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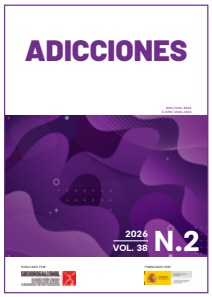
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EDITORIAL

Equity in healthcare: Why addiction consultation-liaison services should be present in all hospitals

Equidad asistencial: Por qué la interconsulta en adicciones debe estar presente en todos los centros hospitalarios

Laura Bueno-Sanya*,**,***; Néstor Arbelo****; Mercè Balcells*,**; Mercè Càmara****; Òscar de Juan*****; Laia Miquel*,**; Luis Pintor****; María Teresa Pons*,**,***; Luis Olivier*,**; Hugo López-Pelayo*,**,****.

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The prevalence of substance use disorders (SUD) among hospitalized patients constitutes a public health problem of the utmost magnitude. Between 20% and 45% of patients hospitalized for a medical or surgical reason have a SUD. In the United States and Canada, up to 44% of hospitalized patients have a SUD. In the United Kingdom, one in five hospitalized patients has an alcohol use disorder (Department of Health and Social Care, 2025; Donroe et al., 2025). In our Mediterranean European context, 800 patients admitted for medical conditions were assessed, identifying high or moderate risk alcohol consumption in 8% and tobacco use in 35%. Those consuming alcohol at a moderate or high risk pattern (according to the ASSIST scale) showed worse functioning and longer hospital stays (Pons-Cabrera et al., 2025).

Hospitalization constitutes a privileged clinical opportunity to intervene in SUD. In our retrospective cohort of 96 patients assessed during their hospital admission by the addiction consultation-liaison service in 2023, we observed that 71.9% were admitted for reasons directly related to substance use, 62.5% had psychiatric comorbidity, and 42.7% met criteria for severe SUD. Despite this complexity, acceptance of referral to the specialized service was very high (89.6%) and 73.3% attended the first psychiatric appointment. Although retention decreased at six (44.2%) and twelve months (32.6%), abstinence rates (per-protocol analysis) remained high: 82.5% at the first visit, 81.6% between 0–6 months, and 64.3% between 6–12 months. These data suggest that hospital admission constitutes a period of maximum receptivity to change, where early intervention could modify the patient's clinical trajectory and allows reaching patients who would not seek treatment on their own.

These conclusions align with the recommendations of an expert group (Delphi methodology including professionals and service users) for addressing substance use in hospitals, which proposes 84 strategies to standardize screening, management, and follow-up of these patients (Donroe et al., 2025). These recommendations highlight the need to include an addiction specialist in the management of hospitalized

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patients with SUD, the creation of a multidisciplinary group to treat patients with this health problem, and the active participation of psychiatrists in the care process.

The presence of psychiatric comorbidity (depression, anxiety, personality disorder) and severe addictive disorders that impact patients' quality of life and functioning makes a structured and integrated approach necessary (Lozano et al., 2017).

Tulloch et al. showed that medical factors (such as the presence of psychosis or physical comorbidity), demographic factors (such as gender), and organizational factors (including self-discharge or hospital size) consistently influence the length of stay (Tulloch et al., 2011). This suggests that organizational and clinical factors—including the integration of specialized liaison teams in addiction psychiatry—can optimize stays and improve care outcomes.

The most robust evidence on the impact of addiction specialist intervention during hospitalization comes from the START trial, which showed that patients who received specialized consultation during hospitalization doubled their likelihood of initiating medication for opioid use disorder and significantly increased their linkage to outpatient follow-up after discharge (Ober et al., 2025). The *American Hospital Association* highlights that care transitions are one of the most critical points for ensuring treatment continuity and reducing SUD-associated mortality (American Hospital Association, 2025). Initiating medication for alcohol use disorder (MAUD) at the time of discharge was associated with a 42% reduction in the combined risk of readmission or 30-day mortality, but only 2% of patients received this treatment at discharge, evidencing a significant treatment gap (Bernstein et al., 2024). Furthermore, receiving a visit from an addiction-specialized psychiatrist during hospitalization for an episode of alcoholic hepatitis was associated with lower mortality (Durkin et al., 2025).

Novel hospital-based interventions for patients with alcohol-related liver disease are showing promising results. The MyWayUp randomized clinical trial demonstrated that a gamified digital intervention, complemented by motivational interviewing, tripled the probability of keeping patients in addiction treatment at six months, improved adherence by 50%, significantly reduced alcohol consumption in the first month in those with active use, and improved prognostic liver parameters such as MELD-Na (Oliveras et al., 2026). These results suggest that digital interventions can overcome traditional barriers such as stigma and logistical difficulties.

The review of care transition strategies (Krawczyk et al., 2023) shows that interventions combining screening in emergency departments or during hospitalization, peer navigation (expert patients who support newly diagnosed individuals), and early follow-up are associated with higher rates of therapeutic linkage, which is consistent with the cohort of 96 patients described above.

The British clinical guideline on alcohol treatment recommends specific care strategies for patients with alcohol use during acute hospitalizations and the use of so-called "alcohol care teams (ACTs)". ACTs are multidisciplinary teams specialized in the management of alcohol use disorder in the hospital setting (Department of Health and Social Care, 2025). Furthermore, during the COVID-19 pandemic it became evident that addiction consultation-liaison teams constitute a central element for the proper care of patients with SUD in a context of health and social crisis (López-Pelayo et al., 2020).

The integration of all this evidence demands a structural change. Hospitalization should not be considered merely an acute care episode, but a therapeutic window of opportunity for patients admitted with medical conditions and psychiatric comorbidity, especially for patients with severe medical illnesses or high relapse risk. In order to optimize this opportunity, we propose:

- Universal screening for SUD and psychiatric comorbidity in hospitalized patients, for example using standardized instruments administered by nursing staff (AUDIT-C, ASSIST).
- Addiction consultations integrated into medical and liaison psychiatry services, along with the creation of multidisciplinary teams, and ensuring these services are considered in budget allocation by administrations.
- Brief, protocolized interventions during admission, based on scientific evidence such as motivational interviewing.
- Systematic assessment for initiating medications for alcohol, opioid, and nicotine use disorder when indicated from hospitalization.
- Structured transition models with intensive follow-up after discharge.
- Integration of digital tools, such as MyWayUp, to improve adherence and ensure continuity of care.
- Integrating a gender perspective with the aim of improving detection of certain conditions in women and reducing barriers to treatment access.
- Ensuring rights-based care (WHO Quality Rights) and respecting bioethical principles including autonomy, privacy and confidentiality, beneficence and non-maleficence, and equitable justice.

Our model of hospital-based addiction care in the consultation-liaison context is summarized in Table 1 and incorporates all the available evidence described above. This model demonstrates that nine out of ten patients consider continuing follow-up after the intervention of a specialized psychiatry and addiction team, and that three out of four attend the first appointment.

Overall, the available evidence consistently suggests that hospitalization represents an optimal window to intervene in SUD, improve clinical outcomes, and reduce associated morbimortality. Inaction in the face of this window means

Table 1
Our addiction intervention model

Methodological principles	Addiction medicine. Motivational interviewing and brief intervention. Complex case management and ensuring care continuity. Addressing complexity: medical, psychiatric, cognitive, and social comorbidity. Multidisciplinarity and training of medical/nursing teams. Ensuring human rights and patient-centered care (Quality Rights WHO model). Continuous updating of evidence to improve care processes.
Intervention objectives	First-order: patient safety by reducing withdrawal risks, preventing self-discharge, elopement, or premature discharge, and ensuring patient comfort. Second-order: achieving linkage to outpatient services, motivating for abstinence, initiating relapse prevention, and use of risk-reducing medications.
Phase 1: stabilization and building patient engagement through motivational interviewing*	Identifying withdrawal risk and preventing it (including risk of seizures or hallucinosis). Preventing and treating Wernicke's syndrome. Guiding the treating medical team on the most common complications (e.g., intracranial hemorrhages, hepatic or infectious diseases). Coordination with nursing and integration in addressing withdrawal symptoms and related behavioral problems: advanced practice nurses identify priorities and coordinate with the patient's responsible nurse.
Phase 2: diagnosis and addressing the patient's main concerns (focus on motivational interviewing)	Diagnosis of substance use disorder based on diagnostic classifications using information from the patient, their relatives (with explicit consent), and the medical history. Diagnosis of mental health comorbidities, especially the most frequent (depression, anxiety, post-traumatic stress disorder). Diagnosis of severe cognitive impairment or dementia. Diagnosis of social, relational, housing, or economic problems affecting prognosis and discharge plan.
Phase 3: motivation and evocative work in motivational interviewing*	Motivational interviewing sessions to address ambivalence, explore reasons and motivations for change beyond the acute illness. Exploring the patient's own resources, their support network, and the system's tools that can help achieve their goals. Exploring the patient's short- and medium-term objectives.
Phase 4: ensuring care continuity and planning work in motivational interviewing*	In a shared decision-making model, deciding the best place to address care after hospitalization: full or partial hospitalization (day hospital) in psychiatry/detoxification unit, home hospitalization, addiction follow-up center or mental health center, primary care. Considering social support, disorder severity, medical and psychiatric comorbidities, detoxification status, relapse risk, patient preference, and logistical and organizational barriers (place of residence, mobility and transport difficulties, etc.). Exploring community resources that may contribute to their well-being.
Cross-cutting	Working with the treating medical team and nursing staff on basic addiction concepts and contingencies arising during admission. Reducing stigma, facilitating the work of professionals, and creating a multidisciplinary team to support the patient's hospital and post-discharge process. Shifting from the view of "difficult patient" to "patient with a treatable problem". Working with the family in the same direction whenever possible (with prior patient authorization). Considering the gender perspective in all phases of the intervention.

losing an effective opportunity to modify the trajectory of substance use disorder.

Conflict of interests

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Use of artificial intelligence

Artificial intelligence tools were used solely for writing support. The scientific content was entirely developed and validated by the authors.

References

American Hospital Association. (2025). *Bridge to care: Advancing linkage and retention for OUD/StUD.* https://www.aha.org

Bernstein, E. Y., Baggett, T. P., Trivedi, S., Herzig, S. J., & Anderson, T. S. (2024). Outcomes after initiation of medications for alcohol use disorder at hospital discharge. *JAMA Network Open, 7*(3), Article e243387. https://doi.org/10.1001/jamanetworkopen.2024.3387

Department of Health and Social Care. (2025). *Clinical guidelines for alcohol treatment: Alcohol care in acute hospitals.* https://www.gov.uk/guidance/clinical-guidelines-for-alcohol-treatment/16-alcohol-care-in-acute-hospitals

Donroe, J. H., Calcaterra, S. L., Simon, C., Weimer, M. B., Huxley-Reicher, Z., Puglisi, L. B., Torres-Lockhart, K., Hall, O. T., Bhandary-Alexander, J., Encandela, J., & Martin, M. (2025). Recommendations for addressing in-hospital substance use: A national Delphi consensus process. *JAMA Network Open, 8*(8), Article e2528703. https://doi.org/10.1001/jamanetworkopen.2025.28703

Durkin, C., Schaubel, D. E., Kaplan, D. E., Mahmud, N., & Bittermann, T. (2025). Survival benefit from corticosteroids in severe alcohol-associated hepatitis attributed to clinical and treatment differences in a large multicenter cohort. *Clinical and Translational Gastroenterology, 16*(1), Article e00791. https://doi.org/10.14309/ctg.0000000000000791

Krawczyk, N., Rivera, B. D., Chang, J. E., Grivel, M., Chen, Y. H., Nagappala, S., Englander, H., & McNeely, J. (2023). Strategies to support substance use disorder care transitions from acute-care to community-based settings: a scoping review and typology. *Addiction Science & Clinical Practice, 18*(1), Article 67. https://doi.org/10.1186/s13722-023-00422-w

López-Pelayo, H., Aubin, H. J., Drummond, C., Dom, G., Pascual, F., Rehm, J., Saitz, R., Scafato, E., & Gual, A. (2020). The post-COVID era: Challenges in the treatment of substance use disorder (SUD) after the pandemic. *BMC Medicine, 18*(1), Article 241. https://doi.org/10.1186/s12916-020-01693-9

Lozano, O. M., Rojas, A. J., & Fernández-Calderón, F. (2017). Psychiatric comorbidity and severity of dependence on substance users: how it impacts on their health-related quality of life? *Journal of Mental Health (Abingdon, England), 26*(2), 119–126. https://doi.org/10.1080/09638237.2016.1177771

Ober, A. J., Murray-Krezan, C., Page, K., Friedmann, P. D., Anderson, J., Osilla, K. C., Ryzewicz, S., Huerta, S., Mazer, M. W., Hoskinson, R. A., Garvey, R., Peltz, A., Watkins, K. E., Nuckols, T., IsHak, W. W., Mariano, L. T., & Danovitch, I. (2025). Hospital addiction consultation service and opioid use disorder treatment: The START randomized clinical trial. *JAMA Internal Medicine, 185*(6), 624–633. https://doi.org/10.1001/jamainternmed.2024.8586

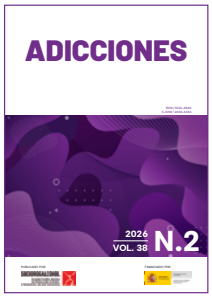
Oliveras, C., Balcells-Oliveró, M., Bataller, R., Bruguera, P., Cabrera, N., Calomarde-Gomez, C., Caballeria, E., Freixa, N., Garcia-Pañella, Ó., Gratacós-Ginès, J., Guzman, P., Hernández-Rubio, A., Lligoña, A., Ortega, L., Pérez-Guasch, M., Pons-Cabrera, M. T., Pose, E., Zuluaga, P., & López-Pelayo, H. (2026). MyWayUp: A Digital Intervention for Alcohol Use Disorder in Patients With Alcohol-Related Liver Disease-Results From an RCT. *Liver International: Official Journal of the International Association for the Study of the Liver, 46*(2), Article e70506. https://doi.org/10.1111/liv.70506

Pons-Cabrera, M. T., Caballería, E., Navarro-Cortés, L., Borràs, R., Barrio, P., Manthey, J., Batalla, A., Oliveras, C., Sagué-Vilavella, M., Balcells, M., Pintor, L., & López-Pelayo, H. (2025). Substance use and psychiatric comorbidities among medical inpatients: Associations with length of stay, health-related quality of life, and functioning, with consideration for gender. *Journal of Psychiatric Research, 186*, 322–330. https://doi.org/10.1016/j.jpsychires.2025.04.006

Tulloch, A. D., Fearon, P., & David, A. S. (2011). Length of stay of general psychiatric inpatients in the United States: systematic review. *Administration and Policy in Mental Health and Mental Health Services Research, 38*(3), 155–168. https://doi.org/10.1007/s10488-010-0310-3

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ORIGINAL

Spanish Validation of the Smoking-Related Weight and Eating Episodes Test (SWEET)

Validación Española del Cuestionario de Episodios de Consumo de Tabaco Relacionados con la Alimentación y el Peso (CECTRAP)

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Abstract

The use of tobacco for the purpose of weight management is a pervasive and detrimental practice among individuals with overweight or obesity. The Smoking-Related Weight and Eating Episodes Test (SWEET) assesses eating- and weight-related motivations for smoking. The goal of this study was to validate the SWEET in Spanish individuals with overweight or obesity. Adults seeking treatment for smoking cessation (N = 123; 54.47% female; M_{BMI} = 31.71 ± 4.27) completed the SWEET and measures related to smoking, weight, eating, emotional symptoms, and physical activity. Reliability and validity were assessed based on internal structure, internal consistency, and relationships with other variables. A four-factor correlated model, as found in the original SWEET, exhibited an adequate fit. The reliability coefficients demonstrated adequate internal consistency across subscales (α = .68 - .88), and the relationships with other measures were consistent, providing positive evidence of convergent and discriminant validity. The implementation of this valid and reliable instrument to assess eating- and weight-related motivations for smoking in individuals with overweight or obesity undergoing smoking cessation may contribute to the development of more effective treatment strategies tailored to the needs of this population.

Keywords: smoking, weight control, SWEET, validation, Spanish, overweight, obesity

Resumen

El consumo de tabaco con fines de control del peso constituye una práctica generalizada y nociva entre las personas con sobrepeso u obesidad. El Smoking-Related Weight and Eating Episodes Test (SWEET) evalúa las motivaciones relacionadas con la alimentación y el peso en el consumo de tabaco. El objetivo de este estudio fue validar el SWEET en personas españolas con sobrepeso u obesidad. Adultos que querían participar en un tratamiento para dejar de fumar (N = 123; 54,47% mujeres; M_{IMC} = 31,71 ± 4,27) completaron el SWEET y otras medidas relacionadas con el tabaquismo, el peso, la alimentación, los síntomas emocionales y la actividad física. La fiabilidad y la validez se evaluaron en función de la estructura interna, la consistencia interna y las relaciones con otras variables. El modelo correlacional de cuatro factores mostró un ajuste adecuado tal y como se encontró en el SWEET original. Los coeficientes de fiabilidad evidenciaron una consistencia interna adecuada en las subescalas (α = ,68 - ,88), y las relaciones con otras medidas fueron consistentes, aportando evidencia positiva de validez convergente y discriminante. La aplicación de este instrumento para evaluar las motivaciones relacionadas con la alimentación y el peso en el consumo de tabaco en personas con sobrepeso u obesidad que participan en programas de cesación tabáquica puede contribuir al desarrollo de estrategias de tratamiento más eficaces adaptadas a las necesidades de esta población.

Palabras clave: tabaquismo, control de peso, SWEET, validación, español, sobrepeso, obesidad

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Individuals who smoke tend to have a lower body weight than individuals who do not smoke (Audrain-Mcgovern & Benowitz, 2011). However, the risk of developing obesity increases with the number of cigarettes smoked per day (Clair et al., 2011), which suggests a U-shaped relationship between body mass index (BMI) and intensity of tobacco use. Smoking cessation is associated with an average increase of 4.67 kilograms after one year of abstinence (Aubin et al., 2012). The mechanisms explaining the link between tobacco use and weight change are not completely understood. The literature underlines that the removal of nicotine, a stimulant that increases metabolic rate (i.e., the rate of energy expenditure per unit of time), may influence weight increase (Audrain-Mcgovern & Benowitz, 2011).

People may use tobacco for weight or shape control (Fahey et al., 2021; White, 2012). This potentially health-damaging method of weight control is associated with being female, having higher levels of disordered eating, lower levels of physical activity, and higher BMI (Kilmurray et al., 2023; Mason et al., 2022). Prior literature has shown that concerns about weight gain prior to quitting smoking are associated with smoking relapse (Siñol et al., 2013; Tuovinen et al., 2018).

Individuals with obesity are more likely to be concerned with post-cessation weight gain, showing less tolerance for weight gain and reporting less confidence in maintaining their weight after quitting (Levine et al., 2013). In addition, people with obesity evidence greater post-cessation weight gain than those with overweight or in the normal weight range (Lycett et al., 2011), and frequently exhibit disordered eating behaviors (e.g., eating ultra-processed foods, emotional eating) (Askari et al., 2020; Vasileiou & Abbott, 2023). Although obesity is generally associated with a higher risk profile than overweight, both conditions entail greater weight-related concerns and vulnerability compared to normal weight; therefore, smoking cessation interventions aimed at preventing post-cessation weight gain are commonly designed for both populations (BMI ≥ 25; see e.g., Heggen et al., 2017; Hurt et al., 2022).

Several instruments have been developed with the purpose of assessing tobacco use as a strategy for weight control (Brandon & Baker, 1991; Copeland et al., 1995; Pomerleau & Snedecor, 2008; Rash & Copeland, 2008; Smith et al., 2010; Weekley et al., 1992). However, these instruments are not without limitations, particularly regarding their application in clinical practice, as they are unable to assess diverse forms of weight control through tobacco use. The Smoking Situations Questionnaire (Weekley et al., 1992), the Smoking Consequences Questionnaire (Brandon & Baker, 1991; Copeland et al., 1995; Rash & Copeland, 2008), the Weight Control Smoking Scale (Pomerleau & Snedecor, 2008), and the brief Wisconsin Inventory of Smoking Dependence Motives (Smith et al., 2010) rely on a single factor to assess this construct; and only two of these insturments have been validated in a Spanish population (Cepeda-Benito & Reig Ferrer, 2000; López-Núñez et al., 2023). Furthermore, it is important to note that some studies employed non-validated measures (see e.g., White, 2012; Yong & Borland, 2008), which could potentially introduce biases to the results.

In contrast, the Smoking-Related Weight and Eating Episodes Test (SWEET) (Adams et al., 2011) assesses eating- and weight-related motivations for smoking through four subscales: smoking to suppress appetite when physically hungry, to avoid snacking and to satisfy food cravings when not physically hungry, to prevent overeating, and when "feeling fat" or weight concerns arise. This instrument was preliminary validated with 280 female undergraduates in the USA and showed excellent psychometric properties in terms of internal consistency and validity (Adams et al., 2011). A subsequent study further supported the psychometric properties of the SWEET through a confirmatory factor analysis conducted with 577 men and women who smoked in the USA (Farris et al., 2018). Prior studies have demonstrated that SWEET scores are associated with following a low-calorie diet (Coniglio et al., 2020) or exhibiting higher levels of distress intolerance (Burr et al., 2020). To the best of our knowledge, the SWEET has not been published in languages other than English and its psychometric properties have not been examined in populations from countries other than the USA.

In summary, taking into account the clinical relevance of evaluating different domains of tobacco use as a method of weight control, the scarce instruments for its evaluation, the small number of psychometric studies on the SWEET and the absence of studies that analyze its psychometric properties in the Spanish population, the main objective of the study is validating the SWEET questionnaire in Spanish adults, specifically among individuals who smoke with overweight or obesity. The psychometric properties of the SWEET scores were examined, specifically evidence based on the factor structure of the questionnaire and its relationships with other relevant variables (i.e., related to sociodemographics, smoking behavior, body weight, eating behaviors, emotional symptoms, and physical activity), as well as reliability through internal consistency.

