73	1.20	-0.23	-0.18	4.5	6.9	0.59
Authentic self-presentation	5	2.72	1.17	-0.25	-0.01	4.8	6.3	0.54
Positive social comparison	1	2.69	1.16	-0.33	-0.32	4.2	3.5	0.47
Positive social comparison	2	2.34	1.21	0.01	-0.41	7.2	3.8	0.61
Positive social comparison	3	2.02	1.27	0.34	-0.37	11.2	4.1	0.62
Positive social comparison	4	1.86	1.35	0.45	-0.49	17.2	4.4	0.56
Civil participation	1	3.02	1.00	-0.86	1.04	3.0	2.7	0.41
Civil participation	2	3.04	1.07	-0.91	0.56	3.2	2.3	0.43
Civil participation	3	3.06	0.95	-0.56	0.83	1.5	4.2	0.45
Civil participation	4	3.11	0.99	-0.54	0.87	1.9	6.3	0.49
Civil participation	5	2.41	1.20	0.03	-0.29	6.3	4.7	0.39
Self-control	1	2.54	1.10	-0.26	-0.29	4.1	2.1	0.62
Self-control	2	2.50	1.12	-0.21	-0.46	4.1	1.9	0.64
Self-control	3	2.39	1.10	-0.18	-0.43	4.7	1.5	0.56
Self-control	4	2.90	1.02	-0.78	0.41	2.8	1.0	0.48

Note. % Floor = Percentage of participants endorsing the lowest possible score on the item. % Ceiling = Percentage of participants endorsing the highest possible score on the item. Item-total correlation indicates the item's ability to discriminate between high and low scorers on the subscale.

a relevant loss in fit, suggesting that constraining item intercepts between men and women resulted in a non-negligible decrease in model fit to the data. Therefore, to continue comparing nested models, a partial invariance analysis was conducted. The intercept of DFSA Civil participation item 2 was identified as the most problematic. By freeing this intercept in the partial scalar invariance model, the changes in fit indices compared to the metric model were below the cut-off, achieving partial scalar invariance. Finally, strict invariance was assessed. The initial strict invariance model (with only DFSA Civil participation item 2 intercept freed) showed a ΔCFI violating the criterion. Further analysis identified the residual variance of DFSA Civil participation item 2 as the most problematic. By freeing both the intercept and the residual variance of DFSA Civil participation item 2, partial strict invariance was supported. In summary, complete metric invariance and partial strict invariance have been established. This means that men and women share the same latent structure and factor loadings. Furthermore, after freeing the intercept and residual variance of DFSA Civil participation item 2, strict invariance was achieved, which is crucial for comparing both latent factor means and variances between the groups.

Figure 1

Measurement Model of the DFSA.



Note. For the sake of clarity, unique variances and intercepts were omitted. Non-significant estimates are written in italics. Factor 1: Authentic self-presentation; Factor 2: Civil participation; Factor 3: Positive social comparison; Factor 4: Connectedness; Factor 5: Self-control.

Table 3

Confirmatory Factor Analyses Models

Model	χ^2	*df*	CFI	TLI	RMSEA	SRMR
One factor (Model 1)	4253.388*	189	.380	.311	.125 [.122, .128]	.115
Five uncorrelated factors (Model 2)	862.972*	189	.897	.886	.051 [.047, .054]	.083
Five correlated factors (Model 3)	519.960*	179	.948	.939	.037 [.033, .041]	.033
Five factors model with a second order factor (Model 4)	623.564*	184	.934	.924	.041 [.038, .045]	.047

Note. χ^2: Chi-Square; df: Degrees of Freedom; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; RMSEA: Root Mean Square Error of Approximation; SRMR: Standardized Root Mean Square Residual. *$p < .05$.