Method

Participants

The sample consisted of individuals with overweight or obesity who were interested in quitting smoking and participated in a clinical trial at the University of Oviedo. The trial was pre-registered (ID: NCT04332029) and the study protocol was approved by the Research Ethics Committee of the Principado de Asturias (n.º 329/19). Recruitment was conducted from September 2020 to October 2021 through various media outlets, including television, radio,

newspapers, social media, and poster advertisements. A total of 123 individuals completed an assessment prior to the initiation of a smoking cessation treatment, which included a weight gain prevention component (Krotter et al., 2024). Inclusion criteria consisted of (1) being at least 18 years of age; (2) smoking at least 10 cigarettes per day and not using electronic nicotine delivery devices over the past year; (3) meeting diagnostic criteria for tobacco use disorder and (4) having a BMI greater than or equal to 25. Exclusion criteria were (1) being pregnant, breastfeeding or in the six-month postpartum period; (2) having received another treatment for smoking cessation or weight control (either behavioral or pharmacological) in the previous 30 days; (3) presenting a diagnosis, during the previous year, of a severe psychiatric disorder (e.g., active psychotic disorder or suicidal ideation), eating disorder other than binge eating disorder, or substance use disorder other than tobacco use disorder; (4) having any health condition requiring a specialized diet or that affected eating, such as uncontrolled diabetes; (5) not being able to attend treatment; or (6) taking medication that affects weight. Regarding the participants' characteristics, the mean age was 52.23 years (*SD* = 10.41), with the majority being women (54.57%). Participants smoked an average of 21.31 cigarettes per day (*SD* = 8.75) and had been smoking for just over 30 years on average (*SD* = 10.66). Most participants (60.98%) fell within the obesity range for body weight. Additional participants characteristics are presented in Table 1.

Table 1
Participants' Characteristics

Mean (standard deviation)	*N* = 123
Age	52.23 (10.41)
Female sex (*n*/%)	67 (54.47)
Cigarettes smoked per day	21.31 (8.75)
Years of regular smoking	30.60 (10.66)
SWEET	
Appetite suppression	6.58 (2.91)
Prevent overeating	5.43 (2.87)
Body dissatisfaction	3.65 (2.16)
Cope with withdrawal	4.8 (2.03)
Nicotine dependence (FTCD)	5.41 (2.06)
Smoking craving (QSU)	
Intention to smoke	19.11 (10.37)
Expectations of negative reinforcement	10.37 (5.89)
Post-cessation weight gain concerns (0-100)	64.23 (30.68)
Urine cotinine levels	2293.62 (1213.91)
Current motivation for weight control (*n*/%)	
Precontemplation	24 (19.51)
Contemplation	36 (29.27)
Preparation	26 (21.14)
Action	21 (17.07)
Maintenance	16 (13.01)
BMI	31.71 (4.27)
Overweight (*n*/%)	48 (39.02)
Obesity (*n*/%)	75 (60.98)
Severity of binge eating (BES)	10.24 (8.69)
DEBQ	
Emotional eating	24.28 (11.40)
External eating	26.05 (7.31)
Restrained eating	22.54 (8.52)
DASS-21	
Depression	8.62 (8.09)
Anxiety	8.18 (6.78)
Stress	11.32 (7.27)
REGICOR	
Light physical activity	528.41 (762.54)
Moderate physical activity	456.80 (846.30)
Vigorous physical activity	424.98 (899.30)

Note. SWEET = Smoking-Related Weight and Eating Episodes Test; FTCD = Fagerström Test for Cigarette Dependence; QSU = Questionnaire of Smoking Urges; BMI = body mass index; BES = binge eating scale; DEBQ = Dutch Eating Behavior Questionnaire; DASS-21 = Depression, Anxiety and Stress Scale; REGICOR = Registre Gironí del Cor.

Instruments

Participants were asked to provide information regarding their sociodemographic characteristics, including their sex and age, as well as details about their smoking habits (i.e., number of cigarettes they smoked per day and the number of years they had been regular smokers). Furthermore, the assessment encompassed a range of measures pertaining to smoking behavior, body weight, eating behavior, emotional symptoms, and physical activity.

Smoking Behavior

Smoking to Control Eating and Weight. The SWEET consists of 10 items on a five-point Likert scale (1 = *never*, 5 = *always*), with scores ranging from 10 to 50. It includes four subscales (i.e., smoking to suppress appetite, smoking to prevent overeating, smoking to cope with body dissatisfaction, and smoking due to withdrawal-induced appetite increase). Its reliability in the original version was .94 for the total score and ranged from .82 to .91 for the four subscales (Adams et al., 2011).

Nicotine Dependence. The Fagerström Test for Cigarette Dependence (FTDC) that has been validated in a Spanish sample (Becoña & Vázquez, 1998) assesses nicotine dependence through six items, with five established levels:

very low (0-2), low (3-4), medium (5), high (6-7) and very high (8-10).

Cotinine Levels. Cotinine levels were biochemically measured through urine cotinine analysis using a BS-120 chemistry analyzer (Shenzhen Mindray Bio-Medical Electronics Co. Ltd., Shenzhen, P.R. China).

Smoking Craving. The brief Questionnaire of Smoking Urges (QSU) validated in Spanish (Cepeda-Benito & Reig-Ferrer, 2004) was used to assess the desire to smoke and the expectations of negative reinforcement or improvements through smoking. The scale consists of two subscales: intention or desire to smoke (e.g., 'If I were offered a cigarette, I would smoke it immediately'), and expectations of negative reinforcement or improvements through smoking (e.g., 'Smoking would make me less depressed'). Each subscale comprises five items, measured on a seven-point Likert-type scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). Both subscales demonstrated adequate psychometric properties in the sample of our study, as evidenced by the satisfactory Cronbach's alpha values of .839 for the intention or desire to smoke subscale and .747 for the negative reinforcement subscale.

Body Weight

Body Mass Index. Participants' height was measured using a medical stadiometer (SECA Mod.213, 20–205 cm), and body weight was measured in light clothing and without shoes using a calibrated medical scale (CL.III 200 kg. SECA Mod. 877). Both variables were then used to calculate the BMI.

Post-Cessation Weight Gain Concerns. Participants rated their level of post-cessation weight gain concerns from 0 to 100, with 100 indicating extreme concerns (Perkins et al., 2001). The translation process for the question, which has not yet been validated in Spanish, followed a procedure similar to that used for the SWEET instrument.

Current Motivation for Weight Control. The S-Weight Questionnaire, validated in Spanish by Andrés et al. (2011), requires participants to select one of five items corresponding to a stage of change in motivation to lose weight (i.e., precontemplation, contemplation, preparation, action or maintenance) specifically by dieting or exercising. This variable was recoded in order to ascertain whether participants were making efforts to lose weight or not, as was done in the confirmatory factor analysis previously published (Farris et al., 2018). The first three items, which referred to precontemplation, contemplation and preparation for action stage, were considered as a single category of 'not dieting or exercising to lose weight'. Conversely, the remaining two items (i.e., referred to the action and maintenance stages) were categorized as 'dieting or exercising to lose weight'.

Eating Behaviors

Severity of Binge Eating Episodes. The Binge Eating Scale (BES) validated in Spanish (Escrivá-Martínez et al., 2019) assesses behavioral manifestations and feelings or cognitions associated with binge eating episodes. The scale comprises 16 items ranging from 0 to 3, with higher scores indicating more severe binge eating behavior. This instrument showed excellent reliability in the sample used for our study (Cronbach's $\alpha = .915$).

Eating Styles. The Spanish version of the Dutch Eating Behavior Questionnaire (DEBQ; Cebolla et al., 2014) comprises 33 items on a 5-point Likert scale ranging from 1 (*never*) to 5 (*very often*), and assesses emotional eating (i.e., in response to emotional arousal states) through 13 items, external eating (i.e., in response to environmental food cues) with 10 items, and restrained eating (i.e., intentions to restrict food intake) through 10 items. All three subscales demonstrated excellent psychometric properties in the sample used for our study (Cronbach's α ranged from .861 to .961).

Emotional Symptoms

Depression, Anxiety, and Stress Symptomatology. The Spanish version of the Depression, Anxiety and Stress Scale (Bados et al., 2005) was used to evaluate emotional symptomatology through 21 items, in which responders evaluated from 0 to 3 the severity or frequency in which they had experienced each of the symptoms during the previous week. The scale is composed of three subscales (i.e. anxiety, depression and stress), each with seven items. Higher scores indicate greater presence of symptoms, and the scale showed acceptable psychometric properties in the sample used for our study (Cronbach's α ranged from .753 to .860).

Physical Activity

Physical Activity Intensity. The validated short version of the Spanish REGICOR (Molina et al., 2017) classifies specific physical activities (i.e., walking at a normal pace, walking fast, walking in the countryside or mountains, climbing stairs, working in the yard or garden, and exercising indoors or outdoors) by energy expenditure based on work metabolic rates (METs), which had been established in a previous compendium of physical activity intensity levels. Total energy expenditure was calculated from the type of activity performed, frequency (number of times per month), duration (minutes per day), and the equivalent METs of the activities performed; and categorized as light, moderate, and vigorous physical activity intensity.

Procedure

The Spanish version of the SWEET was obtained through a three-step process following the international guidelines (International Test Commission, 2017; Muñiz et al., 2013). Firstly, the items were translated into Spanish by a native Spanish psychologist member of the research team who also

possesses an advanced command of the English language. Subsequently, a native English translator proficient in Spanish conducted the back-translation process. Finally, the research team and the translator held a discussion to address any discrepancies between the original and back-translated versions, with the aim of producing the final Spanish version shown in Table 2. The resulting items bear a strong resemblance to the originals, with no significant modifications being necessary.

Participants used an electronic platform to answer the battery of instruments, including the SWEET. Before completing the assessment, participants were informed about the study, assured of the confidentiality of their data and asked for their consent.

Data Analysis

A series of descriptive analyses were conducted to provide clearer context regarding the relevance of SWEET scores in this sample. To this end, three groups were created based on participants' percentile rank on the total SWEET score: a low group (below the 25th percentile), a moderate group (between the 25th and 75th percentiles), and a high group (above the 75th percentile). Once the groups were defined, means and standard deviations were reported for the quantitative variables age, cigarettes per day, years of regular smoking, urinary cotinine, weight, and BMI. In addition, percentages were reported according to sex and whether participants were currently dieting.

The assumptions of normality and homogeneity of variances were examined prior to conducting the analyses. A Confirmatory Factor Analysis (CFA) was conducted using the Robust Maximum Likelihood (MLR) estimator due to moderate deviations from normality (Savalei & Rosseel, 2022). Although the items were measured on five-point Likert scales and are technically ordinal, they were treated as continuous, as this approach has been shown to yield results comparable to categorical estimators when five or more response categories are used (Rhemtulla et al., 2012). A four-factor model was tested, with each item loading exclusively on its respective factor, as outlined by the original authors in their validation study (Adams et al., 2011). The fit of the model was tested using the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximate (RMSEA) and the Standardized Root Mean Square Residual (SRMSR). CFI and TLI values above 0.90 were considered to indicate a good fit and above 0.95 excellent, while a SRMR ≤ 0.08 was necessary to consider an appropriate adjustment and a RMSEA ≤ 0.05 to consider a close fit and less than .08 reasonable fit (Hu & Bentler, 1999; Browne & Cudeck, 1993). Cronbach's alpha coefficient were used to evaluate internal consistency, and values between .6 and .8 are considered acceptable (Hajjar, 2018).

To examine convergent validity, the following variables were analyzed for their correlation with the SWEET subscales: age (as younger individuals are more likely to smoke for weight control, see e.g., Fahey et al., 2021), cigarettes smoked per day, years of regular smoking, nicotine dependence (FTCD), urine cotinine levels, smoking craving (QSU), BMI, post-cessation weight gain concerns, severity of the binge eating episodes (BES), eating styles (i.e., emotional, external, and restrained eating subscales from the DEBQ), and emotional symptomatology (i.e., depression and anxiety subscales from the DASS-21). Regarding discriminant validity, the SWEET subscales were correlated with levels of physical activity (i.e., light, moderate, and vigorous activity, as assessed through the REGICOR). Finally, independent *t*-tests were conducted to examine the differences in all SWEET subscales by sex and current state of dieting or exercising to lose weight. Given that the sample sizes exceeded 30 participants per comparison group, approximate normality was assumed in accordance with the central limit theorem (Kwak & Park, 2019). Homogeneity of variances was assessed using Levene's test, and when this assumption was violated, Welch's t-test was applied. The effect size was calculated through the Cohen's *d* considering small values those between 0.1 and 0.3, intermediate between 0.3 and 0.5, and large those values over 0.5. The SPSS 24 statistics package (IBM Corp, 2016) was used to calculate descriptive statistics, Pearson correlations, and *t*-tests. The RStudio 2021.09.0 "Ghost Orchid" was used to conduct the CFA and calculate reliability coefficients.

Results

Descriptive Analysis

In Table 2, the different characteristics of the sample across low, moderate, and high levels of the total SWEET score are presented. Participants with higher SWEET scores tended to be younger and more likely to report currently being on a diet. In contrast, those in the low SWEET group tended to be older and reported a longer history of regular smoking. Regarding BMI, mean values were in the obese range across all three groups.

Evidence Based on Internal Structure

Table 3 depicts the results of the CFA. The CFI and SRMR values (.96 and .05 respectively) indicate a good model fit. Additionally, TLI and RMSEA values (.92 and .08 respectively) indicate a reasonable model fit. High factor loadings were observed in the four factors. In terms of the reliability of the factors, the subscale *Appetite Suppression* demonstrated an alpha coefficient of .855, *Prevent Overeating* exhibited an alpha coefficient of .876, and *Body Dissatisfaction* displayed an alpha of .852. All three

Table 2
Sample Characteristics by Percentile-based SWEET Scores (N = 123)

Variable	Low SWEET scores (*n* = 31)	Moderate SWEET scores (*n* = 59)	High SWEET scores (*n* = 33)
SWEET Total, *M(SD)*	11.80 (1.66)	19.10 (3.23)	31.10 (4.62)
Sex, *n* (%)			
Women	12 (9.8)	32 (26)	23 (18.7)
Men	19 (15.4)	27 (22)	10 (8.1)
Attempting to lose weight through diet or exercise, *n* (%)			
Yes	7 (5.7)	17 (13.8)	13 (10.6)
No	24 (19.5)	42 (34.1)	20 (16.3)
Age (years), *M* (*SD*)	58.50 (10.10)	50.90 (8.56)	48.70 (11.40)
Cigarettes per day, *M* (*SD*)	20.50 (7.49)	22.10 (10.40)	20.60 (6.48)
Years of regular smoking, *M* (*SD*)	36.00 (11.10)	29.80 (8.51)	27.00 (12.10)
Urine cotinine (ng/mL), *M* (*SD*)	2,225 (1,095)	2,342 (1,183)	2,272 (1,397)
Weight (kg), *M* (*SD*)	88.00 (16.20)	88.90 (13.30)	86.20 (13.50)
BMI (kg/m²), *M* (*SD*)	31.10 (4.41)	31.80 (4.14)	32.20 (4.42)

Note. SWEET = Smoking-Related Weight and Eating Episodes Test; SWEET Total = Total Score of the SWEET Test. The low group comprised participants scoring at or below the 25th percentile, the moderate group included those scoring between the 25th and 75th percentiles, and the high group consisted of participants scoring above the 75th percentile on the total SWEET score.

Table 3
Confirmatory Factor Analysis of the Items of the SWEET, with items both in English and Spanish

Items	F. L. Appetite Suppression	F. L. Prevent Overeating	F. L. Body Dissatisfaction	F. L. Cope with Withdrawal
1. When I feel hungry, I have a cigarette to curb my appetite (*Cuando tengo hambre fumo para reducir mi apetito*).	.78			
2. When I crave unhealthy food, I have a cigarette to avoid eating (*Cuando se me antoja comida no saludable fumo para evitar comerla*).	.89			
3. When I feel like having a snack, I have a cigarette instead (*Cuando me apetece un snack fumo en vez de comerlo*).	.77			
4. If I don't smoke soon after a meal, I continue to eat more than I need (*Si no fumo pronto después de comer, continúo comiendo más de lo que necesito*).		.84		
5. Smoking after a meal helps me to avoid overeating (*Fumar después de las comidas me ayuda a evitar comer en exceso*).		.91		
6. When I am full, I smoke so that I won't eat more (*Cuando estoy lleno/a, fumo para no comer más*).		.79		
7. When I feel fat, I have a cigarette (*Cuando me siento gordo/a, fumo*).			.79	
8. I smoke when I am worried about gaining weight (*Fumo cuando me preocupa ganar peso*).			.94	
9. I crave tasty foods when I haven't smoked in a while (*Siento ganas de comer comida sabrosa cuando no he fumado en un tiempo*).				.64
10. I feel hungrier when I haven't smoked in a while (*Me siento más hambriento/a cuando no he fumado en un tiempo*).				.80
CFI		.96		
TLI		.92		
SRMSR		.05		
RMSEA		.08, 90% IC [.06, .13]		

Note. SWEET = Smoking-Related Weight and Eating Episodes Test; F.L. = Factor Loadings; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index; SRMSR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation.

were optimal values. In the case of *Cope with Withdrawal*, an alpha coefficient of .680 was obtained, which could be considered acceptable.

Validity Evidence Based on Relationships with Other Variables

Table 4 reflects correlations between the SWEET subscales and several relevant variables, providing evidence of both convergent and discriminant validity.

Convergent Validity

A significant negative correlation was evidenced between age and the four SWEET subscales. Similarly, a negative association was found between years of regular smoking and all subscales. However, these latter associations were statistically significant only for the *Appetite Suppression* and *Prevent Overeating* subscales. Regarding the phenomenon of smoking craving, assessed by the two QSU subscales (i.e., intention to smoke and expectations of negative reinforcement), significant positive correlations were identified with all subscales. Notably, the highest correlations were observed for the subscale *Cope with Withdrawal*. Furthermore, post-cessation weight gain concerns were significantly positively correlated with the four subscales, especially with *Body Dissatisfaction*. No significant correlations were found with the remaining smoking-related variables (i.e., cigarettes smoked per day, nicotine dependence or urine cotinine levels) or with the BMI.

Considering the variables related to eating behaviors, the severity of binge eating, as assessed by the BES, showed significant positive correlations with all SWEET subscales,

Table 4
Correlations Between SWEET Subscales and Other Variables as Evidence of Convergent and Discriminant Validity

	Appetite Suppression Subscale	Prevent Overeating Subscale	Body Dissatisfaction Subscale	Cope with Withdrawal Subscale
Appetite Suppression subscale	1			
Prevent Overeating subscale	.56	1		
Body Dissatisfaction subscale	.68	.47	1	
Cope with Withdrawal subscale	.68	.58	.54	1
Convergent validity				
Age	-.336***	-.305***	-.236**	-.226*
Cigarettes smoked per day	-.001	.043	.056	-.112
Years of regular smoking	-.273**	-.285**	-.172	-.134
Nicotine dependence (FTCD)	.055	.151	.151	.159
Urine cotinine levels (ng/ml)	.018	.004	-.091	-.063
Intention to smoke (QSU)	.195*	.344***	.189*	.353***
Expectations of negative reinforcement (QSU)	.294***	.299***	.303***	.325***
BMI	.148	.008	.111	.121
Post-cessation weight gain concerns (0-100)	.300***	.251**	.437***	.315***
Severity of binge eating (BES)	.412***	.445***	.571***	.404***
Emotional eating (DEBQ)	.473***	.468***	.556***	.466***
External eating (DEBQ)	.421***	.485***	.369***	.471***
Restrictive eating (DEBQ)	.318***	.105	.347***	.211*
Depression (DASS-21)	.130	.084	.463***	.267**
Anxiety (DASS-21)	.216*	.159	.456***	.292**
Stress (DASS-21)	.305***	.186*	.489***	.386***
Discriminant validity				
Light physical activity (REGICOR)	-.008	.035	-.104	.164
Moderate physical activity (REGICOR)	.128	-.030	-.040	.047
Vigorous physical activity (REGICOR)	-.016	.020	-.160	-.027

Note. FTCD = Fagerström Test for Cigarette Dependence; ng/ml = nanograms per milliliter; QSU = Questionnaire of Smoking Urges; BMI = body mass index; BES = binge eating scale; DEBQ = Dutch Eating Behavior Questionnaire; DASS-21 = Depression, Anxiety and Stress Scale; REGICOR = Registre Gironí del Cor.
* $p < .05$; ** $p < .01$; ***$p < .001$.

with the highest being *Body Dissatisfaction*. In terms of eating styles, as assessed by the DEBQ, the Emotional Eating subscale and the External Eating subscale showed significant positive correlations with all SWEET subscales. The highest correlations were found with *Body Dissatisfaction* and the *Prevent Overeating* subscales, respectively. The Restrictive Eating subscale showed significant positive correlations with *Appetite Suppression*, *Cope with Withdrawal*, and *Body Dissatisfaction*, with the latter having the highest correlation.

Finally, in terms of emotional symptoms, stress symptomatology correlated significantly with all subscales, depression symptomatology correlated significantly with *Body Dissatisfaction* and *Cope with Withdrawal*, and anxiety symptomatology correlated significantly with *Appetite Suppression, Body Dissatisfaction*, and *Cope with Withdrawal*. In all three cases, the highest correlation was with the *Body Dissatisfaction* subscale.

Discriminant Validity

The correlations between the SWEET factor scores and intensity of physical activity assessed by the REGICOR (including light, moderate and vigorous intensity subscales) were extremely low and non-significant in either case.

Known Groups Validity

The results of the analysis of the differences in SWEET subscales scores by sex and current state of dieting or exercising to lose weight are summarized in Table 4. Women evidenced significantly higher scores than men in the *Appetite Suppression* and *Body Dissatisfaction* subscales. These findings indicated that female participants used cigarettes to suppress their appetite more than male participants (d = 0.45) and to cope with body dissatisfaction (d = 0.51). No differences were found in the *Prevent Overeating* and *Cope with Withdrawal* subscales.

Finally, a comparison was conducted between participants who were currently attempting to lose weight through diet or exercise and participants who were not. The results revealed significant differences only in the *Body Dissatisfaction* subscale. That is, participants who were currently attempting to reduce their body weight used cigarettes more frequently to cope with body dissatisfaction than those who were not making such efforts (d = 0.47).

Discussion

This study aimed to validate the SWEET in Spanish adults with overweight or obesity who smoke. The findings indicated that the Spanish version of the SWEET presented adequate psychometric properties in terms of reliability and convergent and discriminant validity. Women displayed a greater tendency to smoke to suppress their appetite and to cope with body dissatisfaction in comparison with men. Individuals pursuing weight reduction exhibited a greater tendency to smoke as a coping mechanism for body dissatisfaction in contrast to those not engaged in similar efforts.

The findings indicate that the four-correlated-factor structure of the SWEET has a good fit and preserves the structure of the original questionnaire (Farris et al., 2018). Additionally, the alpha coefficients demonstrated adequate reliability across all subscales, with values ranging from .68 to .88. The coefficients were also similar to the original questionnaire, except for the *Cope with Withdrawal* subscale, which demonstrated a lower alpha value, although it remained within the acceptable range (Hajjar, 2018). The appropriate psychometric properties of this version of the SWEET demonstrate the adequacy of its utilization among individuals with overweight or obesity. This is particularly salient considering that the instruments that have been validated for assessing tobacco use as a weight control method employ a single subscale (Brandon & Baker, 1991; Copeland

Table 5
T-test for Differences in the Means of Each SWEET Subscale Between Sex and by Current Motivation for Weight Control

	Appetite Suppression	*t*	*p*	Prevent Overeating	*t*	*p*	Body Dissatisfaction	*t*	*p*	Cope with Withdrawal	*t*	*p*
Sex												
Women (*n* = 67)	7.16 (2.99)	2.50	.014	5.48 (2.78)	.20	.844	4.13 (2.27)	2.84*	.005	5.07 (2.04)	1.63	.107
Men (*n* = 56)	5.88 (2.67)			5.38 (2.99)			3.07 (1.89)			4.48 (1.98)		
Current motivation for weight control												
Dieting or exercising to lose weight (*n* = 37)	7.08 (3.23)	1.26	.209	5.32 (2.73)	-.27	.788	4.38 (2.45)	2.29*	.026	4.89 (1.82)	.31	.756
Not dieting or exercising to lose weight (*n* = 86)	6.36 (2.76)			5.48 (2.94)			3.34 (1.96)			4.77 (2.12)		

Note. * Welch's t-test was used, as the assumption of homogeneity of variances was not met.

et al., 1995; Pomerleau & Snedecor, 2008; Smith et al. 2010; Weekley et al., 1992), and only two have been validated in the Spanish language. The four-factor structure of the SWEET enables the assessment and identification of four related but distinct ways that people might use tobacco for weight control. This is clinically important, as it could help tailor smoking cessation treatments for individuals with overweight or obesity considering the different patterns of weight control behaviors linked to tobacco use (Adams et al., 2011).

With regard to convergent validity, the strong negative correlation between SWEET scores and age aligns with the negative relationship observed between SWEET scores and years of regular smoking, and is also in agreement with previous research (Burr et al., 2020). This finding also supports existing literature indicating that smoking for weight control is more common among young adults (Fahey et al., 2021). The findings, however, showed no significant correlation between the number of cigarettes smoked per day, urine cotinine levels, and nicotine dependence with the SWEET scores, which is unexpected in light of the extant literature (Adams et al., 2011; Burr et al., 2020; Farris et al., 2018). One possible explanation for this finding is the age difference between studies, with a mean age of 52 years in our sample compared to 20 or 44 years of age in previous research. Younger age has been associated with smoking for weight control in adults (Wee et al., 2001), so in our older sample, a larger proportion of participants may smoke heavily for reasons unrelated to weight control. Conversely, a robust relationship was identified between all SWEET subscales and smoking craving. This finding is noteworthy considering the well-established link between smoking cravings and relapse (Robinson et al., 2019). It underscores the importance of providing tailored support for individuals with overweight and obesity who use smoking for weight management, as they may require additional strategies to effectively manage cravings. Furthermore, despite previous evidence (Adams et al., 2011; Burr et al., 2020; Farris et al., 2018), no statistically significant correlation was identified between BMI and SWEET scores. Since the present study encompassed individuals with a BMI of 25 or higher, a distinction from the aforementioned studies, it might be that individuals within this BMI range are equally inclined to use tobacco for the purpose of weight control. The lack of significant finding could also be due to a restricted range of the BMI variable.

As demonstrated in prior research (Adams et al., 2011; Burr et al., 2020; Farris et al., 2018), SWEET scores were associated with post-cessation weight gain concerns as well as a range of maladaptive eating behaviors, including severity of binge eating, emotional eating, external eating, and restrictive eating. In addition, SWEET scores were related to heightened prevalence of emotional symptomatology (i.e., depression, anxiety, and stress), as reported previously (Burr et al., 2020; Farris et al., 2018). A notable finding was the predominance of the highest correlation with the *Body Dissatisfaction* subscale with all the aforementioned variables, except for the external eating subscale from the DEBQ. Therefore, including strategies to improve body image in smoking cessation programs aimed at individuals with overweight or obesity could have a notable effect on other key factors related to concerns about body appearance, disordered eating, or emotional symptoms. Finally, evidence of discriminant validity was obtained in relation to physical activity levels, specifically low, moderate, and vigorous levels, as in line with previous literature, physical activity is not expected to be associated with the use of tobacco as a means of weight control (Farris et al., 2018).

The SWEET demonstrated sensitivity to variations among subgroups in our study, particularly regarding sex and current weight loss attempts. Female participants exhibited higher scores on the *Appetite Suppression* subscale in comparison to their male counterparts. This finding aligns with the results from Farris et al. (2018) conducted with adults who smoked daily. In contrast with Farris et al.'s findings, women in our study demonstrated higher scores than men on the *Body Dissatisfaction* subscale. This discrepancy may be attributed to the sample's BMI (individuals with overweight or obesity in our study vs. the absence of BMI inclusion criteria for the Farris et al. study). A substantial body of literature has pointed out the link between being female or having excessive body weight with both body dissatisfaction (Weinberger et al., 2016) and post-cessation weight gain concerns (Levine et al., 2013). According to our results, it is crucial to monitor changes in body dissatisfaction and body weight during smoking cessation treatment in this vulnerable population (i.e., women with excessive body weight) in order to prevent smoking relapse (Marqueta et al., 2016; Tuovinen et al., 2018). Finally, individuals currently attempting to lose weight showed higher scores on the *Body Dissatisfaction* subscale than those who were not, while Farris et al. (2018) found differences in all subscales. This finding suggests that there is a need to identify individuals attempting to lose weight prior to initiating smoking cessation interventions and to target body image concerns to achieve successful smoking cessation outcomes regardless of post-cessation weight gain.

Some limitations should be considered when interpreting the results of this study. Firstly, the sample size (N = 123) exceeds the minimum recommended criterion of at least 10 participants per item to conduct an instrument validation (Anthoine et al., 2014; Nunnally, 1978). However, it falls below the commonly desired threshold number of participants to perform a CFA (Wolf et al., 2013). This also prevented us from conducting an invariance analysis by sex, as performed in the original study validation (Farris et al., 2018). Additionally, it is important to note that the original structure of the questionnaire consisted of four subscales, two of which included only two items. It is generally recommended that each factor be represented by at least

three indicators, as a smaller number of items may affect the reliability and stability of the factor structure (Kline, 2023). Notwithstanding, it should be noted that, given the model's satisfactory factor loadings and fit indices, as well as its adequate internal consistency indices, the instrument can be regarded as a psychometrically sound tool for use in analogous populations. Importantly, the sample consists of a highly specific and hard-to-reach population: individuals who smoke, with overweight or obesity, and motivated to initiate a smoking cessation treatment. Recruiting participants who simultaneously meet these criteria poses substantial challenges, which justifies the sample size and enhances the relevance of the findings for this clinical subgroup. Secondly, the cross-sectional nature of the study prevented us from establishing causal relationships. Thirdly, the participants in this study were individuals seeking to initiate smoking cessation treatment, and the mean age of the participants was relatively high (over 50 years); therefore, the instrument may not be universally applicable to individuals with overweight or obesity who do not intend to quit smoking, or to younger individuals.

Despite its limitations, the current study provides evidence that the SWEET is a reliable and valid instrument for assessing four distinct eating- and weight-related motivations for smoking among Spanish individuals with overweight or obesity. The measure demonstrated high internal consistency and was significantly associated with relevant clinical constructs, including smoking craving, concerns about post-cessation weight gain, maladaptive eating patterns, and emotional symptoms. Additionally, variations in response were observed based on sex and current weight-loss efforts through diet or exercise. Notably, the *Body Dissatisfaction* subscale showed the strongest associations with clinical variables, indicating that smoking as a coping mechanism for body dissatisfaction may represent a key target for intervention in smoking cessation programs in individuals with overweight or obesity.

Declarations

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Conflicts of Interest

The authors have no conflict of interest to report.

Ethics Approval and Consent to Participate

The study protocol was approved by the Research Ethics Committee of the Principality of Asturias (nº 329/19). All participants provided informed consent.

Data Availability Statement

Data will be made available on request.

CRediT Authorship Contribution Statement

Andrea Krotter: Conceptualization, Data curation, Investigation, Validation, Writing – original draft. Covadonga González-Nuevo: Conceptualization, Formal analysis, Methodology, Software, Writing – original draft. Claire A. Spears: Writing – review and editing. Gloria Garcia-Fernandez: Conceptualization, Funding acquisition, Investigation, Resources, Methodology, Project administration, Supervision, Writing – review and editing.

References

Adams, C. E., Baillie, L. E., & Copeland, A. L. (2011). The Smoking-Related Weight and Eating Episodes Test (SWEET): Development and preliminary validation. *Nicotine & Tobacco Research*, *13*(11), 1123–1131. https://doi.org/10.1093/ntr/ntr162

Andrés, A., Saldaña, C., & Gómez-Benito, J. (2011). The transtheoretical model in weight management: Validation of the Processes of Change Questionnaire. *Obesity Facts*, *4*(6), 433–442. https://doi.org/10.1159/000335135

Anthoine, E., Moret, L., Regnault, A., Sébille, V., & Hardouin, J.-B. (2014). Sample size used to validate a scale: a review of publications on newly-developed patient reported outcomes measures. *Health and Quality of Life Outcomes, 12*(1), Article 2. https://doi.org/10.1186/s12955-014-0176-2

Askari, M., Heshmati, J., Shahinfar, H., Tripathi, N., & Daneshzad, E. (2020). Ultra-processed food and the risk of overweight and obesity: a systematic review and meta-analysis of observational studies. *International Journal of Obesity*, *44*(10), 2080–2091. https://doi.org/10.1038/S41366-020-00650-Z

Aubin, H. J., Farley, A., Lycett, D., Lahmek, P., & Aveyard, P. (2012). Weight gain in smokers after quitting cigarettes: Meta-analysis. *BMJ*, *345*, Article e4439. https://doi.org/10.1136/bmj.e4439

Audrain-Mcgovern, J., & Benowitz, N. L. (2011). Cigarette smoking, nicotine, and body weight. *Clinical Pharmacology and Therapeutics, 90*(1), 164–168. https://doi.org/10.1038/clpt.2011.105

Bados, A., Solanas, A., & Andrés, R. (2005). Psychometric properties of the Spanish version of Depression, Anxiety and Stress Scales (DASS) [Propiedades psicométricas de la versión española de las Escalas de Depresión, Ansiedad y Estrés (DASS)]. *Psicothema*, *17*(4), 679–683.

Becoña, E., & Vázquez, F. L. (1998). The Fagerström Test for Nicotine Dependence in a Spanish sample. *Psychological Reports*, *83*(3), 1455–1458. https://doi.org/10.2466/pr0.1998.83.3f.145

Brandon, T. H., & Baker, T. B. (1991). The Smoking Consequences Questionnaire: The subjective expected utility of smoking in college students. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, *3*(3), 484–491. https://doi.org/10.1037/1040-3590.3.3.484

Browne, M. W., Cudeck, R., Bollen, K. A., & Long, J. S. (1993). Alternative ways of assessing model fit. *Testing structural equation models*, *154*(4), 136-162. https://doi.org/10.1177/0049124192021002005

Burr, E. K., O'Keeffe, B., Kibbey, M. M., Coniglio, K. A., Leyro, T. M., & Farris, S. G. (2020). Distress intolerance in relation to reliance on cigarettes for weight, shape, and appetite control. *International Journal of Behavioral Medicine, 27*(2), 247–254. https://doi.org/10.1007/s12529-020-09858-9

Cebolla, A., Barrada, J. R., van Strien, T., Oliver, E., & Baños, R. (2014). Validation of the Dutch Eating Behavior Questionnaire (DEBQ) in a sample of Spanish women. *Appetite*, *73*, 58–64. https://doi.org/10.1016/J.APPET.2013.10.014

Cepeda-Benito, A., & Reig-Ferrer, A. (2004). Development of a Brief Questionnaire of Smoking Urges--Spanish. *Psychological Assessment*, *16*(4), 402–407. https://doi.org/10.1037/1040-3590.16.4.402

Cepeda-Benito, A., & Reig Ferrer, A. (2000). Smoking Consequences Questionnaire—Spanish. *Psychology of Addictive Behaviors*, *14*(3), 219–230. https://doi.org/10.1037/0893-164X.14.3.219

Clair, C., Chiolero, A., Faeh, D., Cornuz, J., Marques-Vidal, P., Paccaud, F., Mooser, V., Waeber, G., & Vollenweider, P. (2011). Dose-dependent positive association between cigarette smoking, abdominal obesity and body fat: cross-sectional data from a population-based survey. *BMC Public Health*, *11*, Article 23. https://doi.org/10.1186/1471-2458-11-23

Coniglio, K. A., Rosen, R., Burr, E. K., & Farris, S. G. (2020). Adherence to low-calorie and low-sugar diets is uniquely associated with distinct facets of appearance/weight-related smoking motivations. *Journal of Behavioral Medicine*, *43*(3), 487–492. https://doi.org/10.1007/s10865-020-00149-y

Copeland, A. L., Brandon, T. H., & Quinn, E. P. (1995). The Smoking Consequences Questionnaire-Adult: Measurement of smoking outcome expectancies of experienced smokers. *Psychological Assessment*, *7*(4), 484–494. https://doi.org/10.1037/1040-3590.7.4.484

Escrivá-Martínez, T., Galiana, L., Rodríguez-Arias, M., & Baños, R. M. (2019). The Binge Eating Scale: Structural equation competitive models, invariance measurement between sexes, and relationships with food addiction, impulsivity, binge drinking, and body mass index. *Frontiers in Psychology*, *10*, Article 530. https://doi.org/10.3389/FPSYG.2019.00530

Fahey, M. C., Little, M. A., Klesges, R. C., Talcott, G. W., Richey, P. A., Mehmet, K., & Krukowski, R. A. (2021). Use of Tobacco for weight control across products among young adults in the U.S. Military. *Substance Use & Misuse*, *56*(1), 153–161. https://doi.org/10.1080/10826084.2020.1846196

Farris, S. G., DiBello, A. M., Bloom, E. L., & Abrantes, A. M. (2018). A Confirmatory factor analysis of the Smoking and Weight Eating Episodes Test (SWEET). *International Journal of Behavioral Medicine*, *25*(4), 465–472. https://doi.org/10.1007/S12529-018-9717-0

Hajjar, S. T. (2018). Statistical analysis: Internal-consistency reliability and construct validity. *European Centre for Research Training and Development UK*, *6*(1), 27–38.

Heggen, E., Svendsen, M., & Tonstad, S. (2017). Smoking cessation improves cardiometabolic risk in overweight and obese subjects treated with varenicline and dietary counseling. *Nutrition, Metabolism, and Cardiovascular diseases*, *27*(4), 335–341. https://doi.org/10.1016/j.numecd.2016.12.011

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hurt, R. T., Croghan, I. T., Schroeder, D. R., Choi, D. S., Fischer, K., Fokken, S., & Ebbert, J. O. (2022). Varenicline and Lorcaserin for Smoking Cessation and Weight Gain Prevention: A Randomized Clinical Trial. Mayo Clinic proceedings. Innovations, quality & outcomes, 6(5), 465–474. https://doi.org/10.1016/j.mayocpiqo.2022.01.004

International Test Commission. (2017). The ITC guidelines for translating and adapting tests (Second edition). *International Journal of Testing*, *17*(2), 89–107. https://doi.org/10.1080/15305058.2017.1398166

Kwak, S. G., & Park, S.-H. (2019). Normality test in clinical research. *Journal of the Korean Association of Oral and Maxillofacial Surgeons, 45*, 123–125. https://doi.org/10.5125/jkaoms.2019.45.3.123

Kilmurray, C., Vander Weg, M., Wilson, N., Relyea, G., McClanahan, B., Stockton, M. B., & Ward, K. D. (2023). Determinants of smoking related weight-concern in smokers participating in a community-based cessation program. *Eating Behaviors*, *51*, Article 101809. https://doi.org/10.1016/J.EATBEH.2023.101809

Kline, R. B. (2023). *Principles and practice of structural equation modeling.* Guilford publications.

Krotter, A., García-Fernández, G., García-Pérez, Á., Aonso-Diego, G., & Weidberg, S. (2024). Contingency management for smoking cessation for individuals with

overweight or obesity: A randomized controlled trial. *Drug and Alcohol Dependence*, *258*, Article 111269. https://doi.org/10.1016/j.drugalcdep.2024.111269

Levine, M. D., Bush, T., Magnusson, B., Cheng, Y., & Chen, X. (2013). Smoking-related weight concerns and obesity: Differences among normal weight, overweight, and obese smokers using a telephone tobacco quitline. *Nicotine & Tobacco Research*, *15*(6), 1136–1140. https://doi.org/10.1093/NTR/NTS226

López-Núñez, C., Ruiz, M. J., Domínguez-Salas, S., & Fernández-Artamendi, S. (2023). Psychometric properties and factor structure of the brief Wisconsin Inventory of Smoking Dependence Motives among Spanish smokers from the general population. *Addictive Behaviors, 147*, Article 107833. https://doi.org/10.1016/j.addbeh.2023.107833

Lycett, D., Munafò, M., Johnstone, E., Murphy, M., & Aveyard, P. (2011). Associations between weight change over 8 years and baseline body mass index in a cohort of continuing and quitting smokers. *Addiction (Abingdon, England)*, *106*(1), 188–196. https://doi.org/10.1111/J.1360-0443.2010.03136.X

Marqueta, A., Nerín, I., Gargallo, P., & Beamonte, A. (2016). Gender differences in success at quitting smoking: Short- and long-term outcomes. *Adicciones, 29*(1), 13–21. https://doi.org/10.20882/adicciones.826

Mason, T. B., Tackett, A. P., Smith, C. E., & Leventhal, A. M. (2022). Tobacco product use for weight control as an eating disorder behavior: Recommendations for future clinical and public health research. *The International Journal of Eating Disorders*, *55*(3), 313–317. https://doi.org/10.1002/EAT.23651

Molina, L., Sarmiento, M., Peñafiel, J., Donaire, D., Garcia-Aymerich, J., Gomez, M., Ble, M., Ruiz, S., Frances, A., Schröder, H., Marrugat, J., & Elosua, R. (2017). Validation of the Regicor Short Physical Activity Questionnaire for the adult population. *PloS One*, *12*(1), Article e0168148. https://doi.org/10.1371/JOURNAL.PONE.0168148

Muñiz, J., Elosua, P., & Hambleton, R. K. (2013). Directrices para la traducción y adaptación de los tests: Segunda edición. *Psicothema*, *25*(2), 151–157. https://doi.org/10.7334/psicothema2013.24

Nunnally, J. C. (1978). *Pyschometric Theory*. McGraw-Hill.

Pomerleau, C. S., & Snedecor, S. M. (2008). Validity and reliability of the Weight Control Smoking Scale. *Eating Behaviors*, *9*(3), 376–380. https://doi.org/10.1016/j.eatbeh.2007.12.001

Perkins, K. A., Marcus, M. D., Levine, M. D., D'Amico, D., Miller, A., Broge, M., Ashcom, J., & Shiffman, S. (2001). Cognitive–behavioral therapy to reduce weight concerns improves smoking cessation outcome in weight-concerned women. *Journal of Consulting and Clinical Psychology*, *69*(4), 604–613. https://doi.org/10.1037/0022-006X.69.4.604

Rash, C., & Copeland, A. (2008). The Brief Smoking Consequences Questionnaire-Adult (BSCQ-A): Development of a short form of the SCQ-A. *Nicotine & Tobacco Research, 10*(11), 1633–1643. https://doi.org/10.1080/14622200802409990

Rhemtulla, M., Brosseau-Liard, P. É., & Savalei, V. (2012). When can categorical variables be treated as continuous? A comparison of robust continuous and categorical SEM estimation methods under suboptimal conditions. *Psychological Methods*, *17*(3), 354-373. https://doi.org/10.1037/a0029315

Robinson, J. D., Li, L., Chen, M., Lerman, C., Tyndale, R. F., Schnoll, R. A., Hawk, L. W., George, T. P., Benowitz, N. L., & Cinciripini, P. M. (2019). Evaluating the temporal relationships between withdrawal symptoms and smoking relapse. *Psychology of Addictive Behaviors*, *33*(2), 105–116. https://doi.org/10.1037/adb0000434

Savalei, V., & Rosseel, Y. (2022). Computational options for standard errors and test statistics with incomplete normal and nonnormal data in SEM. *Structural Equation Modeling: A Multidisciplinary Journal*, *29*(2), 163–181. https://doi.org/10.1080/10705511.2021.1877548

Siñol, N., Martínez-Sánchez, E., Guillamó, E., Campins, M. J., Larger, F., & Trujols, J. (2013). Efectividad del ejercicio físico como intervención coadyuvante en las adicciones: una revisión [Effectiveness of exercise as a complementary intervention in addictions: a review]. *Adicciones, 25*(1), 71–85.