Table 4

Confirmatory Factor Models Assessing Gender Invariance

Model	χ^2	*df*	CFI	RMSEA	$\Delta\chi^2$	Δdf	*p*-value	ΔCFI	ΔRMSEA
Boys	378.644*	179	.940	.040	-	-	-	-	-
Girls	357.366*	179	.947	.038	-	-	-	-	-
Measurement Invariance Models									
Configural invariance	901.710	358	.943	.039	-	-	-	-	-
Metric invariance	945.500	374	.940	.039	33.980	16	.005	.003	.000
Scalar invariance	1069.100	390	.927	.042	125.310	16	<.001	.013	.003
Partial scalar invariance (DFSA Civil Participation - item 2 intercept freed)	1012.031	389	.934	.040	67.297	15	<.001	.007	.001
Partial strict invariance (DFSA Civil Participation - item 2 intercept freed)	1184.858	410	.916	.044	114.200	21	<.001	.017	.003
Partial strict invariance (DFSA Civil Participation - item 2 intercept and residual freed)	909.381	409	.924	.042	19.518	14	.146	.006	.005

Note. $\Delta\chi^2$: Chi-square difference across the previous and the current model; *Δdf:* Degrees of Freedom Difference across the previous and the current model; p-value: Probability Value; ΔCFI: Change in Comparative Fit Index across the previous and the current model; ΔRMSEA Change in Root Mean Square Error of Approximation across the previous and the current model

Table 5 reports age (early, middle and late adolescents) invariance models. The configural model obtained acceptable fit according to CFI and RMSEA. The metric model indicated non-significant χ^2 difference and minimal loss of fit in CFI and RMSEA. Similarly, the scalar and strict invariance models do not show a significant χ^2 difference, with CFI and RMSEA below the cut-off thresholds, supporting the assumption of age invariance across factor loadings, item intercepts, and unique variances. Therefore, the different adolescent age groups share a similar latent structure in the DFSA.

Figure 2 indicates the associations among variables. DFSA dimensions positively correlated with basic psychological needs satisfaction, and life satisfaction, except for positive social comparison, which was not significantly associated with life satisfaction. Loneliness was negatively associated with DFSA connectedness. Subjective authenticity of positive self-content on social media was associated with higher of DFSA authentic self-presentation. Social media-induced inspiration was positively correlated with DFSA positive social comparison. Internet aggression was negatively associated with DFSA civil participation. Finally, problematic social media use was negatively associated with DFSA self-control.

Study 3: A Longitudinal Survey

Participants

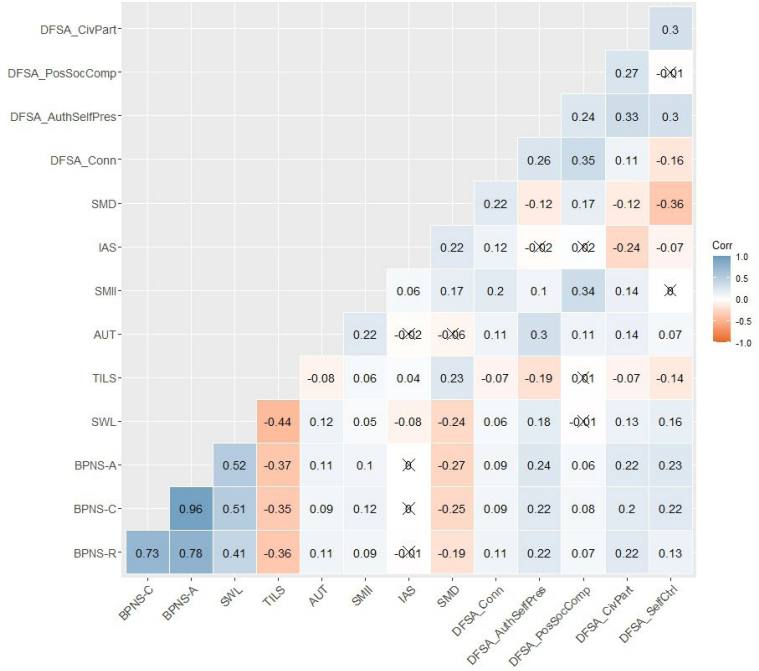
A subsample of 286 adolescents from the cross-sectional Study 2 participated in a follow-up assessment 6 weeks later (M_{age} = 15.71,