Smith, S. S., Piper, M. E., Bolt, D. M., Fiore, M. C., Wetter, D. W., Cinciripini, P. M., & Baker, T. B. (2010). Development of the Brief Wisconsin Inventory of Smoking Dependence Motives. *Nicotine & Tobacco Research*, *12*(5), 489–499. https://doi.org/10.1093/ntr/ntq032

Tuovinen, E. L., Saarni, S. E., Kinnunen, T. H., Ollila, H., Ruokolainen, O., Patja, K., Männistö, S., Jousilahti, P., Kaprio, J., & Korhonen, T. (2018). Weight concerns as a predictor of smoking cessation according to nicotine dependence: A population-based study. *Nordic Studies on Alcohol and Drugs, 35*(5), 344–356. https://doi.org/10.1177/1455072518800217

Vasileiou, V., & Abbott, S. (2023). Emotional eating among adults with healthy weight, overweight and obesity: A systematic review and meta-analysis. *Journal of Human Nutrition and Dietetics*, *36*(5), 1922–1930. https://doi.org/10.1111/JHN.13176

Wee, C. C., Rigotti, N. A., Davis, R. B., & Phillips, R. S. (2001). Relationship between smoking and weight control efforts among adults in the United States. *Archives of Internal Medicine*, *161*(4), 546–550. https://doi.org/10.1001/archinte.161.4.546

Weekley, C. K., Klesges, R. C., & Reylea, G. (1992). Smoking as a weight-control strategy and its relationship to

smoking status. *Addictive Behaviors*, *17*(3), 259–271. https://doi.org/10.1016/0306-4603(92)90031-P

Weinberger, N.-A., Kersting, A., Riedel-Heller, S. G., & Luck-Sikorski, C. (2016). Body dissatisfaction in individuals with obesity compared to normal-weight individuals: A systematic review and meta-analysis. *Obesity Facts*, *9*(6), 424–441. https://doi.org/10.1159/000454837

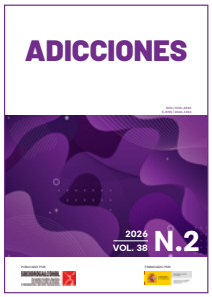
White, M. A. (2012). Smoking for weight control and its associations with eating disorder symptomatology. *Comprehensive Psychiatry*, *53*(4), 403–407. https://doi.org/10.1016/j.comppsych.2011.05.007

Wolf, E. J., Harrington, K. M., Clark, S. L., & Miller, M. W. (2013). Sample size requirements for structural equation models. *Educational and Psychological Measurement*, *73*(6), 913–934. https://doi.org/10.1177/0013164413495237

Yong, H.-H., & Borland, R. (2008). Functional beliefs about smoking and quitting activity among adult smokers in four countries: Findings from the International Tobacco Control Four-Country Survey. *Health Psychology*, *27*(3S), S216–S223. https://doi.org/10.1037/0278-6133.27.3(Suppl.).S216

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ORIGINAL

Pharmacological interventions for smoking cessation in patients with bipolar disorder

Intervenciones farmacológicas en cesación tabáquica en pacientes con trastorno bipolar

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Abstract

Background: Bipolar disorder (BD) is a chronic mental illness associated with increased premature mortality. Tobacco use is highly prevalent in BD and contributes substantially to physical morbidity. *Objective:* To critically appraise the evidence on pharmacological interventions for smoking cessation in patients with BD. *Methods:* A structured narrative review was conducted in PubMed, The Cochrane Library, and Web of Science, including studies published between January 1985 and March 2025. Original studies evaluating pharmacological smoking cessation treatments in patients diagnosed with BD according to DSM or ICD criteria were included. Due to clinical and methodological heterogeneity, no meta-analysis was performed. *Results:* Fifteen studies were included. Most trials evaluated patients with BD within broader psychiatric cohorts. Varenicline showed higher abstinence rates than placebo, with odds ratios ranging approximately from 3.0 to 8.1 in randomized trials, and was superior to bupropion and nicotine replacement therapy (NRT) in several large studies. Bupropion and NRT were generally more effective than placebo, although results were less consistent. Treatments were generally well tolerated, without increased severe neuropsychiatric adverse events. *Conclusions:* Pharmacological interventions, particularly varenicline, appear effective and generally safe for smoking cessation in BD, especially when combined with behavioral support. Evidence remains heterogeneous, highlighting the need for BD-specific trials.

Keywords: bipolar disorder, smoking cessation, pharmacological treatment, varenicline, nicotine replacement therapy

Resumen

Introducción: El trastorno bipolar (TB) es una enfermedad mental crónica asociada a un mayor riesgo de mortalidad prematura. El consumo de tabaco es altamente prevalente en esta población y contribuye de forma relevante a la morbimortalidad física. *Objetivo:* Analizar críticamente la evidencia disponible sobre las intervenciones farmacológicas para el abandono del tabaco en pacientes con TB. *Métodos:* Se realizó una revisión narrativa estructurada en PubMed, The Cochrane Library y Web of Science, incluyendo estudios publicados entre enero de 1985 y marzo de 2025. Se incluyeron estudios originales que evaluaban tratamientos farmacológicos para la cesación tabáquica en pacientes con TB diagnosticado según criterios DSM o CIE. Debido a la heterogeneidad clínica y metodológica, no se realizó metaanálisis. *Resultados:* Se incluyeron 15 estudios. La mayoría evaluaron pacientes con TB dentro de cohortes psiquiátricas más amplias. La vareniclina mostró mayores tasas de abstinencia que el placebo, con odds ratios aproximadas entre 3,0 y 8,1, y fue superior al bupropión y a la terapia sustitutiva con nicotina (TSN) en varios estudios de gran tamaño. El bupropión y la TSN fueron generalmente más eficaces que el placebo, aunque con resultados menos consistentes. Los tratamientos fueron, en general, bien tolerados, sin aumento de eventos adversos neuropsiquiátricos graves. *Conclusiones:* Las intervenciones farmacológicas, especialmente la vareniclina, parecen efectivas y generalmente seguras para el abandono del tabaco en pacientes con TB. No obstante, la evidencia es heterogénea, lo que subraya la necesidad de estudios específicos en esta población.

Palabras clave: trastorno bipolar, abandono del tabaco, tratamiento farmacológico, vareniclina, terapia sustitutiva con nicotina

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Bipolar disorder (BD) is a severe, chronic, and recurrent mental illness characterized by alternating depressive and manic or hypomanic episodes, frequently interspersed with periods of euthymia (American Psychiatric Association, 2022). The lifetime prevalence of bipolar spectrum disorders has been estimated at approximately 2–3% worldwide (Merikangas et al., 2011). Beyond its psychiatric burden, BD is associated with a markedly increased risk of premature mortality compared with the general population, largely driven by physical comorbidities rather than suicide alone (Leverich et al., 2003; Sylvia et al., 2015).

Respiratory diseases, particularly chronic obstructive pulmonary disease (COPD) and pneumonia, represent a major cause of excess mortality in individuals with BD, along with cardiovascular disease and cancer (Callaghan et al., 2014; Su et al., 2017). Tobacco smoking is the principal modifiable risk factor underlying these conditions and remains highly prevalent in patients with BD. Epidemiological studies estimate smoking rates between 30% and 70% in BD, substantially exceeding those observed in the general population (Heffner et al., 2011). Moreover, lifetime exposure to tobacco among individuals with BD has been reported to approach 80%, reflecting both higher initiation rates and lower cessation success (Heffner et al., 2011).

The relationship between tobacco use and BD appears to be bidirectional. On the one hand, individuals with BD are more likely to develop nicotine dependence; on the other, smoking has been associated with greater illness severity, including more frequent mood episodes, rapid cycling, and increased suicidal behavior (Diaz et al., 2009; García-Jiménez et al., 2023; Martínez-Ortega et al., 2013). Shared vulnerability factors have been proposed, including genetic susceptibility, environmental influences, and neurobiological mechanisms involving reward processing and dopaminergic dysregulation (McClave et al., 2010).

Smoking cessation in BD poses particular clinical challenges. Compared with the general population, individuals with BD show lower quit rates and higher relapse risk, potentially influenced by depressive symptoms, impulsivity, cognitive dysfunction, and concerns regarding mood destabilization during abstinence (Heffner et al., 2011). These difficulties are further compounded by pharmacokinetic interactions between tobacco smoke and psychotropic medications, as well as by comorbid substance use disorders (Qiu et al., 2024).

Although robust evidence exists supporting pharmacological smoking cessation treatments in the general population and in psychiatric cohorts more broadly, the evidence specifically focused on bipolar disorder remains fragmented. Many clinical trials include BD patients within heterogeneous samples of severe mental illness or mood disorders, and findings are often derived from subgroup or post hoc analyses. Consequently, clinicians face uncertainty when extrapolating results to patients with BD in routine practice.

The aim of this study is to provide a structured narrative review of the available literature on pharmacological interventions for smoking cessation in patients with BD, critically appraising their effectiveness, tolerability, and clinical applicability, with the goal of informing evidence-based decision-making in this high-risk population.

Methods

A structured narrative review of the literature was conducted using PubMed, The Cochrane Library, and Web of Science databases, identifying relevant articles published from January 1983 up to March 2025. Although the review followed a predefined search strategy with explicit inclusion and exclusion criteria and a structured study selection process, it was conceived as a narrative review, as no quantitative synthesis or formal meta-analysis was planned due to marked clinical and methodological heterogeneity across studies.

The search was performed using combinations of MeSH terms and free-text keywords related to BD and smoking cessation, including: 'bipolar disorder,' 'smoking cessation,' 'pharmacological treatment,' 'varenicline,' 'bupropion,' and 'nicotine replacement therapy.' Overlapping terms referring to tobacco use were not used simultaneously to avoid redundancy.

Studies were considered eligible if they met the following criteria: (1) original research articles published between January 1985 and March 2025; (2) peer-reviewed journals; (3) written in English or Spanish; (4) evaluation of pharmacological interventions for smoking cessation; (5) inclusion of patients diagnosed with BD according to Diagnostic and Statistical Manual of Mental Disorders (DSM) or International Classification of Diseases (ICD) criteria (any version); (6) reporting outcomes related to smoking cessation efficacy, including measures of association and confidence intervals when available.

Exclusion criteria were: (1) studies in which BD data were not analyzed separately from other diagnostic groups; (2) non-pharmacological interventions as the primary treatment; (3) reviews, meta-analyses, case reports, opinion articles, protocols, or editorials; (4) studies published in languages other than English or Spanish.

Two reviewers independently screened titles, abstracts, and full texts (JCT and MDR). Discrepancies were resolved by consensus, with the involvement of a third reviewer when necessary (PGD). Data extracted included author, year of publication, country, study design, sample size, diagnostic composition, pharmacological intervention and dosage, follow-up duration, smoking cessation outcomes, and reported adverse effects.

Given the narrative nature of the review and the heterogeneity of study designs, a formal standardized risk-of-bias tool (e.g., Cochrane RoB or ROBINS-I) was not applied. Instead, an overall qualitative appraisal of methodological quality was performed, considering key aspects such as study design (randomized vs. non-randomized), sample size, diagnostic specificity for BD, method of smoking abstinence verification, duration of follow-up, and reporting of adverse events.

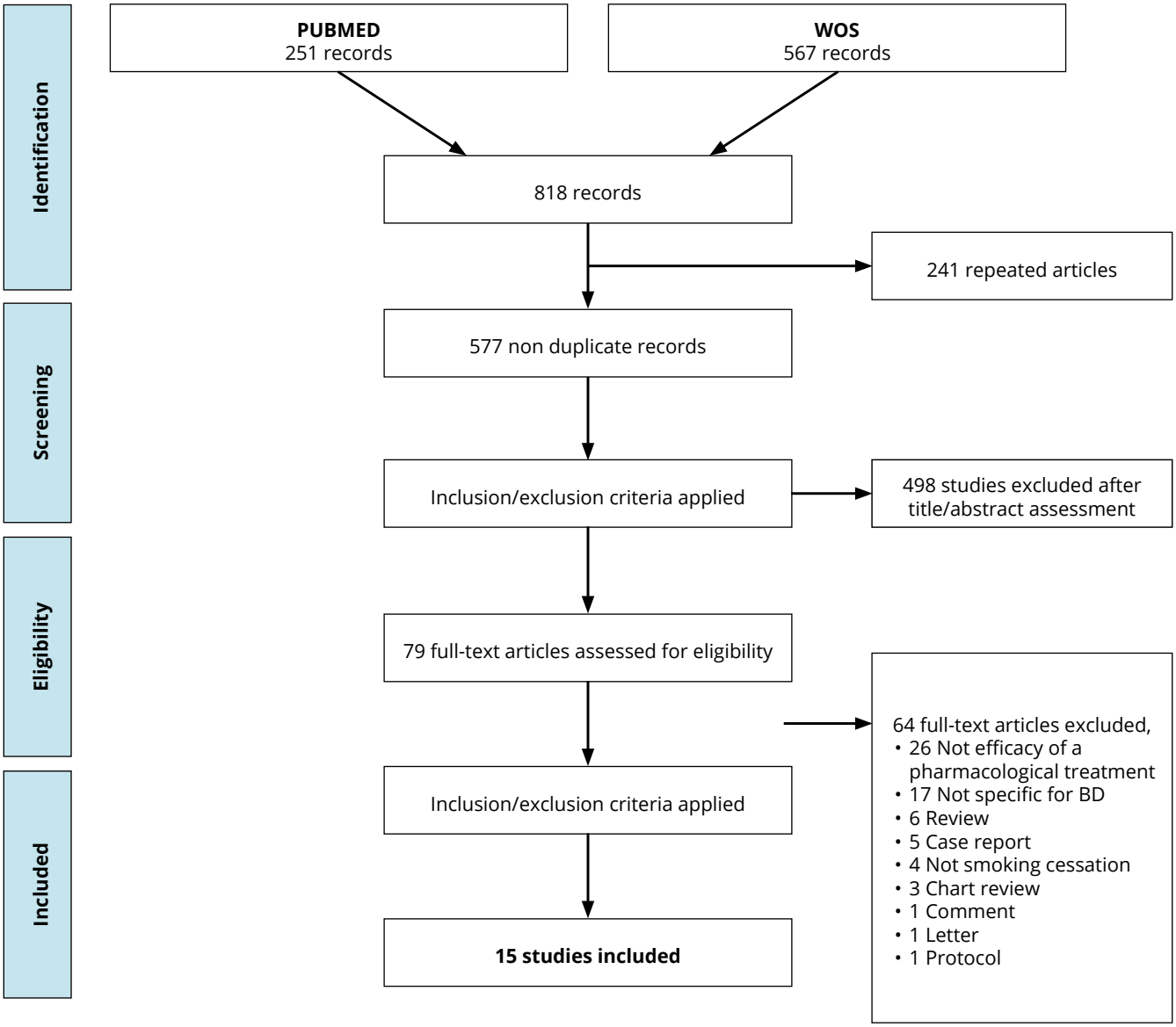
Overall, the quality of evidence ranged from moderate in large randomized controlled trials and post hoc analyses of multicenter studies to low in small pilot trials and open-label studies, which limits the comparability of findings across studies.

Results

Study selection

Figure 1 shows the flow chart of the literature search. Initial search showed 818 records (251 from PubMed database, 567 from Web of Science database). No additional records were identified through The Cochrane Library. From these, 241 were repeated articles, keeping 577 non duplicate records for the screening. After applying the inclusion and exclusion criteria after title and abstract assessment, 498 articles were excluded. 79 full-text were assessed for eligibility, excluding 64 from these. Finally, 15 records were included in the review.

Figure 1
Flow diagram of study selection for the structured narrative review



Characteristics of the studies:

Their characteristics and main findings are presented in *Table 1* (Anthenelli et al., 2016, 2023; Brunette et al., 2018; Chengappa et al., 2014; Daumit et al., 2023; Evins et al., 2014, 2019; Fouz Rosón et al., 2017; Garcia-Portilla et al., 2016; Gilbody et al., 2019; Heffner et al., 2019; Hickman et al., 2015; Prochaska et al., 2014; Weinberger et al., 2008).

Table 1
Published studies about pharmacological smoking cessation treatments in BD patients

Author, year and country	Participants	Design and follow-up	Assessment	Pharmacological Smoking cessation treatment	Other Smoking cessation treatment	Main findings
Anthenelli *et al*. 2016 USA	N = 8144 Psychiatric cohort (n=4116) MDD and BD (n=2882) AD (n=782) SSD (n=386) BPD (n=24) Non-psychiatric cohort (n= 4028)	Multi center, randomized, double-blind, triple-dummy, placebo-controlled and active-controlled trial 12 weeks follow-up	**BD diagnosis:** SCID-I (DSM-IV-TR) **Abstinence:** Self-reported and CO level ≤10 ppm	Varenicline (n=731) 1 mg twice daily Bupropion (n=716) 150 mg twice daily NRT (n=722) 21 mg daily with taper	Quitline counseling (all participants, each visit)	- Higher abstinence rates with varenicline vs: Placebo (OR 3.61, 95% CI 3.07 to 4.24); Nicotine patch (OR 1.68, 95% CI 1.46 to 1.93); and Bupropion (OR 1.75, 95% CI 1.52 to 2.01) - Higher abstinence rates with bupropion vs placebo (OR 2.07, 95% CI 1.75 to 2.45) - Higher abstinence rates with nicotine patch vs placebo (OR 2.15, 95% CI 1.82 to 2.54)
Anthenelli *et al*. 2023 USA	N = 28 BD (n=15) SSD (n= 13)	Randomized, double-blind, placebo-controlled clinical trial 12 weeks follow-up	**BD diagnosis:** MINI (DSM-V) **Abstinence:** CO level ≤4 ppm and Urine cotinine (-)	Varenicline Low dose (0.5 mg twice daily) Standard dose (1 mg twice daily)	ACT (all participant, up to 10 sessions)	Higher abstinence rates in BD participants (37.5%) than SSD participants (16.7%) for standard dose
Brunette *et al.* 2018 USA	N= 661* AD/Other (n= 205) MDD (n= 158) BD (n=150) SSD (n=148) *n=231 participants discontinued	Randomized, clinical trial 1 year follow-up	**BD diagnosis:** DSM-IV-TR **Abstinence:** CO level ≤ 4 ppm and Urine cotinine <10 ng/ml	Varenicline/ Bupropion NRT (doses not reported)	CBT Quitline counseling	- There was no significant effect of intervention (medication only, medication + Quitline counseling, and medication + CBT) - Higher abstinent for who received monetary incentives (AOR=1.77, p=.009) - No differences between diagnostic groups
Chengappa *et al*. 2014 USA	N= 60 euthymic BD participants	Randomized, double-blind, placebo-controlled clinical trial 3 months follow-up + 3 (extra) months	**BD diagnosis:** DSM-IV **Abstinence:** Self-reported and CO level ≤10 ppm	Varenicline (1 mg twice daily)	Quitline counselling (all participants)	- Higher abstinence with varenicline vs placebo (OR= 8.1; 95% CI, 2.0-32.5; p<.002) - At 6 months, varenicline-treated subjects remained more abstinent compared to placebo
Daumit *et al*. 2023 USA	N= 192 SSD (n=82) BD (n=62) MDD (n= 48)	Randomized, double-blind, clinical trial (intervention Vs control groups) 18 months follow-up	**BD diagnosis:** BPRS **Abstinence:** Self-reported (FTCD) CO level Urine cotinine	Intervention group: Varenicline (+/- NRT) or Bupropion + NRT	Motivational interview (all participants) Quitline counselling (all participants) Group exercise class, 50 minutes, 2-3 x/week (all participants)	- 62% reported interest in quitting immediately (within 1 month) - At 18 months, 26.4% of participants in the intervention group and 5.7% of participants in the control group achieved abstinence (AOR 5.9; 95% CI, 2.3-15.4; p < .001). - No differences at weight gain between groups
Evins *et al*. 2014 USA	N = 203 SSD (n=185) BD (n=18)	Randomized, double-blind, placebo-controlled, parallel-group, relapse-prevention clinical trial 19 months follow-up	**BD diagnosis:** BPRS YMRS MADRS **Abstinence:** Self-reported and CO level<9 ppm	Varenicline 1 mg twice daily	CBT (varenicline group)	- Weeks 12-52: abstinence rates: 60% varenicline vs 19% placebo (OR 6.2; 95%CI, 2.2-19.2; p < .001) - Weeks 12-64: abstinence rates: 45% varenicline vs 15% placebo (OR, 4.6; 95%CI, 1.5-15.7; p = .004); - Weeks 12-76: abstinence rates: 30% varenicline vs 11% placebo (OR, 3.4; 95%CI, 1.02-13.6; p = .03)

Author, year and country	Participants	Design and follow-up	Assessment	Pharmacological Smoking cessation treatment	Other Smoking cessation treatment	Main findings
Evins *et al*. 2019 USA United Kingdom	N = 4092 MDD and BD (n=2910) AD (n=792) SSD (n=390)	Randomized, double-blind, triple-dummy, placebo-controlled and active-controlled trial 12 weeks follow-up	**BD diagnosis:** SCID-I (DSM-IV-TR) **Abstinence:** Self-reported and CO level ≤10 ppm	Varenicline 1 mg twice daily Bupropion 150 mg twice a day NRT 21 mg per day with taper		- Higher abstinence rates with varenicline vs placebo (OR 4.57, 95% CI 2.59 to 8.06) - Higher abstinence rates with bupropion vs placebo (OR 2.22, 95% CI 1.21 to 4.06) - Higher abstinence rates with NRT vs placebo (OR 2.76, 95% CI 1.53 to 4.97)
Garcia-Portilla *et al*. 2016 Spain	N = 75 SSD (n=54) BD (n=21)	Multi center, non-randomized, open-label, prospective trial 12 weeks follow-up	**BD diagnosis:** DSM-IV **Abstinence:** Self-reported and CO level ≤9 ppm	Varenicline 1 mg twice daily Bupropion 150 mg twice daily NRT 21, 28 or 35 mg depending on tobacco use	Motivational therapy	- 12-week abstinence rates: 49,3% (NRT 50.0%; varenicline 48.6%) - Week 24 abstinence rates:41,3% (no treatments differences) - Week 36 abstinence rates:37,3% (no treatments differences)
Fouz Rosón *et al.* 2007 Spain	N= 109 AD, MDD, SSD, BD (not specified)	Open-label, randomized, parallel-group, controlled trial 1-year follow-up	**BD diagnosis:** Not reported **Abstinence:** Not reported	Varenicline 1 mg twice daily or 0.5 mg twice daily (both during 8 weeks)		- Better results (not significative; p=0.094) with the low dose (44.3%) vs the standard dose (37.5%) - Patients with BD or SSD had more difficulties to stop smoking - Patients with addiction to other drugs had a tendency (not significative; p=0.078) to quit smoking less than those without drug addiction (34,3% vs 48,2%)
Gilbody *et al.* 2015 USA United Kingdom	N = 97 BD (not specified) SSD (not specified)	Randomized controlled trial 12 months follow-up	**BD diagnosis:** ICD 10 **Abstinence*:** CO level < 10 ppm *Self-reported if CO level couldn´t obtained	Intervention group: A bespoke, structured, smoking cessation program (tailored assessment) that include varenicline and NRT	Free telephone Quitline (for all participants)	Higher smoking cessation ([36%] vs [23%]; adjusted OR 2.9, 95% CI 0.8–10.5) if received bespoke intervention 16% participants stopped smoking in the control group vs 26% from the intervention group (OR 2.5, 95% CI 0.8–7.7).
Gilbody *et al*. 2019 United Kingdom	N= 524 SSD (n= 343) BD (n= 115) SAD (n= 66)	Multi center randomized controlled trial 12 months follow-up	**BD diagnosis:** ICD 10 **Abstinence*:** CO level < 10 ppm *Self-reported if CO level couldn´t obtained	Intervention group: Bespoke smoking cessation intervention (behavioral support and pharmacological aids for smoking cessation*, with adaptations for people with SMI) *Include vareniciline and NRT (not dosage reported)	Usual care by NHS (all participants)	- 6 months: Higher smoking cessation rates in the intervention (14%) vs control (6%) OR 2.4, 95% CI 1.2 to 4.6; p=0.010) - 12 months: Higher smoking cessation rates in the intervention (15%) vs control (13%), but non-significantly (OR 1.6, 95% CI 0.9 to 2.9; p=0·10)
Heffner *et al*. 2019 USA United Kingdom	N = 3041* BD I/II sub cohort (n=280) (81.4% with BD I) Non-psychiatric cohort (n= 2761) *Post hoc analyses of Anthenelli *et al*, 2016 with BD	Multi center, randomized, double-blind, triple-dummy, placebo-controlled and active-controlled trial 12 weeks follow-up	**BD diagnosis:** SCID-I (DSM-IV-TR) **Abstinence:** Self-reported and CO level ≤10 ppm	Varenicline (n=75) 1 mg twice daily Bupropion (n=84) 150 mg twice daily NRT (n=64) 21 mg per day with tapering	Placebo (n=57)	- Higher abstinence rates with varenicline vs: Placebo (OR, 3.36; 95% CI: 1.68 to 6.74; P<0.001); Nicotine patch (OR, 2.45; 95% CI: 1.18 to 5.06; P=0.002); and Bupropion (OR, 1.93; 95% CI: 1.07 to 3.48; P=0.005) - OR for bupropion vs placebo: 1.29 (95% CI: 0.31 to 5.37) - OR for NRT vs placebo: 0.71 (95% CI: 0.14 to 3.74) The Non-psychiatric cohort had significantly higher abstinence rates than the BD sub cohort

Author, year and country	Participants	Design and follow-up	Assessment	Pharmacological Smoking cessation treatment	Other Smoking cessation treatment	Main findings
Hickman *et al*. 2015 USA	N = 100* MDD (n= 52) SSD (n= 29) BD (n= 15) Non diagnosis (n=4) *Extension and replication of Prochaska *et al*, 2014	Two-arms randomized clinical trial 12 months follow-up	**BD diagnosis:** DSM-IV **Abstinence:** CO level ≤10 ppm	Intervention group: Transtheoretical-model tailored, computer-assisted intervention, stage-matched manual, brief counseling, and 10-week post-hospitalization NRT	Usual care group: On-unit NRT + quit advice while hospitalized	- 3 months abstinence: intervention (12.5%) vs usual care (7.3%) - 6 months abstinence: intervention (17.5%) vs usual care (8.5%) - 12 months abstinence: intervention (26.2%) vs usual care (16.7%)
Prochaska *et al.* 2014 USA	N = 224* MDD (n= 105) BD (n= 56) SSD (n= 34) Other (n=29) *Inpatient psychiatry	Randomized controlled trial 18 months follow-up	**BD diagnosis:** DSM-IV **Abstinence*:** Collateral reports (67%) CO level ≤10 ppm (33%) *No difference by groups for type of verification	Intervention group: Transtheoretical-model tailored, computer-assisted intervention, stage-matched manual, brief counseling, and 10-week post-hospitalization NRT* *NRT were delivered in 4 and 6 weeks supplies to prevent loss or misuse	Usual care group: On-unit NRT + quit advice while hospitalized	- Higher rates of abstinence in intervention group (OR 3.15; 95% CI 1.22 to 8.14; p=.018) - 6 months abstinence: intervention (3.9%) vs usual care (3.2%) - 12 months abstinence: intervention (19.4%) vs usual care (10.9%) - 18 months abstinence: intervention (20.0%) vs usual care (7.7%) - More rehospitalization in usual care group (adjusted OR=1.92; 95% CI =1.06, 3.49).
Weinberger *et al*. 2008	N = 5 BD I	Pilot placebo-controlled trial 10 weeks follow-up	**BD diagnosis:** DSM-IV **Abstinence:** CO level <10 ppm	Bupropion (n=2) 75-300 mg daily Placebo (n=3)		- No participant receiving placebo medication quit smoking during the trial - 2 participants receiving bupropion reported smoking cessation but only one was CO-confirmed abstinent.

Note. Acceptance and Commitment Therapy (ACT); Anxiety disorder (AD); Adjusted odds ratio (AOR); Bipolar disorder (BD); Border-line personality disorder (BPD); Brief Psychiatric Rating Scale (BPRS); Cognitive behavioral therapy (CBT); Confidence interval (CI); Continuous abstinence rate (CAR); Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV); Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR); Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5); Fagerström Test for Cigarette Dependence (FTCD); Intermediate-release (IR); Major depression disorder (MDD); Milligrams (mg); Mini-International Neuropsychiatric Interview (MINI) for DSM-5; Montgomery-Asberg Depression Rating Scale (MADRS); Nicotine replacement therapy (NRT); Nonpsychiatric cohort (NPC); Odds ratio (OR); Parts per million (ppm); Severe mental illness (SMI); Sustained-release (SR); Schizoaffective disorder (SAD); Schizophrenia spectrum disorder (SSD); Structured Clinical Interviews for DSM-IV-TR Axis I (SCID-I); Transdermal nicotine patches (TNP); Transtheoretical model (TTM); United States of America (USA); Young Mania Rating Scale (YMRS).

Pharmacological interventions for smoking cessation

Globally, the findings of the studies included in this review showed that pharmacological smoking cessation treatments are effective in BD patients. According to Anthenelli et al. (2016) and Evins et al. (2019), varenicline reached higher abstinence rates than placebo (odds ratio [OR] 3.61, 95% CI 3.07 to 4.24 and 3.03, 95% CI 2.13 to 4.32, respectively), nicotine patch (odds ratio [OR] 1.68, 95% CI 1.46 to 1.93 and 1.68, 95% CI 1.23 to 2.32, respectively) and bupropion (odds ratio [OR] 1.75, 95% CI 1.52 to 2.01 and 1.59, 95% CI 1.16 to 2.18, respectively), and these two were more useful than placebo too. Similar outcomes were found by Heffner and collaborators (Heffner et al., 2019), but in this cases nicotine replacement therapy (NRT) was less effective than placebo (odds ratio [OR] 0.71, 95% CI 0.14 to 3.74). Nevertheless, García-Portilla et al. (2016) did not find significant differences between varenicline and nicotine patch (12-week 7-day smoking cessation of varenicline 48.6% vs nicotine patch 50.0%, chi-square=0.015, p=1.000). Evins et al. (2014) have found out that varenicline combined with cognitive behavioral therapy (CBT) increases abstinence rates. Besides, Gilbody et al. (2019) observed a higher efficacy in those patients who, apart from receiving the usual treatment by local National Health Service (NHS) for smoking cessation, also participated in a personalized intervention consisted of behavioural support from a mental health smoking cessation practitioner and pharmacological aids for smoking cessation, with adaptations for people with severe mental illness—such as, extended pre-quit sessions, cut down to quit, and home visits. Access to pharmacotherapy was via primary care after discussion with the smoking cessation specialist. Weinberger et al. (2008) studied the efficacy of bupropion versus placebo through 10 week trial and all the patients who received it reported efficacy in smoking cessation, although the sample was small (n=5).

Some of these papers have also researched about the possible adverse effects caused by these drugs. The most frequent adverse events found by Anthenelli et al. (2016) were nausea in the 25% of patients under varenicline, insomnia for 12% of patients under bupropion, abnormal dreams for 12% patients under nicotine patch and headache for 10% of patients under placebo. However, these adverse

effects were not significant, and the interventions were well tolerated. According to Evins et al. (2019), varenicline and bupropion were not associated with a significant increase of neuropsychiatric adverse events relative to nicotine patch or placebo in their psychiatric cohort. Female and previous substance use disorders were related with the presence of neuropsychiatric adverse events. This study shows that the most common adverse effects were insomnia and anxiety with bupropion and nicotine patch and abnormal dreams with varenicline and nicotine patch. García-Portilla et al. (2016) point that patient who used varenicline experienced nausea with more frequency and those who used nicotine patches suffered skin reactions with more frequency. Another study showed that neuropsychiatric adverse events incidence for BD smokers was: 14.7% for varenicline, 11.9% for bupropion, 6.3% for NRT and 8.8% for placebo, being sleep disorders the most common (Heffner et al., 2019). In this sense, Chengappa´s group showed that the use of hypnotic drugs was different between quitters and non-quitters (50% vs 21%). Also, Varenicline/placebo, (β = 2.23, p = 0.003) and hypnotics/no-hypnotics (β= 1.5, p = 0.032) were significant independent predictors of quit status, with the OR – (β) of 9.3 (95% CI = 2.1, 40.9) and 4.5 (95% CI = 1.1, 17.6), respectively (Forrest et al., 2015).

Discussion

This structured narrative review suggests that pharmacological interventions can facilitate smoking cessation in patients with BD, particularly when combined with structured behavioral support. Among available treatments, varenicline appears to be associated with higher abstinence rates compared with placebo and, in several studies, with bupropion and NRT (Anthenelli et al., 2016; Evins et al., 2019; Heffner et al., 2019). However, the magnitude and consistency of these effects vary across studies, requiring cautious interpretation.

A major limitation of the existing literature is that most studies were not specifically designed for BD, but rather included patients with BD as part of broader psychiatric or severe mental illness cohorts (Anthenelli et al., 2016; Gilbody et al., 2019). Consequently, much of the evidence derives from subgroup or post hoc analyses, which may be underpowered and prone to selection bias.

In addition, sample sizes varied substantially, ranging from small pilot studies with very limited numbers of BD participants (Weinberger et al., 2008) to large multicenter randomized trials (Anthenelli et al., 2016; Evins et al., 2019). This heterogeneity limits the comparability of effect sizes and precludes direct quantitative synthesis.

Although varenicline demonstrated superior efficacy in several randomized controlled trials, not all studies reported consistent results. For example, García-Portilla et al. (2016) did not observe significant differences between varenicline and nicotine patch in a pragmatic clinical trial, and a BD subgroup analysis by Heffner et al. (2019) found that NRT did not outperform placebo. These discrepancies may reflect differences in study design, diagnostic composition, baseline nicotine dependence, follow-up duration, and the intensity of accompanying behavioral interventions (Evins et al., 2014; Gilbody et al., 2015).

Several studies suggest that pharmacological treatments are more effective when integrated into structured psychosocial interventions, such as CBT, motivational interviewing, or tailored smoking cessation programs (Evins et al., 2014; Gilbody et al., 2019). This highlights the importance of understanding medication effects within a broader therapeutic context, particularly in patients with BD, who often present with complex clinical needs.

Across studies, pharmacological smoking cessation treatments were generally well tolerated in patients with BD, with no significant increase in severe neuropsychiatric adverse events compared with placebo (Anthenelli et al., 2016; Evins et al., 2019). Reported adverse effects were consistent with known safety profiles, including nausea with varenicline, insomnia with bupropion, and sleep disturbances or skin reactions with NRT (García-Portilla et al., 2016; Heffner et al., 2019). Nevertheless, potential drug interactions and individual vulnerability such as seizure risk with bupropion should be carefully considered in clinical practice (Pesola et al., 2002).

Patients with BD exhibit substantially higher smoking rates and cumulative tobacco exposure, which likely contributes to the increased prevalence of respiratory disease, including COPD, observed in this population (Callaghan et al., 2014; Jaén-Moreno et al., 2023; Laguna-Muñoz et al., 2025). Shared neurobiological mechanisms—particularly alterations in dopaminergic reward pathways and impulse control—may underlie both nicotine dependence and mood dysregulation, and merit further investigation (Heffner et al., 2011; Qiu et al., 2024).

The present review has limitations, including the absence of a formal quantitative synthesis and standardized risk-of-bias assessment. Moreover, most studies focused on clinically stable or euthymic patients, limiting generalizability to acute mood episodes. Future research should prioritize randomized controlled trials specifically designed for BD, with stratification by mood phase, longer follow-up, and systematic assessment of adverse events.

Overall, the available evidence supports the use of pharmacological smoking cessation treatments in patients with BD, particularly varenicline, when delivered as part of comprehensive and structured cessation programs. However, the heterogeneity and indirect nature of current evidence underscore the need for bipolar-specific studies to better inform clinical decision-making.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

American Psychiatric Association. (2022). *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5-TR). American Psychiatric Association Publishing. https://doi.org/10.1176/appi.books.9780890425787

Anthenelli, R. M., Benowitz, N. L., West, R., St Aubin, L., y McRae, T., Lawrence, D., Ascher J, Russ C, Krishen A. & Evins, A. E. (2016). Neuropsychiatric safety and efficacy of varenicline, bupropion, and nicotine patch in smokers with and without psychiatric disorders (EAGLES): A double-blind, randomised, placebo-controlled clinical trial. *Lancet (London, England)*, *387*, 2507–2520. https://doi.org/10.1016/S0140-6736(16)30272-0

Anthenelli, R. M., McKenna, B. S., Giannini, J., Attaluri, S. V., Rubin, M., O'Crowley, E., Miller, S. & Heffner, J. L. (2023). Combining varenicline preloading with Acceptance and Commitment Therapy (ACT) in persons with serious mental illness who smoke: The randomized ACTSLow pilot feasibility trial. *Drug and Alcohol Dependence*, *253*, 111012. https://doi.org/10.1016/j.drugalcdep.2023.111012

Brunette, M. F., Pratt, S. I., Bartels, S. J., Scherer, E. A., Sigmon, S. C., Ferron, J. C., Santos, M., Williams, G.E., Kosydar, S., Wolfe, R.S., Lotz, D. & Capuchino, K. (2018). Randomized Trial of Interventions for Smoking Cessation Among Medicaid Beneficiaries With Mental Illness. *Psychiatric Services (Washington, D.C.)*, *69*, 274–280. https://doi.org/10.1176/appi.ps.201700245

Callaghan, R. C., Veldhuizen, S., Jeysingh, T., Orlan, C., Graham, C., Kakouris, G., Remington, G. & Gatley, J. (2014). Patterns of tobacco-related mortality among individuals diagnosed with schizophrenia, bipolar disorder, or depression. *Journal of Psychiatric Research*, *48*, 102–110. https://doi.org/10.1016/j.jpsychires.2013.09.014

Chengappa, K. N. R., Perkins, K. A., Brar, J. S., Schlicht, P. J., Turkin, S. R., Hetrick, M. L., Levine, M. D. & George, T. P. (2014). Varenicline for smoking cessation in bipolar disorder: A randomized, double-blind, placebo-controlled study. *The Journal of Clinical Psychiatry*, *75*, 765–772. https://doi.org/10.4088/JCP.13m08756

Daumit, G. L., Evins, A. E., Cather, C., Dalcin, A. T., Dickerson, F. B., Miller, E. R. 3rd, Appel, L.J., Jerome, G.J., McCann, U., Ford, D.E., Charleston, J.B., Young, D.R., Gennusa, J.V. 3rd., Goldsholl, S., Cook, C., Fink, T. & Wang, N. Y. (2023). Effect of a Tobacco Cessation Intervention Incorporating Weight Management for Adults With Serious Mental Illness: A Randomized Clinical Trial. *JAMA Psychiatry*, *80*, 895–904. https://doi.org/10.1001/jamapsychiatry.2023.1691

Diaz, F. J., James, D., Botts, S., Maw, L., Susce, M. T. & de Leon, J. (2009). Tobacco smoking behaviors in bipolar disorder: A comparison of the general population, schizophrenia, and major depression. *Bipolar Disorders*, *11*, 154–165. https://doi.org/10.1111/j.1399-5618.2009.00664.x

Evins, A. E., Benowitz, N. L., West, R., Russ, C., McRae, T., Lawrence, D., Krishen, A., St Aubin, L., Maravic, M. C. & Anthenelli, R. M. (2019). Neuropsychiatric Safety and Efficacy of Varenicline, Bupropion, and Nicotine Patch in Smokers With Psychotic, Anxiety, and Mood Disorders in the EAGLES Trial. *Journal of Clinical Psychopharmacology*, *39*, 108–116. https://doi.org/10.1097/JCP.0000000000001015

Evins, A. E., Cather, C., Pratt, S. A., Pachas, G. N., Hoeppner, S. S., Goff, D. C., Achtyes, E. D., Ayer, D. & Schoenfeld, D. A. (2014). Maintenance treatment with varenicline for smoking cessation in patients with schizophrenia and bipolar disorder: A randomized clinical trial. *JAMA*, *311*, 145–154. https://doi.org/10.1001/jama.2013.285113

Forrest, P. E., Brinson, A. J., Gannon, J. M., George, T. P., Perkins, K. A. & Chengappa, K. N. R. (2015). An association between the use of hypnotics and quit status in the treatment of nicotine dependence with varenicline in bipolar disorder. *Journal of Clinical Psychopharmacology*, *35*(2), 199–200. https://doi.org/10.1097/JCP.0000000000000272

Fouz Rosón, N., Panadero-Paz, C., Almadana-Pacheco, V., Benito-Bernáldez, C., Rodríguez-Martín, P. J. & Montemayor-Rubio, T. (2017). Influence of psychiatric disorders in patients treated with Varenicline. *European Respiratory Journal*, *50*(suppl 61), PA4478. https://doi.org/10.1183/1393003.congress-2017.PA4478

García-Jiménez, J., Gómez-Sierra, F. J., Martínez-Hortelano, A., Moreno-Merino, P., Girela-Serrano, B., Molero, P. & Gutiérrez-Rojas, L. (2023). Cigarette smoking and risk of suicide in bipolar disorder: A systematic review. *Frontiers in Psychiatry*, *14*, 1179733. https://doi.org/10.3389/fpsyt.2023.1179733

Garcia-Portilla, M. P., Garcia-Alvarez, L., Sarramea, F., Galvan, G., Diaz-Mesa, E., Bobes-Bascaran, T., Al-Halabi, S., Elizagarate, E., Iglesias, C., Saiz Martínez, P. A. & Bobes, J. (2016). It is feasible and effective to help patients with severe mental disorders to quit smoking: An ecological pragmatic clinical trial with transdermal nicotine patches and varenicline. *Schizophrenia*

Research, *176*, 272–280. https://doi.org/10.1016/j.schres.2016.05.011

Gilbody, S., Peckham, E., Bailey, D., Arundel, C., Heron, P., Crosland, S., Fairhurst, C., Hewitt, C., Li, J., Parrott, S., Bradshaw, T., Horspool, M., Hughes, E., Hughes, T., Ker, S., Leahy, M., McCloud, T., Osborn, D., Reilly, J., Steare, T., Ballantyne, E., Bidwell, P., Bonner, S., Brennan, D., Callen, T., Carey, A., Colbeck, C., Coton, D., Donaldson, E., Evans, K., Herlihy, H., Khan, W., Nyathi, L., Nyamadzawo, E., Oldknow, H., Phiri, P., Rathod, S., Rea, J., Romain-Hooper, C. B., Smith, K., Stribling, A. & Vickers, C. (2019). Smoking cessation for people with severe mental illness (SCIMITAR+): A pragmatic randomised controlled trial. *The Lancet. Psychiatry*, *6*, 379–390. https://doi.org/10.1016/S2215-0366(19)30047-1

Gilbody, S., Peckham, E., Man, M. S., Mitchell, N., Li, J., Becque, T., Hewitt, C., Knowles, S., Bradshaw, T., Planner, C., Parrott, S., Michie, S. & Shepherd, C. (2015). Bespoke smoking cessation for people with severe mental ill health (SCIMITAR): A pilot randomised controlled trial. *The Lancet. Psychiatry*, *2*, 395–402. https://doi.org/10.1016/S2215-0366(15)00091-7

Heffner, J. L., Evins, A. E., Russ, C., Lawrence, D., Ayers, C. R., McRae, T., Aubin, L. S., Krishen, A., West, R. & Anthenelli, R. M. (2019). Safety and efficacy of first-line smoking cessation pharmacotherapies in bipolar disorders: Subgroup analysis of a randomized clinical trial. *Journal of Affective Disorders*, *256*, 267–277. https://doi.org/10.1016/j.jad.2019.06.008