Table 5
Confirmatory Factor Models Assessing Age Invariance

Model	χ^2	*df*	CFI	RMSEA	$\Delta\chi^2$	Δdf	*p*-value	ΔCFI	ΔRMSEA
Early Adolescence (13-14)	253.726	179	0.953	0.035	-	-	-	-	-
Middle Adolescence (15-16)	365.989	179	0.941	0.039	-	-	-	-	-
Late Adolescence (17-19)	288.115	179	0.948	0.038	-	-	-	-	-
Measurement Invariance Models									
Configural	1105.0	537	0.942	0.035	-	-	-	-	-
Metric	1161.5	569	0.940	0.034	42.849	32	0.095	0.002	0.001
Scalar	1204.8	601	0.938	0.034	43.220	32	0.089	0.002	0.000
Strict	1281.1	643	0.938	0.033	50.372	42	0.176	0.001	0.001

Note. χ^2: Chi-square; *df:* Degrees of freedom; CFI: Comparative Fit Index; RMSEA: Root Mean Square Error of Approximation. $\Delta\chi^2$: Chi-square difference across the previous and the current model; Δdf: Degrees of freedom difference across the previous and the current model; ΔCFI: Change in CFI across the previous and the current model; ΔRMSEA: Change in RMSEA across the previous and the current model.

Figure 2
Spearman Correlation Matrix Among Variables



Note. BPNS-R: Basic Psychological Needs Satisfaction Relatedness; BPNS-C: Competence; BPNS-A: Autonomy; SWL: Satisfaction with Life; TILS: Loneliness; AUT: Subjective Authenticity of Positive Self-Content on Social Media; SMII: Social Media-Induced Inspiration Scale; IAS: Internet Aggression Scale; SMD: Social Media Disorder; DFSA_Conn: Connectedness; DFSA_AuthSelfPres: Authentic Self-Presentation; DFSA_PosSocComp: Positive Social Comparison; DFSA_CivPart: Civil Participation; DFSA_SelfCtrl: Self-Control. Non-significant Spearman correlations are blank.

SD_{age} = 1.08, age range: 14-19; 49.99% boys). Table 6 presents descriptive statistics for the study variables

Table 6
Sociodemographic Characteristics of Participants in Study 3

Variables	*n*
Age	286
14	29 (10%)
15	100 (35%)
16	108 (37%)
17	31 (11%)
18	10 (3.5%)
19	8 (2.8%)
Gender	286
Boy	143 (50.9%)
Girl	141 (49.8%)
Non-binary	1 (0.3%)
Prefer not to say	1 (0.3%)

Instruments

The DFSA (Rosič et al., 2022) adapted in Study 1 was administered.

Procedure

The same procedure as in Study 2 was followed.

Data Analysis

To evaluate temporal reliability of the DFSA subscales scores, intraclass correlation coefficients (ICC) for each dimension were computed to detect systematic measurement bias while verifying temporal stability of scores (Correa-Rojas, 2021). The ICC were calculated along with its 95% confidence interval using a two-way mixed-effects model, single measurement, and absolute agreement. Cutoff values of ICC values were: < .50 poor, .50 < .75 moderate, .75 < .90 good, and > .90 excellent reliability of the scores (Koo & Li, 2016).

To evaluate the longitudinal invariance of the DFSA measurement model between measurement time points (time 1 and 2, i.e. after 6 weeks), a series of progressively constrained CFAs was performed using MLR as the estimation method and full information maximum likelihood to handle missing values.

Results

Table 7 reports the ICCs and confidence intervals. Subscales for connectedness, authentic self-presentation, positive social comparison, civil participation, and self-control showed poor to moderate stability, indicating that scores are prone to fluctuate over time.