Heffner, J. L., Strawn, J. R., DelBello, M. P., Strakowski, S. M. & Anthenelli, R. M. (2011). The co-occurrence of cigarette smoking and bipolar disorder: Phenomenology and treatment considerations. *Bipolar Disorders*, *13*, 439–453. https://doi.org/10.1111/j.1399-5618.2011.00943.x

Hickman, N. J., Delucchi, K. L. & Prochaska, J. J. (2015). Treating Tobacco Dependence at the Intersection of Diversity, Poverty, and Mental Illness: A Randomized Feasibility and Replication Trial. *Nicotine & Tobacco Research*, *17*, 1012–1021. https://doi.org/10.1093/ntr/ntv034

Jaén-Moreno, M. J., Rico-Villademoros, F., Ruiz-Rull, C., Laguna-Muñoz, D., Del Pozo, G. I. & Sarramea, F. (2023). A Systematic Review on the Association between Schizophrenia and Bipolar Disorder with Chronic Obstructive Pulmonary Disease. *COPD*, *20*, 31–43. https://doi.org/10.1080/15412555.2022.2154646

Laguna-Muñoz, D., Jiménez-Peinado, A., Jaén-Moreno, M. J., Camacho-Rodríguez, C., Del Pozo, G. I., Vieta, E., Caballero-Villarraso, J., Khan, M. I., Rico-Villademoros, F. & Sarramea, F. (2025). Respiratory disease in people with bipolar disorder: A systematic review and meta-analysis. Molecular Psychiatry, *30*, 777–785. https://doi.org/10.1038/s41380-024-02793-1

Leverich, G. S., Altshuler, L. L., Frye, M. A., Suppes, T., Keck, P. E., McElroy, S. L., Denicoff, K.D., Obrocea, G., Nolen, W. A., Kupka, R., Walden, J., Grunze, H., Perez, S., Luckenbaugh, D. A. & Post, R. M. (2003). Factors associated with suicide attempts in 648 patients with bipolar disorder in the Stanley Foundation Bipolar Network. *The Journal of Clinical Psychiatry*, *64*, 506–515. https://doi.org/10.4088/jcp.v64n0503

Martínez-Ortega, J. M., Goldstein, B. I., Gutiérrez-Rojas, L., Sala, R., Wang, S. & Blanco, C. (2013). Temporal sequencing of nicotine dependence and bipolar disorder in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Journal of Psychiatric Research*, *47*, 858–864. https://doi.org/10.1016/j.jpsychires.2013.03.012

McClave, A. K., McKnight-Eily, L. R., Davis, S. P. & Dube, S. R. (2010). Smoking characteristics of adults with selected lifetime mental illnesses: Results from the 2007 National Health Interview Study. *American Journal of Public Health*, *100*, 2464–2472. https://doi.org/10.2105/AJPH.2009.188136

Merikangas, K. R., Jin, R., He, J.-P., Kessler, R. C., Lee, S., Sampson, N. A., Viana, M. C., Andrade, L. H., Hu, C., Karam, E. G., Ladea, M., Medina-Mora, M. E., Ono, Y., Posada-Villa, J., Sagar, R., Wells, J. E. & Zarkov, Z. (2011). Prevalence and Correlates of Bipolar Spectrum Disorder in the World Mental Health Survey Initiative. *Archives of General Psychiatry*, *68*, 241–251. https://doi.org/10.1001/archgenpsychiatry.2011.12

Pesola, G. R. & Avasarala, J. (2002). Bupropion seizure proportion among new-onset generalized seizures and drug related seizures presenting to an emergency department. *The Journal of emergency medicine*, *22*(3), 235–239. https://doi.org/10.1016/s0736-4679(01)00474-7

Prochaska, J. J., Hall, S. E., Delucchi, K. & Hall, S. M. (2014). Efficacy of Initiating Tobacco Dependence Treatment in Inpatient Psychiatry: A Randomized Controlled Trial. *American Journal of Public Health*, *104*, 1557–1565. https://doi.org/10.2105/AJPH.2013.301403

Qiu, L., Liang, C., Kochunov, P., Hutchison, K. E., Sui, J., Jiang, R., Zhi D, Vergara, V. M., Yang, X., Zhang, D., Fu, Z., Bustillo, J. R., Qi, S. & Calhoun, V. D. (2024). Associations of alcohol and tobacco use with psychotic, depressive and developmental disorders revealed via multimodal neuroimaging. *Translational Psychiatry*, *14*, 326. https://doi.org/10.1038/s41398-024-03035-2

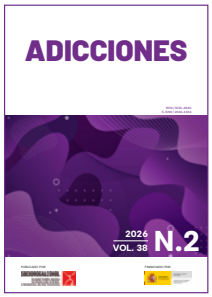
Su, V. Y., Hu, L. Y., Yeh, C. M., Chiang, H. L., Shen, C. C., Chou, K. T., Chen, T. J., Lu, T., Tzeng, C. H. & Liu, C. J. (2017). Chronic obstructive pulmonary disease associated with increased risk of bipolar disorder. *Chronic Respiratory Disease*, *14*, 151–160. https://doi.org/10.1177/1479972316680846

Sylvia, L. G., Shelton, R. C., Kemp, D. E., Bernstein, E. E., Friedman, E. S., Brody, B. D., McElroy, S. L., Singh, V., Tohen, M., Bowden, C. L., Ketter, T. A., Deckersbach, T., Thase, M. E., Reilly-Harrington, N. A., Nierenberg, A. A., Rabideau, D. J., Kinrys, G., Kocsis, J. H., Bobo, W. V., Kamali, M., McInnis, M. G. & Calabrese, J. R. (2015). Medical burden in bipolar disorder: Findings from the Clinical and Health Outcomes Initiative in Comparative Effectiveness for Bipolar Disorder study (Bipolar CHOICE). *Bipolar Disorders*, *17*, 212–223. https://doi.org/10.1111/bdi.12243

Weinberger, A. H., Vessicchio, J. C., Sacco, K. A., Creeden, C. L., Chengappa, K. N. R. & George, T. P. (2008). A preliminary study of sustained-release bupropion for smoking cessation in bipolar disorder. *Journal of Clinical Psychopharmacology*, *28*, 584–587. https://doi.org/10.1097/JCP.0b013e318184ba3c

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ORIGINAL

A multidimensional measure of social networking addiction: Psychometric properties of AdiTec-I scores in Spanish-speaking adolescents and young adults

Una medida multidimensional de la adicción a las redes sociales: Propiedades psicométricas de las puntuaciones del AdiTec-I en adolescentes y adultos jóvenes hispanohablantes

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Abstract

Social networking addiction (SNA) is not formally recognized as a disorder in current diagnostic systems, although research has mainly approached it from an addiction-based perspective. Most available instruments provide predominantly unidimensional scores, which may limit the characterization of symptom heterogeneity. The AdiTec-I was developed as a multidimensional instrument adapted from DSM-IV-TR substance abuse and dependence criteria to assess SNA. This study examined evidence of validity based on the internal structure of AdiTec-I scores, reliability estimates, convergent and discriminant evidence, and measurement invariance across gender and cultural background in Spanish-speaking adolescents and young adults.

The final sample comprised 3,817 participants aged 14–22 years (M = 15.94, SD = 1.44) from educational institutions in Spain and Latin America. A competitive confirmatory factor analysis showed that the hierarchical second-order model, comprising Abuse, Abstinence, Lack of Control, and Escape, provided adequate fit and was retained over the alternative models (CFI = .935, RMSEA = .066, SRMR = .046). Reliability estimates were adequate across all domains, and convergent and discriminant evidence supported score interpretation. Metric invariance supported comparable interpretation of the latent structure across gender and cultural background, whereas scalar invariance was only partially supported.

These findings support the AdiTec-I as a psychometrically sound multidimensional instrument for assessing SNA in Spanish-speaking adolescents and young adults. Its hierarchical structure supports both overall severity assessment and profile-based interpretation of domain scores, with potential usefulness in preventive and clinical settings. Future research should strengthen the Escape domain, extend cross-group evidence, and examine temporal stability, external criteria, and the practical utility of interpretive thresholds.

Keywords: social networking addiction, adolescents, psychometric properties, confirmatory factor analysis, measurement invariance

Resumen

La adicción a las redes sociales (SNA) no está reconocida formalmente como trastorno, aunque suele estudiarse desde una perspectiva adictiva. La mayoría de los instrumentos disponibles ofrecen puntuaciones unidimensionales, lo que puede limitar la caracterización de la heterogeneidad sintomática. El AdiTec-I se desarrolló como un instrumento multidimensional adaptado de criterios DSM-IV-TR para evaluar la SNA. Este estudio examinó evidencias de validez basadas en la estructura interna de sus puntuaciones, estimaciones de fiabilidad, evidencias de validez convergente y discriminante, e invarianza según género y contexto cultural en adolescentes y adultos jóvenes hispanohablantes.

La muestra final incluyó 3.817 participantes de 14 a 22 años (M = 15,94; DT = 1,44) de centros educativos de España y América Latina. Un análisis factorial confirmatorio competitivo mostró que el modelo jerárquico de segundo orden, compuesto por Abuso, Abstinencia, Falta de Control y Escape, presentó ajuste adecuado y fue retenido frente a los modelos alternativos (CFI = ,935, RMSEA = ,066, SRMR = ,046). Las estimaciones de fiabilidad fueron adecuadas y las evidencias convergente y discriminante apoyaron la interpretación de las puntuaciones. La invarianza métrica apoyó una interpretación comparable según género y contexto cultural, mientras que la escalar solo se sostuvo parcialmente.

Estos hallazgos apoyan el AdiTec-I como un instrumento multidimensional psicométricamente sólido para evaluar la SNA en adolescentes y adultos jóvenes hispanohablantes. Su estructura jerárquica permite evaluar gravedad global e interpretar perfiles sintomáticos en contextos preventivos y clínicos. Futuros estudios deberían reforzar el dominio Escape y examinar estabilidad temporal, criterios externos y utilidad aplicada de los puntos de corte interpretativos.

Palabras clave: adicción a las redes sociales, adolescentes, propiedades psicométricas, análisis factorial confirmatorio, invarianza de medida

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Social networking sites (SNS) are deeply embedded in contemporary social life. In early 2024, more than five billion active social media user identities were recorded worldwide (Kemp, 2024). Within this context, excessive SNS engagement has been associated with addiction-like symptoms and functional impairment (Kuss & Griffiths, 2011; Tsilosani et al., 2023). Social networking addiction (SNA) has been conceptualized as excessive preoccupation with SNS, persistent urges to use SNS, and continued engagement despite interference with social, academic, occupational, or psychological functioning (Andreassen & Pallesen, 2014). Adolescents and young adults constitute a particularly relevant population, especially girls and young women, given their intensive SNS use and the association between maladaptive SNS use and poorer mental health indicators (Montag et al., 2024; Shannon et al., 2022; Su et al., 2020).

At present, SNA is not formally recognized as a disorder in either the Diagnostic and Statistical Manual of Mental Disorders (5th ed., text rev.; DSM-5-TR; American Psychiatric Association [APA], 2022) or the International Classification of Diseases (11th ed.; ICD-11; World Health Organization [WHO], 2019). Early research often framed SNS-related problems within the broader umbrella of "Internet addiction", a construct that has been criticized as conceptually inadequate because it groups distinct online behaviors under an excessively broad label (Starcevic & Aboujaoude, 2017). More recent work suggests that maladaptive online behaviors are better understood as related but distinct conditions rather than as manifestations of a single undifferentiated disorder (Baggio et al., 2024; Billieux et al., 2015).

Broader formulations such as problematic SNS use have also been proposed as alternatives to addiction-based conceptualizations (Casale, 2020). However, when their boundaries with addiction-oriented constructs are not clearly specified, such formulations may contribute to conceptual heterogeneity (Das & Chaudhary, 2026; Varona et al., 2022). Despite these debates, addiction-based approaches remain highly influential in research on excessive SNS use. Within the so-called confirmatory framework, criteria and mechanisms originally developed for substance-related and behavioral addictions have been adapted to specific online behaviors (Billieux et al., 2015). This perspective has informed much of the SNA literature, particularly work drawing on Griffiths' (2005) component model of addiction, developed in analogy with DSM-IV substance-dependence criteria.

These conceptual debates have direct implications for assessment. In the absence of formal SNA diagnostic criteria, most instruments have adapted addiction-based models. Two of the most widely used measures are the Bergen Social Media Addiction Scale (BSMAS; Andreassen et al., 2016), based on the component model of addiction (Griffiths, 2005), and the Social Media Disorder Scale (SMD Scale; van den Eijnden et al., 2016), derived from the DSM-5 Internet Gaming Disorder criteria (APA, 2013). Both primarily yield a single global severity score and have shown robust psychometric performance across different contexts. For example, the SMD Scale has shown cross-national validity in adolescents from 44 countries, whereas the BSMAS has shown evidence of validity across multiple national contexts, together with evidence of cross-cultural and gender invariance (Boer et al., 2022; Brailovskaia & Margraf, 2024; Leung et al., 2020; Yue et al., 2022).

However, recent work has also highlighted limitations of predominantly unidimensional approaches. In particular, scales derived from classic addiction-component models may blur potentially central and peripheral symptoms when applied to SNA, which may in turn inflate the risk of overpathologizing high but nonimpairing engagement (Cataldo et al., 2022; Fournier et al., 2023). This concern is especially relevant when the aim is not only to screen for severity but also to characterize the internal organization of the construct. A multidimensional approach may therefore be better suited to differentiate symptom domains and capture heterogeneity in the expression of SNA (Billieux et al., 2015; Griffiths, 2005).

Evidence from Spanish-speaking contexts is consistent with this multidimensional perspective. For example, in Spain, the Social Network Addiction Scale (SNAddS-6S) supported a multidimensional structure based on addiction components and organized under a higher-order solution (Cuadrado et al., 2020). Likewise, the Adicción a Redes Sociales scale (ARS), originally developed in Peru, was also conceived as a multidimensional instrument (Escurra-Mayaute & Salas-Blas, 2014), and subsequent evidence in Mexican adolescents supported a multidimensional re-specification of the ARS together with measurement invariance across gender (González-Alcántara et al., 2021). Taken together, these findings suggest that SNA may be better represented by differentiated symptom domains than by a single undifferentiated score, supporting the potential value of multidimensional assessment (Billieux et al., 2015; Cataldo et al., 2022). At the same time, because available evidence in Spanish-speaking contexts comes largely from single-country studies, comparability across Spanish-speaking populations should not be assumed a priori, and further psychometric evaluation of multidimensional SNA instruments across these populations is still needed (e.g., Machimbarrena et al., 2023).

Within this context, the AdiTec-I was developed to assess SNA in Spanish-speaking adolescents and young adults (Chóliz et al., 2016). Derived from the Internet Dependence Test, the instrument adapts DSM-IV-TR substance abuse and dependence criteria to SNS use (APA, 2000; Chóliz & Marco, 2012). Although DSM-5 reorganized substance-related diagnoses by merging abuse

and dependence into a single disorder and introducing craving, substantial continuity in the underlying addiction-related construct remains (APA, 2013, 2022). Retaining the DSM-IV-TR-derived framework therefore preserves central addiction domains such as impaired control, withdrawal-like symptoms, and functional interference, which remain theoretically aligned with contemporary addiction models.

The AdiTec-I has a hierarchical structure comprising four first-order factors—Abuse, Abstinence, Lack of Control, and Escape—under a higher-order SNA factor, and yields both a total score and domain-specific scores. In this way, it responds to two needs highlighted in the field: moving beyond purely global severity indices and testing a multidimensional model in Spanish-speaking populations. It also allows profile-based interpretation in preventive and clinical contexts. The original instrument further includes gender-specific interpretive thresholds intended to distinguish normative, at-risk, and potentially addictive patterns (Chóliz et al., 2016).

The aim of the present study was to provide additional evidence supporting the interpretation of AdiTec-I scores in a large sample of Spanish-speaking adolescents and young adults. Specifically, evidence of validity based on internal structure was examined through a competitive confirmatory factor analysis (CFA), comparing the hypothesized hierarchical second-order model with alternative structures, including a unidimensional model and a four-factor correlated first-order model. Score reliability and evidence of convergent and discriminant validity based on the internal structure were also evaluated. Finally, measurement invariance across gender and cultural background (Spain vs. Latin America) was tested. It was hypothesized that (1) the hierarchical second-order model would show adequate fit and outperform the alternative models; (2) AdiTec-I scores would demonstrate satisfactory reliability and evidence of convergent and discriminant validity; and (3) the model would show at least metric, and ideally partial scalar, invariance across gender and cultural background.

Method

Participants and procedure

The initial sample comprised 4,013 participants recruited from educational institutions in Spain and several Latin American countries between 2017 and 2021. This study used a nonprobabilistic sampling strategy and a cross-sectional design. Students completed the AdiTec-I either individually, in cases of suspected problematic or addictive use, or collectively as part of the AdiTec universal prevention program. Questionnaires were administered by authorized school staff (teachers or educational psychologists) in accordance with the procedures specified in the AdiTec user's manual (Chóliz et al., 2016). Responses were subsequently entered into the TEA Ediciones online platform. The present study was based on the anonymized database generated during this period.

Analyses were restricted to adolescents and young adults aged 14–22 years, the primary target population of the instrument (Chóliz, 2010; Chóliz et al., 2016). Inclusion criteria were (a) completion of the AdiTec-I questionnaire and (b) age within the 14–22 range. Gender and country of origin data were used for subgroup analyses when available. Participants outside this age range or with incomplete questionnaire data were excluded.

After applying the eligibility criteria, the final sample comprised 3,817 participants. Gender data were available for 3,803 participants (99.6% of the total sample), including 2,216 men (58.3%) and 1,585 women (41.7%). Mean age was 15.94 years (SD = 1.44). Country of origin data were available for 2,391 participants (62.6% of the total sample). Of these, 1,325 (55.4%) were from Spain and 1,066 (44.6%) from Latin American countries, including Guatemala, Panama, Colombia, Ecuador, Paraguay, Bolivia, Costa Rica, the Dominican Republic, Honduras, Mexico, and El Salvador.

All procedures complied with the Declaration of Helsinki and Spanish legislation on biomedical research, bioethics, and data protection. The protocol was approved by the Ethics Commission of University of Valencia (procedure number: H1482079199937).

Instruments

The AdiTec-I is a self-administered questionnaire requiring approximately 10–15 minutes to complete. It comprises 23 items rated on a 5-point ordinal scale according to degree of agreement (Items 1–11) or frequency of use (Items 12–23): 0 = *strongly disagree/never*, 1 = *disagree/rarely*, 2 = *neutral/sometimes*, 3 = *agree/often*, and 4 = *strongly agree/very often*. Although some items retain Internet-related wording inherited from the source instrument, the questionnaire was designed to assess SNA, as specified in its instructions (Chóliz et al., 2016). It also collects sociodemographic data, including gender, age, educational institution, and country of origin.

The internal structure of the AdiTec-I comprises four interrelated factors associated with SNA: Abuse (7 items; "excessive SNS use affecting the ability to engage in healthy and routine activities"), Abstinence (7 items; "emotional discomfort or irritability when it is not possible to connect to SNS"), Lack of Control (7 items; "inability to stop using SNS despite negative psychosocial consequences"), and Escape (2 items; "use of SNS to avoid dysphoria") (Chóliz et al., 2016).

These four first-order factors yield four domain scores that allow profile-based interpretation and, when combined, form a total score for interpretive classification.

Throughout the manuscript, these scores are referred to as domain scores. The instrument manual proposes percentile-based interpretive thresholds intended to distinguish at-risk and potentially addictive patterns; however, the empirical evaluation of these thresholds was beyond the scope of the present study.

Previous studies reported adequate internal consistency estimates for AdiTec-I scores (Chóliz et al., 2016). Cronbach's alpha coefficients (α) were .93 for the total score and .86, .83, .81, and .79 for Abuse, Abstinence, Lack of Control, and Escape, respectively.

Statistical analysis

All statistical analyses were conducted using RStudio and SPSS Statistics 28. Missing sociodemographic data were examined prior to group-specific analyses. Missing values were present in 0.4% of cases (n = 14) for gender and 37.4% (n = 1,426) for country of origin. Cultural background was operationalized as a dichotomous grouping variable based on country of origin (Spain vs. Latin America). For analyses involving gender or cultural background, cases with missing values on the relevant grouping variable were excluded using listwise deletion. Consequently, gender-based analyses were conducted on 3,803 participants, whereas cultural comparisons were conducted on participants with available country of origin data (n = 2,391). Missing data for country of origin were relatively high because this variable was not systematically recorded during all administrations of the program across participating educational centers. No extreme values requiring exclusion were detected in the analyzed variables.

To examine the internal structure of the AdiTec-I (Hypothesis 1), confirmatory factor analysis (CFA) was conducted within a structural equation modeling (SEM) framework. A competitive CFA was used to compare the hypothesized hierarchical second-order model of SNA with a four-factor first-order model and a unidimensional alternative. Alternative bifactor specifications were also considered; however, all solutions showed empirical and conceptual limitations, including Heywood cases, unstable or negative loadings, low residual variances, and orthogonality constraints inconsistent with the construct's interdependent subdimensions, and were therefore not retained (Bonifay et al., 2017; Reise et al., 2010; Rodriguez et al., 2016). Robust diagonally weighted least squares (DWLS) estimation was used given the ordinal nature of the items and the large sample size (N > 2,000) (Mîndrilă, 2010). Model fit was evaluated using the χ^2 statistic, comparative fit index (CFI; acceptable ≥ .90, excellent ≥ .95), root mean square error of approximation (RMSEA; good < .06, acceptable < .08), and standardized root mean square residual (SRMR; acceptable < .08) (van de Schoot et al., 2012).