Table 8 presents fit indices for longitudinal invariance models of the DFSA. The configural, metric, and scalar models show adequate fit indices, with minimal changes in χ^2, CFI, and RMSEA. However, the strict model indicated a significant χ^2 difference. Although ΔRMSEA was within acceptable limits, the decrease in CFI exceeded the threshold. Hence, the DFSA demonstrated longitudinal invariance across factor loadings and item intercepts but not for unique item variances.

Table 7
Intraclass Correlation Coefficients and Confidence Intervals

Subscale	ICC	Lower CI	Upper CI	Classification
Connectedness	.467	.372	.553	Poor to Moderate
Authentic Self-Presentation	.504	.412	.585	Poor to Moderate
Positive Social Comparison	.464	.368	.550	Poor to Moderate
Civil Participation	.471	.375	.556	Poor to Moderate
Self-control	.599	.519	.668	Moderate

Note. ICC: Intraclass correlation coefficient. ICC was computed considering a single-measurement, absolute-agreement, two-way mixed effects model.

Discussion

This research had two aims: translating and adapting the DFSA and evaluating its psychometric properties in Spanish adolescents. Results showed that the Spanish DFSA is a promising tool for measuring digital flourishing, aligning with prior validations (Janicke-Bowles et al., 2023; Rosič et al., 2022; Schreurs & Vandenbosch, 2024; Yao et al., 2025).

Study 1 improved questionnaire comprehensibility by tailoring it to the Spanish context. While some items were easily understood, others posed difficulties, prompting further refinement. Based on cognitive interviews results, instructions were clarified, the language was simplified, and additional examples were provided to improve clarity. These adjustments laid the groundwork for the psychometric evaluation.

Table 8
Longitudinal Invariance Models

Model	χ^2	*df*	CFI	RMSEA	$\Delta\chi^2$	Δdf	*p*-value	ΔCFI	ΔRMSEA
Time 1	328.651	179	.916	.047	-	-	-	-	-
Time 2	320.362	179	.941	.047	-	-	-	-	-
Configural	649.01	358	.931	.047	-	-	-	-	-
Metric	673.04	374	.930	.046	17.401	16	.360	-.001	-.001
Scalar	693.33	390	.929	.046	20.502	16	.198	-.001	-.001
Strict invariance	815.31	411	.901	.052	74.380	21	<.001	-.027	.007

Note. $\Delta\chi^2$: Chi-square difference across the previous and the current model; Δdf: Degrees of Freedom Difference across the previous and the current model; *p*-value: Probability Value; ΔCFI: Change in Comparative Fit Index across the previous and the current model; ΔRMSEA: Change in Root Mean Square Error of Approximation across the previous and the current model.

In Study 2, the correlated five-factor model comprising connectedness, authentic self-presentation, positive social comparison, civil participation, and self-control, showed the best fit in the Spanish adolescent context and supports the conceptualization of digital flourishing as a set of interrelated but distinct dimensions. This finding aligns with prior validations of the scale in both adolescent and adult samples (Janicke-Bowles et al., 2023; Rosič et al., 2022), where the multidimensional structure consistently outperformed alternative models. In our sample, both the one-factor and the hierarchical models showed poorer fit indices compared to the five-factor solution, further supporting a multidimensional conceptualization of the construct over the use of a global DFSA score. Internal consistency was acceptable across subscales, except for connectedness, which was borderline-possibly due to its three-item length (Streiner, 2003).

The study also found strict measurement invariance across age groups, meaning the construct is measured equivalently in early, middle and late adolescents. As a result, observed differences between these age groups could probably be attributed to true differences in the underlying latent variable, rather than to variations in item interpretation (Meredith, 1993). Only metric measurement invariance was met across gender, indicating that the construct is conceptualized similarly by boys and girls. However, the lack of scalar invariance suggests discrepancies in item intercepts across gender, meaning that boys and girls may interpret items differently, potentially leading to biased comparisons of latent means (Blanco-Canitrot et al., 2018).