Additional evidence regarding score reliability and convergent and discriminant validity based on the internal structure (Hypothesis 2) was examined. Convergent validity was assessed through standardized factor loadings (λ ≥ .40), explained variance (R^2), and average variance extracted (AVE ≥ .50) (Hair et al., 2019). Following the Fornell and Larcker (1981) criterion, AVE values below .50 were considered acceptable when composite reliability (CR) exceeded .70. Discriminant validity was evaluated through correlations among domain scores. Internal consistency was estimated using Cronbach's α, McDonald's ω, and CR, with values above .80 indicating satisfactory score reliability (Hayes & Coutts, 2020). Corrected item–total correlations (CTICs) and α if item deleted were also computed.

Measurement invariance across gender and cultural background was examined to test Hypothesis 3. Multigroup CFA was conducted to evaluate configural, metric, and scalar invariance (Byrne, 2013). When full invariance was not supported, partial invariance was tested by freeing the parameters of noninvariant items (Hirschfeld & Von Brachel, 2014). Partial scalar invariance is considered sufficient for meaningful group comparisons (Putnick & Bornstein, 2016). Invariance was considered supported when ΔCFI ≤ .01, ΔRMSEA < .015, and ΔSRMR < .03 for metric models and < .01 for scalar models. Finally, t tests were conducted to compare domain scores across gender and cultural background groups, and effect sizes were estimated using Hedges' g (trivial: .00–.19; small: .20–.49; medium: .50–.79; large: ≥ .80) (Cohen, 1992).

Results

Descriptive analysis

Descriptive statistics indicated adequate variability across the response scale (Table 1). Among the three seven-item domains, Abuse showed the highest mean score, followed by Abstinence and Lack of Control. Skewness and kurtosis values at the domain-score level did not indicate severe distributional problems. At the item level, distributions showed mild-to-moderate asymmetry in both directions, with no evidence of extreme deviations likely to compromise subsequent analyses.

Competitive Confirmatory Factor Analysis

A competitive CFA was conducted to compare the hierarchical second-order model of AdiTec-I with alternative models. The unidimensional model (Model 1) showed inadequate fit, $\chi^2(230) = 7298.50$, $p < .001$, CFI = .878, RMSEA = .090 [.088, .092], SRMR = .060. In contrast, the hierarchical second-order model (Model 2) showed adequate fit, $\chi^2(226) = 3976.67$, $p < .001$, CFI = .935, RMSEA = .066 [.064, .068], SRMR = .046.

A four-factor correlated first-order model (Model 3) was also estimated for comparison. This model showed similarly

Table 1

Descriptive statistics for AdiTec-I items and domain scores

	Mean	*SD*	*sk*	*ks*
Abuse	15.74	7.00	-0.20	-0.75
Item 9. *I think I use the Internet too much.*	2.86	1.49	0.12	-1.40
Item 12. *The first thing I do when I wake up on weekends is connect to the Internet.*	3.18	1.36	-0.18	-1.16
Item 13. *I have been connected to the Internet for > 3 hours at a time.*	2.54	1.37	0.44	-1.04
Item 15. *When I am bored I connect to the Internet.*	2.29	1.37	0.68	-0.85
Item 16. *I have gone to bed later or slept less because I was using the Internet.*	3.29	1.41	-0.30	-1.20
Item 17. *I access the Internet several times a day to see if I have any messages or mail from friends.*	2.34	1.25	0.56	-0.71
Item 20. *The first thing I do when I get home from school is go online.*	2.56	1.37	0.38	-1.12
Abstinence	11.57	6.19	0.27	-0.49
Item 1. *If the Internet does not work at home, I try to connect somewhere else.*	2.06	1.25	0.94	-0.25
Item 2. *It affects me a lot when I want to connect to the Internet but it is not working.*	3.19	1.34	-0.19	-1.11
Item 3. *Every time I think about the Internet, I feel the need to go online.*	2.45	1.35	0.50	-0.97
Item 4. *If I am without Internet for a while, I find myself feeling empty and I do not know what to do.*	2.51	1.46	0.45	-1.21
Item 5. *It irritates me when the Internet does not work properly because of a problem with the computer or the network.*	3.12	1.42	-0.09	-1.27
Item 6. *It is no longer sufficient for me to connect for the same amount of time as before.*	3.22	1.48	-0.12	-1.39
Item 8. *I am obsessed with downloading files, searching for links, participating in chats, or posting photos or videos.*	2.32	1.31	0.68	-0.67
Lack of Control	9.09	5.96	0.59	-0.13
Item 7. *I spend less time doing other activities because the Internet takes up a lot of my time.*	3.66	1.23	-0.57	-0.65
Item 10. *I find it very difficult to close the Internet browser once I start surfing, even if my parents or friends call me or I have to go somewhere.*	3.18	1.44	-0.14	-1.30
Item 14. *I have argued with my parents, family, or friends because they think I spend too much time on the Internet.*	3.34	1.36	-0.29	-1.12
Item 18. *I have been late (to class, meeting friends, etc.) because I was connected to the Internet.*	1.86	1.18	1.33	0.80
Item 19. *When I am connected to the Internet I lose track of time.*	2.85	1.35	0.18	-1.11
Item 21. *I have lied to my family or others about how long I have been online.*	3.03	1.40	-0.01	-1.26
Item 22. *Even when I am doing other tasks (in class, with my friends, studying, etc.) I think about the Internet (downloading files, visiting sites, uploading photos or videos, etc.).*	2.02	1.23	1.03	0.16
Escape	3.27	2.56	0.37	-1.02
Item 11. *When I feel bad, I take refuge in the Internet.*	2.03	1.19	1.01	0.07
Item 23. *When I have a problem I connect to the Internet to distract myself.*	2.75	1.40	0.27	-1.18
SNA	39.65	18.40	0.18	-0.40

Note. SD, standard deviation; sk, asymmetry; ks, kurtosis. All items were translated into English from the original language (Spanish).

adequate fit, $\chi^2(224) = 4010.52$, $p < .001$, CFI = .934, RMSEA = .067 [.065, .068], SRMR = .045. Standardized latent correlations among the first-order factors in Model 3 ranged from .68 to .84 (F1–F2 = .76, F1–F3 = .82, F1–F4 = .70, F2–F3 = .84, F2–F4 = .68, F3–F4 = .71), indicating substantial shared variance among the dimensions.

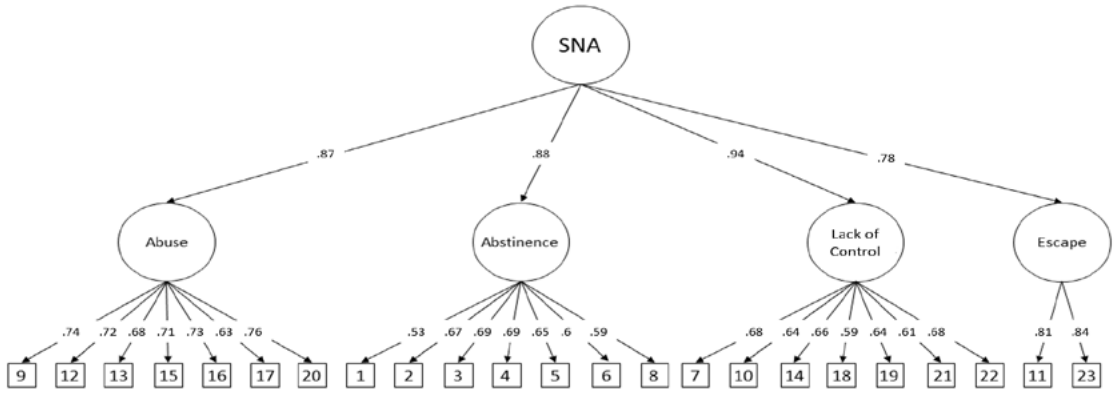
Given the high latent correlations observed in Model 3 and the comparable fit of Models 2 and 3, the hierarchical second-order model was retained as the more parsimonious representation of the latent structure. Accordingly, Model 2 was used in the subsequent validity and measurement invariance analyses (see Figure 1).

Evidence of Validity Based on Internal Structure and Internal Consistency

Item- and domain-level results were then examined to evaluate the internal structure of AdiTec-I scores and their internal consistency. Standardized factor loadings, explained variance, and residual variances supported item-level convergent validity, indicating that all items contributed meaningfully to their corresponding first-order factors (Table 2). At the construct level, AVE values exceeded .50 for Abuse and Escape, whereas Abstinence and Lack of Control showed lower AVE values; however, CR

Figure 1

Hierarchical second-order model of AdiTec-I



Source: Elaborated by the authors.

Table 2

Item-level indices for AdiTec-I scores

Domain	Item	CTIC	α-item	λ_e	ε_e	R^2
Abuse	9	.433	.915	.741	.45	.494
	12	.548	.912	.724	.48	.458
	13	.565	.912	.684	.53	.407
	15	.549	.912	.714	.49	.431
	16	.517	.913	.730	.47	.470
	17	.479	.913	.630	.6	.347
	20	.569	.912	.755	.43	.506
Abstinence	1	.453	.914	.529	.72	.245
	2	.628	.911	.672	.55	.389
	3	.530	.913	.694	.52	.415
	4	.550	.912	.685	.53	.391
	5	.589	.911	.649	.58	.346
	6	.557	.912	.598	.64	.295
	8	.539	.912	.592	.65	.259
Lack of Control	7	.557	.912	.682	.54	.403
	10	.602	.911	.637	.59	.345
	14	.521	.913	.656	.57	.365
	18	.465	.914	.592	.65	.265
	19	.547	.912	.641	.59	.375
	21	.622	.911	.605	.63	.282
	22	.480	.913	.676	.54	.376
Escape	11	.577	.912	.809	.35	.569
	23	.583	.911	.838	.3	.647

Note. CTIC, corrected item–total correlation; α-item, α if item deleted; R^2, explained variance; λ_e, standardized factor loading, ε_e, residual variance.

coefficients remained above .70 for all factors, supporting acceptable score interpretation across dimensions (Table 3).

Discriminant validity was supported by the pattern of correlations among domain scores, which indicated related yet empirically distinguishable dimensions (Table 3). Internal consistency estimates were also satisfactory. Across the first-order factors, Cronbach's α ranged from .755 to .847, McDonald's ω from .772 to .848, and CR from .799 to .877, whereas the total score showed high internal consistency (α = .916, ω = .915, CR = .945) (Table 3). At the item level, corrected item–total correlations and α if item deleted further indicated that all items contributed meaningfully to their respective dimensions and that deleting any item would not improve score reliability (Table 2).

Overall, these results provide evidence of validity based on the internal structure of AdiTec-I scores together with adequate internal consistency.

Measurement Invariance Across Gender and Cultural Background

Measurement invariance across gender and cultural background was then examined. Prior to the multigroup analyses, the hierarchical second-order model was estimated separately within each subgroup to verify that the proposed structure showed adequate fit. The model fit was adequate for women, $\chi^2(226) = 1730.66$, $p < .001$, CFI = .945, RMSEA = .065 [.062, .068], SRMR = .046; for men, $\chi^2(226) = 2580.89$, $p < .001$, CFI = .922, RMSEA = .069 [.066, .071], SRMR = .051; for Spanish participants, $\chi^2(226) = 1406.07$, $p < .001$, CFI = .943, RMSEA = .063 [.060, .066], SRMR = .046; and for Latin American participants, $\chi^2(226) = 1033.65$, $p < .001$, CFI = .943, RMSEA = .058 [.054, .062], SRMR = .048. These results supported proceeding with multigroup invariance analyses.

Table 3

Domain-level evidence based on internal structure and internal consistency estimates for AdiTec-I scores

	Abuse	Abstinence	Lack of Control	Escape	SNA
Abuse	1				
Abstinence	.619	1			
Lack of Control	.655	.660	1		
Escape	.540	.512	.530	1	
SNA	.876	.857	.869	.689	1
α	.847	.775	.787	.755	.916
ω	.848	.772	.787	-	.915
CR	.877	.823	.829	.799	.945
AVE	.507	.402	.412	.678	.461
λ_e	.872	.882	.940	.777	-
ε_e	.24	.22	.12	.4	-
R^2	.747	.790	.873	.578	-

Note. **α**, Cronbach's alpha; **ω**, McDonald's omega; CR, composite reliability; AVE, average variance extracted; R^2, explained variance; λ_e, standardized factor loading, ε_e, residual variance. McDonald's ω could not be estimated for Escape with the SPSS procedure used in the present study because this factor comprised only two items. Correlation coefficients were obtained from bivariate Pearson correlations among domain scores. All correlations were statistically significant ($p < .001$).

Table 4

Results of measurement invariance analysis of AdiTec-I

Model	Variable	Group	χ^2	*DF*	*p*	*CFI (ΔCFI)*	*SRMR (ΔSRMR)*	*RMSEA (ΔRMSEA)*
Configural	Gender	W	1,331.49	448	< .001	.934	.049	.066
		M	1,831.13					
	Cultural background	S	1,291.39	448	< .001	.945	.047	.060
		L	1,023.69					
Metric	Gender	W	1,122.26	467	< .001	.947 (.013)	.050 (.001)	.058 (.008)
		M	1,520.72					
	Cultural background	S	1,105.64	467	< .001	.954 (.009)	.049 (.002)	.055 (.005)
		L	949.67					
Scalar	Gender	W	1,498.22	532	< .001	.930 (.017)	.049 (.001)	.063 (.005)
		M	1,915.22					
	Cultural background	S	1,526.02	532	< .001	.931 (.023)	.047 (.002)	.062 (.007)
		L	1,368.74					

Note. W, women; M, men; S, Spanish; L, Latin American; DF, degrees of freedom.

As shown in Table 4, metric invariance was supported across both gender and cultural background. In both comparisons, CFI and RMSEA improved from the configural to the metric model, whereas SRMR changed only slightly. Full scalar invariance was not supported, as ΔCFI exceeded the prespecified criterion in both cases. Partial scalar invariance was therefore examined. For gender, freeing the intercept of Item 13 (Abuse) yielded the selected partial scalar model (CFI = .900, ΔCFI = .004; RMSEA = .057, ΔRMSEA = .001). For cultural background, freeing the intercepts of Items 3 (Abstinence), 5 (Abstinence), and 19 (Lack of Control) yielded the selected partial scalar model (CFI = .901, ΔCFI = .010; RMSEA = .056, ΔRMSEA = .002). Overall, these findings indicate that the hierarchical second-order structure was comparable across groups at the metric level, whereas scalar equivalence was only partially supported.

Group comparisons based on AdiTec-I domain scores are presented in Table 5. Women scored significantly higher than men on all domain scores and on the total score, although effect sizes were trivial. Regarding cultural background, Spanish participants scored higher on Abuse, whereas Latin American participants scored higher on Abstinence and Escape; no significant differences emerged

Table 5

Results of t-tests of AdiTec-I domain and total scores

	Score	Group	*Mean (SD)*	*t (DF)*	*p*	*95% CI*	*Hedges' g*
Gender	Abuse	W	16.51 (7.12)	−5.74 (3,332.68)	< .001	−1.78, −0.87	−.19
		M	15.18 (6.86)				
	Abstinence	W	12.17 (6.29)	−5.08 (3,345.24)	< .001	−1.44, −0.64	−.17
		M	11.13 (6.09)				
	Lack of Control	W	9.39 (6.96)	−2.69 (3,799)	.007	−0.91, −0.14	−.09
		M	8.86 (5.88)				
	Escape	W	3.45 (2.68)	−3.66 (3,240.04)	< .001	−0.48, −0.14	−.12
		M	3.14 (2.47)				
	SNA	W	41.51 (18.97)	−5.26 (3,285.51)	< .001	−4.40, −2.01	−.18
		M	38.31 (17.87)				
Cultural background	Abuse	S	15.91 (6.05)	2.96 (2,389)	.003	0.28, 1.40	.12
		L	15.07 (6.74)				
	Abstinence	S	11.12 (6.31)	−4.51 (2,389)	< .001	−1.63, −0.06	−.19
		L	12.25 (5.89)				
	Lack of Control	S	9.11 (5.99)	−0.04 (2,340.09)	.967	−0.47, 0.45	−.002
		L	9.12 (5.56)				
	Escape	S	3.12 (2.54)	−3.25 (2,389)	.001	−0.54, −0.13	−.13
		L	3.45 (2.51)				
	SNA	S	39.25 (18.63)	−0.89 (2,345.21)	.375	−2.09, 0.79	−.04
		L	39.90 (17.17)				

Note. W, women; M, men; S, Spanish; L, Latin American; SD, standard deviation; t, Student's t-test statistic; DF, degrees of freedom; CI, confidence interval; *g*, Hedges' g; p values are based on two-tailed tests.

for Lack of Control or the total score. Taken together, these findings suggest that group comparisons should be interpreted with caution, particularly for dimensions linked to noninvariant items.

Discussion

The present study examined the psychometric properties of the AdiTec-I in Spanish-speaking adolescents and young adults. Overall, the findings supported the hypothesized hierarchical second-order structure, provided evidence regarding the internal structure of AdiTec-I scores together with adequate reliability, and indicated metric invariance across gender and cultural background, with only partial scalar invariance. Taken together, these findings supported the AdiTec-I as a multidimensional measure of SNA comprising distinguishable but closely related symptom domains.

The hierarchical second-order model provided an adequate fit and a more parsimonious representation of the covariance structure among the domains, while outperforming the unidimensional alternative. Although the correlated four-factor model also showed acceptable fit, the substantial latent intercorrelations indicated that the common variance across domains is meaningfully captured by a higher-order SNA factor. This pattern supports the view that SNA is not adequately captured as a single undifferentiated continuum, but instead involves related yet distinguishable components, a perspective broadly consistent with recent work on problematic online behaviors and addiction models (Baggio et al., 2024; Griffiths, 2005).

This result is consistent with recent multidimensional conceptualizations of SNA, as well as broader conceptual critiques of behavioral addictions, which emphasize heterogeneity in symptom expression and caution against relying exclusively on global representations (Billieux et al., 2015; Cataldo et al., 2022; Fournier et al., 2023). Widely used instruments such as the BSMAS and the SMD Scale have shown robust psychometric properties across different populations and settings (Boer et al., 2022; Brailovskaia & Margraf, 2024; Leung et al., 2020; Yue et al., 2022), and both instruments have also shown promise as screening tools (Schlossarek et al., 2023). However, their reliance on a single composite score may provide a less differentiated characterization of symptom patterns than multidimensional approaches (Cataldo et al., 2022; Fournier et al., 2023). In contrast, the hierarchical structure of the AdiTec-I supports both global severity assessment and

profile-based interpretation of domain scores, which may be especially useful for refining conceptual understanding and supporting individualized assessment.

The results provided favorable evidence regarding the internal structure of AdiTec-I scores. All items showed meaningful associations with their respective factors, and the four domains were empirically distinguishable despite their strong interrelations. At the construct level, the pattern of AVE and CR coefficients suggests that the domains do not show the same degree of psychometric strength, although all retained acceptable levels of composite reliability according to conventional criteria (Fornell & Larcker, 1981). Together with the satisfactory reliability estimates, this pattern suggests that the AdiTec-I captures differentiated symptom domains rather than a fully undifferentiated continuum. From a measurement perspective, this highlights the need to interpret domain scores with appropriate nuance rather than assuming equivalent psychometric strength across dimensions.

The Escape factor warrants particular attention. Although it showed acceptable support at both the factor and item levels, its two-item composition suggests more limited content coverage of the underlying domain (Robinson, 2018). Despite this limitation, the process it captures—using SNS to regulate negative affect or cope with distress—remains theoretically central in both addiction-based and broader problematic-use frameworks (Griffiths, 2005; Varona et al., 2022). Mood modification and coping-oriented SNS use have been consistently identified as core mechanisms in the development and maintenance of maladaptive digital behaviors, particularly through negative-reinforcement processes (Moretta et al., 2023; Wegmann et al., 2023). Retaining the Escape domain therefore appears justified because it captures a clinically and theoretically meaningful dimension that is not reducible to the other components. Future revisions of the AdiTec-I should strengthen this domain by developing additional indicators that better capture the range of affect-regulation processes involved in SNA.

Measurement invariance findings were mixed. These findings are especially relevant in Spanish-speaking contexts, where several instruments have shown adequate psychometric properties in single-country samples, but evidence on cross-group comparability remains less developed (Cuadrado et al., 2020; Escurra-Mayaute & Salas-Blas, 2014; González-Alcántara et al., 2021; Machimbarrena et al., 2023; Valencia-Ortiz & Cabero-Almenara, 2019). Against this background, the invariance findings support broad comparability of the latent structure across gender and cultural background, although the partial scalar results indicate that mean-level comparisons require cautious interpretation (Putnick & Bornstein, 2016; Vandenberg & Lance, 2000). Even so, once noninvariant items are identified, partial scalar invariance remains adequate for many comparative purposes, provided that conclusions are appropriately qualified (Byrne, 2013; Putnick & Bornstein, 2016).

Comparisons by cultural background should be interpreted in light of the identified noninvariant items. Specifically, noninvariance was concentrated in Item 19 (Lack of Control) and Items 3 and 5 (Abstinence). This pattern suggests that cross-cultural differences may be concentrated in specific indicators and domains rather than in overall SNA severity (Atroszko et al., 2022). This interpretation is compatible with the observed score pattern, with higher Abuse scores in Spain and higher Abstinence and Escape scores in Latin America. Similar item- and dimension-level differences have been reported in prior cross-cultural work with Spanish-speaking adolescents (Machimbarrena et al., 2023). Accordingly, these interpretations remain tentative, and future research should determine whether these items function differently across Spanish-speaking cultural groups because their endorsement is shaped by contextual or cultural factors despite comparable levels of the underlying construct.