The DFSA's validity based on relationships to other variables was supported. The connectedness subscale correlated negatively with loneliness, a pattern consistent with prior research suggesting that digital communication can help foster a sense of belonging and reduce feelings of isolation (Trucharte et al., 2023; Vincent, 2016). Authentic self-presentation was positively associated with subjective authenticity, supporting that adolescents who feel able to act in accordance with their values and preferences online also perceive their digital self-presentation as more genuine (Ryan & Ryan, 2019; Schreurs & Vandenbosch, 2022). Positive social comparison online was positively associated with inspiration, consistent with studies showing that upward comparison in online contexts can evoke constructive and motivating emotional responses (Chang, 2022; Meier & Schäfer, 2018). Civil participation was inversely related to Internet aggression, indicating that adolescents who engage more frequently in polite and respectful digital communication report lower involvement in hostile online interactions (Lysenstøen et al., 2021; Werner et al., 2010). Finally, self-control correlated negatively with problematic social media use, echoing previous findings that highlight the role of self-regulatory difficulties in problematic patterns of social media engagement (Boer et al., 2020; Osatuyi & Turel, 2018). However, effect sizes were small (r = .05 to .20), finding not uncommon in media effects research (Meier & Reinecke, 2021). These low estimates may reflect moderate measurement error, especially in dimensions like positive social comparison, self-control, and civil participation, which showed lower reliability (DeVellis & Thorpe, 2021). This suggests a need to review and possibly expand these subscales.

It is worth noting the weak, albeit significant, relationship between positive social comparison and the need for competence. Conceptualization of the scale (Janicke-Bowles et al., 2023) proposes that enhancing competence in digital communication involves successfully organizing one's online social environment to reduce negative social comparisons and increase positive ones. However, in both the current study and the original validation, this subscale, while significant, shows the lowest correlation with the hypothesized basic psychological need (in this case with competence). This may be due to operationalization of the items. While items capture the received benefits from positive social comparisons, the scale does not address the presence of negative social comparisons, which may be equally important in assessing a sense of competence in digital interactions. Without considering both positive and negative social comparisons, the scale may fail to fully capture adolescents' ability to manage social dynamics in digital communication, which is central to the feeling of competence in this context. Similarly, all DFSA subscales were significantly associated with satisfaction with life, further supporting the scale's relevance in capturing key aspects of overall well-being (Janicke-Bowles et al., 2023; Kjell & Diener, 2021).

Study 3 showed poor to moderate temporal stability of the DFSA across six weeks. The ICC values suggest that scores fluctuate, potentially due to changes in school or family context, social dynamics, digital trends, or broader sociocultural factors (Magis-Weinberg et al., 2021). Given that the DFSA measures adolescents' digital communication experiences, such variability is not unexpected. Adolescence is a developmental period characterized by ongoing changes in self-concept, social habits, and digital engagement patterns, making adolescents more susceptible to variations in their responses (Berk, 2022). Moreover, recent research emphasizes that the time frame chosen for measurement plays an important role in how digital media uses and effects manifest. Media use and its effects can vary depending on the daily events, the distinction between weekdays and weekends, and even seasonal factors (Vandenbosch et al., 2025). It is therefore possible that a six-week interval is insufficient to capture meaningful temporal stability, and longer intervals should be considered in future research. For instance, study on digital flourishing fluctuations among adolescents found relatively stable patterns when assessments were spaced over one-year with four-month intervals (Rosič et al., 2024).

Longitudinal invariance testing showed scalar invariance over time, indicating that score changes reflect genuine shifts in the latent construct rather than interpretation differences (Mackinnon et al., 2022). However, residual invariance was not met, suggesting that item-level measurement error varied across time. Despite this, the DFSA appears suitable for longitudinal studies, although further research is needed.

The Spanish version of the DFSA offers educators and researchers a promising tool to assess the extent to which adolescents experience their digital communication as enriching and meaningful. While most available instruments emphasize problematic or excessive use, the DFSA offers a complementary, theory-based perspective by capturing five positive dimensions of digital communication. The results support its reliability, structural validity, and measurement invariance in the samples, allowing for use across diverse adolescent groups. In educational settings, the DFSA can help identify areas where students perceive greater or lesser fulfilment in their digital experiences, inform digital literacy programs, and support more balanced technology-related policies. Developed exclusively for research purposes, the scale is not intended for diagnostic or high-stakes decision-making. Instead, it promotes educational dialogue around adolescents' lived positive digital communication experiences, fostering a more holistic understanding of their

relationship with technology and supporting the development of healthier, more autonomous, and socially engaged digital habits.

This study has some limitations. First, the cognitive group interviews included fewer male than female participants. Additionally, the sample used to validate the DFSA was composed entirely of students from Valencia and Madrid, limiting the generalizability of the findings to Spanish adolescents as a whole. Moreover, lower internal consistency was found with the connectedness subscale. Future research may explore whether revisiting the original five-item subscale of social connectedness with Spanish adolescents would yield more reliable results than a three-item subscale (Janicke-Bowles et al., 2023). Moreover, DFSA is a self-report measure and captures reflections of adolescents' digital communication experiences rather than actual outcomes. This could lead to socially desirable responses (Janicke-Bowles et al., 2023). However, self-reported measures are frequently used in digital communication use research (Meier & Reinecke, 2021). Finally, while several of the scales used in Study 2 had validated Spanish versions, three instruments had not been formally validated in Spanish: the Satisfaction of Basic Psychological Needs (Girelli et al., 2019), the Virtual Self subscale (Bodroža & Jovanović, 2016), the Social Media-Induced Inspiration Scale (Meier & Schäfer, 2018), and the Internet Aggression Scale (Werner et al., 2010). These were included following the same approach used in the original adolescent validation of the DFSA (Rosič et al., 2022), but relying on non-validated translations is not considered best practice and may affect the accuracy and interpretability of the results. Future studies should further validate the DFSA with other validated measures in Spanish.

The DFSA focuses on positive digital experiences. Combining it with measures of digital drawbacks may clarify how benefits and harms coexist in media use (Vanden Abeele, 2021). This counterbalance is essential, as positive experiences alone do not capture the full scope of adolescent digital communication. Although the DFSA emphasizes need satisfaction via positive digital interactions, Basic Psychological Needs Theory (Ryan & Deci, 2017) suggests that experiences can also lead to need frustration. Future research should consider developing instruments to assess negative digital experiences linked to need frustration, offering a fuller picture of adolescents' digital lives within SDT. Additionally, cross-country comparisons could reveal how cultural differences shape digital flourishing. Understanding these variations would inform culturally tailored strategies to promote positive digital experiences among adolescents.

Author Contributions Statement

Alfredo Zarco-Alpuente: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Visualization, Writing - Original draft. **Víctor Ciudad-Fernández**: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Visualization, Writing - Original draft, Writing - Review & editing. **Jasmina Rosič:** Conceptualization, Methodology, Writing - Original draft, Writing - Review & editing. **Sophie H. Janicke-Bowles**: Conceptualization, Writing - Review & editing. **Tamara Escrivà-Martínez**: Conceptualization, Data curation, Writing - Review & editing**. Paula Samper-García**: Conceptualization, Methodology, Project administration, Supervision, Writing - Review & editing.

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Conflict of Interest

The authors declare that there are no conflicts of interest.

Data Availability Statement

This study was preregistered in November 2023 on the Open Science Framework (OSF) at https://osf.io/be4wh/?view_only=bc0e99ccd6334f66aaf463ccd7b0403b. Data, scripts, supplementary materials, and other resources are available on the same OSF page.

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