Gender comparisons should be interpreted in light of the largely invariant measurement structure. Noninvariance was limited to Item 13 (Abuse), suggesting localized item-level nonequivalence rather than a broader lack of equivalence in the latent structure. Similar research with the SMD scale has also reported gender-related variation in item thresholds, indicating that some indicators may be endorsed differently despite comparable levels of the latent construct (Šablatúrová et al., 2022). In the present study, however, this localized deviation did not translate into meaningful domain-level differences: women scored slightly higher across all domains and on the total SNA score, but effect sizes were trivial. Thus, although the direction of the differences is consistent with studies reporting higher SNA among girls and young women (Andreassen et al., 2016; Bányai et al., 2017; Su et al., 2020), their magnitude suggests limited practical relevance. Accordingly, gender-related variation in AdiTec-I scores appears better interpreted as trivial mean-level differences together with mild noninvariance in a specific item than as evidence of meaningful differences in the latent structure across gender groups. In line with these findings, future studies should examine the interpretive utility of gender-specific score profiles and thresholds against external clinical or functional criteria.

The multidimensional structure of the AdiTec-I has clear applied implications. Beyond yielding a total severity score, the instrument allows profile-based interpretation of domain scores that may help identify potentially relevant targets in preventive, clinical, and assessment contexts (Chóliz, 2010; Chóliz & Marco, 2012; Chóliz et al., 2016). Elevated Lack of Control scores may indicate self-regulatory difficulties and may therefore point to the

relevance of behavioral self-management strategies or executive control training. High Escape scores may reflect greater reliance on SNS for emotion regulation, pointing to the potential relevance of coping skills, distress tolerance, or mindfulness-based components. Elevated Abstinence scores may indicate difficulties disengaging from SNS and the need to develop alternative routines, whereas high Abuse scores may reflect functional interference requiring behavioral or environmental adjustments.

This domain-level interpretation is consistent with recent intervention literature suggesting that approaches targeting underlying cognitive, behavioral, and emotional mechanisms may be more informative than those based solely on reducing screen time or imposing generalized abstinence (Nagata et al., 2025; Plackett et al., 2023; Pérez-Wiesner et al., 2025). In school-based prevention, this approach may help prioritize the competencies to be targeted, although current evidence on digital well-being interventions remains heterogeneous (Žmavc et al., 2025). In more individualized assessment contexts, it may also contribute to case formulation and intervention planning (Chóliz & Marco, 2012). These potential applications of AdiTec-I domain profiles should be understood as complements to, rather than replacements for, comprehensive assessment procedures.

This study has several strengths, including the large sample, the inclusion of participants from multiple Spanish-speaking contexts, the use of appropriate estimators for ordinal data, and the examination of measurement invariance across relevant groups. Several limitations should also be acknowledged. The cross-sectional design precludes evidence on score stability over time and limits conclusions about predictive relations with clinically relevant outcomes. The nonprobabilistic, school-based sample restricts generalizability beyond similar populations, and missing data on cultural background reduced the effective sample for some subgroup analyses. In addition, the study focused primarily on validity evidence based on internal structure and did not examine validity evidence based on relations to other variables, score stability across time, or the classification accuracy of the proposed interpretive thresholds.

Future research should address these limitations by examining the temporal stability of AdiTec-I scores in longitudinal designs and testing their relations with external criteria, including mental health indicators, functional impairment, and other clinically relevant outcomes. Instrument refinement should also prioritize expansion of the Escape domain and further evaluation of the noninvariant items through differential item functioning analyses. Finally, the accuracy and practical utility of the proposed interpretive thresholds should be evaluated against external benchmarks before they are used in applied settings.

In conclusion, the present findings support the AdiTec-I as a psychometrically sound multidimensional instrument for assessing SNA in Spanish-speaking adolescents and young adults. Its hierarchical structure and the available evidence regarding internal structure and cross-group comparability support its use in research and assessment contexts. Importantly, its multidimensional design may facilitate the identification of heterogeneous symptom profiles and thereby contribute to more targeted prevention and intervention strategies.

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Conflict of interest

The authors declare that TEA Ediciones had no role in the design, analysis, or interpretation of the study.

Author contributions

Amparo Luján-Barrera: Conceptualization, Validation, Investigation, Data Curation, Methodology, Formal analysis, Writing - Original Draft, Visualization.
Lydia Cervera-Ortiz: Validation, Investigation, Writing - Review & Editing.
Mariano Chóliz: Conceptualization, Validation, Resources, Writing - Review & Editing, Supervision, Project administration, Funding acquisition.

Generative AI disclosure

Generative artificial intelligence tools were used exclusively to support language editing and manuscript revision. Specifically, they were used to assist with improving clarity, wording, grammar, and style in selected passages of the manuscript. No generative AI tools were used to generate data, conduct analyses, interpret results, or draw scientific conclusions. All AI-assisted outputs were critically reviewed and edited by the authors, who take full responsibility for the final content of the manuscript.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders, Fourth edition, Text revision* (4th ed., text rev.). American Psychiatric Association.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). American Psychiatric Association. https://doi.org/10.1176/appi.books.9780890425596

American Psychiatric Association. (2022). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., text rev.). American Psychiatric Association Publishing. https://doi.org/10.1176/appi.books.9780890425787

Andreassen, C. S., & Pallesen, S. (2014). Social network site addiction—An overview. *Current Pharmaceutical Design*, *20*(25), 4053–4061. https://doi.org/10.2174/13816128113199990616

Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study. *Psychology of Addictive Behaviors*, *30*(2), 252–262. https://doi.org/10.1037/adb0000160

Atroszko, P. A., El Abiddine, F. Z., Malik, S., Mamun, M. A., Vally, Z., & Czerwiński, S. K. (2022). Lack of measurement invariance in a widely used Facebook addiction scale may thwart progress in research on social-network-use disorder: A cross-cultural study. *Computers in Human Behavior*, *128*, 107132. https://doi.org/10.1016/j.chb.2021.107132

Baggio, S., Bosson, M., Berle, D., Starcevic, V., Simon, O., & Billieux, J. (2024). Problematic online behaviors constitute related yet distinct conditions: A cross-sectional study. *Computers in Human Behavior*, *160*, 108358. https://doi.org/10.1016/j.chb.2024.108358

Bányai, F., Zsila, Á., Király, O., Maraz, A., Elekes, Z., Griffiths, M. D., Andreassen, C. S., & Demetrovics, Z. (2017). Problematic social media use: Results from a large-scale nationally representative adolescent sample. *PLOS ONE*, *12*(1), e0169839. https://doi.org/10.1371/journal.pone.0169839

Billieux, J., Schimmenti, A., Khazaal, Y., Maurage, P., & Heeren, A. (2015). Are we overpathologizing everyday life? A tenable blueprint for behavioral addiction research. *Journal of Behavioral Addictions*, *4*(3), 119–123. https://doi.org/10.1556/2006.4.2015.009

Boer, M., van den Eijnden, R. J. J. M., Finkenauer, C., Boniel-Nissim, M., Marino, C., Inchley, J., Cosma, A., Paakkari, L., & Stevens, G. W. J. M. (2022). Cross-national validation of the social media disorder scale: Findings from adolescents from 44 countries. *Addiction*, *117*(3), 784–795. https://doi.org/10.1111/add.15709

Bonifay, W., Lane, S. P., & Reise, S. P. (2017). Three concerns with applying a bifactor model as a structure of psychopathology. *Clinical Psychological Science*, *5*(1), 184–186. https://doi.org/10.1177/2167702616657069

Brailovskaia, J., & Margraf, J. (2024). Addictive social media use during COVID-19 outbreak: Validation of the Bergen Social Media Addiction Scale (BSMAS) and investigation of protective factors in nine countries. *Current Psychology*, *43*(14), 13022–13040. https://doi.org/10.1007/s12144-022-03182-z

Byrne, B. M. (2013). Structural equation modeling with AMOS: Basic concepts, applications, and programming (2nd ed.). Routledge. https://doi.org/10.4324/9780203805534

Casale, S. (2020). Problematic social media use: Conceptualization, assessment and trends in scientific literature. *Addictive Behaviors Reports*, *12*, 100281. https://doi.org/10.1016/j.abrep.2020.100281

Cataldo, I., Billieux, J., Esposito, G., & Corazza, O. (2022). Assessing problematic use of social media: Where do we stand and what can be improved? *Current Opinion in Behavioral Sciences*, *45*, 101145. https://doi.org/10.1016/j.cobeha.2022.101145

Cohen, J. (1992). Things I have learned (so far). *Anales de Psicología*, *8*(1-2), 3–18. https://revistas.um.es/analesps/article/view/28521

Chóliz, M. (2010). *PrevTec 3.1: Programa de prevención de las adicciones tecnológicas.* Fejar Ediciones

Chóliz, M., & Marco, C. (2012). *Adicción a Internet y Redes Sociales: Tratamiento Psicológico*. Alianza Editorial.

Chóliz, M., Marco, C., & Chóliz, C. (2016). *ADITEC. Evaluación y prevención de la adicción a internet, móvil y videojuegos*. TEA Ediciones.

Cuadrado, E., Rojas, R., & Tabernero, C. (2020). Development and validation of the Social Network Addiction Scale (SNAddS-6S). *European Journal of Investigation in Health, Psychology and Education*, *10*(3), 763–778. https://doi.org/10.3390/ejihpe10030056

Das, P., & Chaudhary, A. (2026). Navigating the terminological confusion in addiction-adjacent internet and social media use constructs: Recommendations based on a rapid conceptual review. *Journal of Technology in Behavioral Science*. https://doi.org/10.1007/s41347-025-00590-3

Escurra-Mayaute, M., & Salas-Blas, E. (2014). Construcción y validación del cuestionario de adicción a redes sociales (ARS). *Liberabit*, *20*(1), 73-91. http://www.scielo.org.pe/scielo.php?pid=S1729-48272014000100007&script=sci_arttext&tlng=pt

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50. https://doi.org/10.1177/002224378101800104

Fournier, L., Schimmenti, A., Musetti, A., Boursier, V., Flayelle, M., Cataldo, I., Starcevic, V., & Billieux, J. (2023). Deconstructing the components model of addiction: An illustration through "addictive" use of social media. *Ad-*

dictive Behaviors, *143*, 107694. https://doi.org/10.1016/j.addbeh.2023.107694

González-Alcántara, K. E., Tortolero, R. C., & Silva, C. (2021). Valoración psicométrica del Cuestionario de Adicción a Redes Sociales (ARS) en adolescentes mexicanos. *Revista de Psicología Clínica con Niños y Adolescentes*, *8*(3), 26-34. https://doi.org/10.21134/rpcna.2021.08.3.3

Griffiths, M. (2005). A 'components' model of addiction within a biopsychosocial framework. *Journal of Substance Use*, *10*(4), 191–197. https://doi.org/10.1080/14659890500114359

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate data analysis (8th ed.). Cengage.

Hayes, A. F., & Coutts, J. J. (2020). Use Omega Rather than Cronbach's Alpha for Estimating Reliability. But…. *Communication Methods and Measures*, *14*(1), 1–24. https://doi.org/10.1080/19312458.2020.1718629

Hirschfeld, G., & von Brachel, R. (2014). Improving multiple-group confirmatory factor analysis in R: A tutorial in measurement invariance with continuous and ordinal indicators. *Practical Assessment, Research, and Evaluation 19*(1), 7. https://doi.org/10.7275/QAZY-2946

Kemp, S. (2024, January 31). Digital 2024: Global overview report. DataReportal. https://datareportal.com/reports/digital-2024-global-overview-report

Kuss, D. J., & Griffiths, M. D. (2011). Online social networking and addiction—A review of the psychological literature. *International Journal of Environmental Research and Public Health*, *8*(9), 3528–3552. https://doi.org/10.3390/ijerph8093528

Leung, H., Pakpour, A. H., Strong, C., Lin, Y.-C., Tsai, M.-C., Griffiths, M. D., Lin, C.-Y., & Chen, I.-H. (2020). Measurement invariance across young adults from Hong Kong and Taiwan among three internet-related addiction scales: Bergen Social Media Addiction Scale (BSMAS), Smartphone Application-Based Addiction Scale (SABAS), and Internet Gaming Disorder Scale-Short Form (IGDS-SF9) (Study Part A). *Addictive Behaviors*, *101*, 105969. https://doi.org/10.1016/j.addbeh.2019.04.027

Machimbarrena, J. M., Varona, M., Muela, A., & González-Cabrera, J. M. (2023). Profiles of problematic social networking site use: A cross-cultural validation of a scale with Spanish and Mexican adolescents. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, *17*(3). https://doi.org/10.5817/CP2023-3-5

Mîndrilă, D. (2010). Maximum likelihood (ML) and diagonally weighted least squares (DWLS) estimation procedures: A comparison of estimation bias with ordinal and multivariate non-normal data. *International Journal for Digital Society*, *1*(1), 60–66. https://doi.org/10.20533/ijds.2040.2570.2010.0010

Montag, C., Demetrovics, Z., Elhai, J. D., Grant, D., Koning, I., Rumpf, H.-J., Spada, M. M., Throuvala, M., & van den Eijnden, R. (2024). Problematic social media use in childhood and adolescence. *Addictive Behaviors*, *153*, 107980. https://doi.org/10.1016/j.addbeh.2024.107980

Moretta, T., Buodo, G., Santucci, V. G., Chen, S., & Potenza, M. N. (2023). Problematic social media use is statistically predicted by using social media for coping motives and by positive reinforcement processes in individuals with high COVID-19-related stress levels. *Journal of Psychiatric Research*, *158*, 104–113. https://doi.org/10.1016/j.jpsychires.2022.12.036

Nagata, J. M., Hur, J. O., Talebloo, J., Lee, S., Choi, W. W., Kim, S. J., Lavender, J. M., & Moreno, M. A. (2025). Problematic social media use interventions for mental health outcomes in adolescents. *Current Psychiatry Reports*, *27*(9), 491–499. https://doi.org/10.1007/s11920-025-01619-3

Pérez-Wiesner, M., Bühler, K.-M., López-Moreno, J. A., & López-Salmerón, M. D. (2025). Effectiveness of psychological treatments for problematic use of internet, video games, social media and instant messaging: A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, *22*(10), 1598. https://doi.org/10.3390/ijerph22101598

Plackett, R., Blyth, A., & Schartau, P. (2023). The impact of social media use interventions on mental well-being: Systematic review. *Journal of Medical Internet Research*, *25*, e44922. https://doi.org/10.2196/44922

Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and reporting: The state of the art and future directions for psychological research. *Developmental Review*, *41*, 71–90. https://doi.org/10.1016/j.dr.2016.06.004

Reise, S. P., Moore, T. M., & Haviland, M. G. (2010). Bifactor models and rotations: exploring the extent to which multidimensional data yield univocal scale scores. *Journal of Personality Assessment*, *92*(6), 544–559. https://doi.org/10.1080/00223891.2010.496477

Robinson, M. A. (2018). Using multi-item psychometric scales for research and practice in human resource management. *Human Resource Management*, *57*(3), 739–750. https://doi.org/10.1002/hrm.21852

Rodriguez, A., Reise, S. P., & Haviland, M. G. (2016). Evaluating bifactor models: Calculating and interpreting statistical indices. *Psychological Methods*, *21*(2), 137–150. https://doi.org/10.1037/met0000045

Šablatúrová, N., Rečka, K., & Blinka, L. (2022). Validation of the Social Media Disorder Scale using network analysis in a large representative sample of Czech adolescents. *Frontiers in Public Health*, *10*, 907522. https://doi.org/10.3389/fpubh.2022.907522

Schlossarek, S., Schmidt, H., Bischof, A., Bischof, G., Brandt, D., Borgwardt, S., Browne, D. T., Christakis, D., Hurst-Della Pietra, P., Demetrovics, Z., & Rumpf, H.-J.

(2023). Psychometric properties of screening instruments for social network use disorder in children and adolescents: A systematic review. *JAMA Pediatrics*, *177*(4), 419. https://doi.org/10.1001/jamapediatrics.2022.5741

Shannon, H., Bush, K., Villeneuve, P. J., Hellemans, K. G., & Guimond, S. (2022). Problematic social media use in adolescents and young adults: Systematic review and meta-analysis. *JMIR Mental Health*, *9*(4), e33450. https://doi.org/10.2196/33450

Starcevic, V., & Aboujaoude, E. (2017). Internet addiction: Reappraisal of an increasingly inadequate concept. *CNS Spectrums*, *22*(1), 7–13. https://doi.org/10.1017/S1092852915000863

Su, W., Han, X., Yu, H., Wu, Y., & Potenza, M. N. (2020). Do men become addicted to internet gaming and women to social media? A meta-analysis examining gender-related differences in specific internet addiction. *Computers in Human Behavior*, *113*, 106480. https://doi.org/10.1016/j.chb.2020.106480

Tsilosani, A., Chan, K., Steffens, A., Bolton, T. B., & Kowalczyk, W. J. (2023). Problematic social media use is associated with depression and similar to behavioral addictions: Physiological and behavioral evidence. *Addictive Behaviors*, *145*, 107781. https://doi.org/10.1016/j.addbeh.2023.107781

Valencia-Ortiz, R., & Cabero-Almenara, J. (2019). La adicción a las redes sociales: Validación de un instrumento en el contexto mexicano. *Salud y drogas*, *19*(2), 149-159. https://www.redalyc.org/pdf/839/83982642015.pdf

van de Schoot, R., Lugtig, P., & Hox, J. (2012). A checklist for testing measurement invariance. *European Journal of Developmental Psychology*, *9*(4), 486–492. https://doi.org/10.1080/17405629.2012.686740

van den Eijnden, R. J. J. M., Lemmens, J. S., & Valkenburg, P. M. (2016). The Social Media Disorder Scale. *Computers in Human Behavior*, *61*, 478–487. https://doi.org/10.1016/j.chb.2016.03.038

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, *3*(1), 4–70. https://doi.org/10.1177/109442810031002

Varona, M. N., Muela, A., & Machimbarrena, J. M. (2022). Problematic use or addiction? A scoping review on conceptual and operational definitions of negative social networking sites use in adolescents. *Addictive Behaviors*, *134*, 107400. https://doi.org/10.1016/j.addbeh.2022.107400

Wegmann, E., Schiebener, J., & Brand, M. (2023). Social-networks use as adaptive or maladaptive strategy for coping with stress. *Scientific Reports*, *13*(1), 11895. https://doi.org/10.1038/s41598-023-39042-4

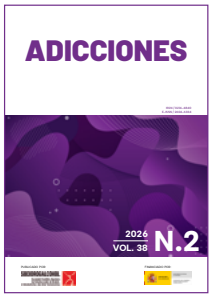
World Health Organization. (2019). *International classification of diseases, 11th revision* (ICD-11). https://icd.who.int/en.

Yue, H., Zhang, X., Cheng, X., Liu, B., & Bao, H. (2022). Measurement invariance of the Bergen Social Media Addiction Scale across genders. *Frontiers in Psychology*, *13*, 879259. https://doi.org/10.3389/fpsyg.2022.879259

Žmavc, M., Horvat, J., Židan, M., & Selak, Š. (2025). The effectiveness of school-based interventions to reduce problematic digital technology use and screen time: A systematic review and meta-analysis. *Journal of Behavioral Addictions*, *14*(2), 571–589. https://doi.org/10.1556/2006.2025.00043

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ORIGINAL

Personality factors associated with alcohol, tobacco and marijuana use in adolescents: A longitudinal study

Factores de personalidad asociados al uso de alcohol, tabaco y marihuana en adolescentes: Un estudio longitudinal

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Abstract

Longitudinal studies examining how personality variables predict substance use in adolescents in Latin America are scarce. This study examined variations in alcohol, tobacco, and cannabis use over three years among Argentinian adolescents, and assessed how impulsivity and risk-taking (at Time 1) prospectively discriminate between adolescents with and without binge drinking, tobacco and cannabis use at Time 3. A longitudinal design was employed. A total of 1080 adolescents (*M*=12.27 years, *SD*=0.952; 54% girls) from Córdoba (Argentina) completed, once per year for three years, a risk-taking task (BART) and a survey assessing substance use and trait impulsivity. Drug use increased over time, reaching lifetime prevalence rates of 85% (alcohol), 18% (tobacco), and 8% (cannabis) at the final assessment. Tobacco use was significantly higher ($p \leq .05$) among girls and cannabis use was higher ($p \leq .01$) among boys. Higher levels of negative urgency (PR = 1.023), lack of premeditation (PR = 1.025), lack of perseverance (PR = 1.045), sensation seeking (PR = 1.036), and risk-taking (PR = 1.008) at baseline were associated with a higher prevalence of BD two years later. Higher levels of lack of perseverance (PR = 1.033) and sensation seeking (PR = 1.029) were associated with a higher subsequent prevalence of tobacco use. Lack of premeditation (PR = 1.057), lack of perseverance (PR = 1.042), sensation seeking (PR = 1.033), and risk-taking (PR = 1.019) were associated with a higher subsequent prevalence of marijuana use. Adolescents with higher levels of impulsivity and risk-taking constitute a relevant subpopulation for the design of preventive interventions aimed at delaying the onset and progression towards problematic substance use.

Keywords: alcohol, tobacco, marijuana, adolescents, impulsivity, risk-taking

Resumen

Son escasos los estudios longitudinales que, en Latinoamérica, describen como las variables de personalidad predicen el consumo de sustancias en adolescentes. Este estudio examinó variaciones en el consumo de alcohol, tabaco y marihuana, a lo largo de tres años, en adolescentes, y analizó como la impulsividad y toma de riesgos (en el Tiempo 1 [T1]) discriminan prospectivamente entre adolescentes con y sin consumo episódico excesivo de alcohol (BD, binge drinking), tabaco y marihuana en el Tiempo 3. Se utilizó un diseño longitudinal. Mil ochenta adolescentes (*M*=12,27 años, *DE*=0,95; 54% chicas) de Córdoba (Argentina) completaron, una vez por año durante tres años, una prueba de toma de riesgos (BART) y una encuesta sobre consumo de sustancias e impulsividad rasgo. El consumo de sustancias aumentó con el tiempo, alcanzando prevalencias de consumo alguna vez en la vida de 85% (alcohol), 18% (tabaco) y 8% (marihuana) en la última medición. El consumo de tabaco fue significativamente mayor en chicas ($p \leq 0,05$) y el de marihuana más alto en chicos ($p \leq 0,01$). Mayores niveles de urgencia negativa (RP = 1,023), falta de premeditación (RP = 1,025), falta de perseverancia (RP = 1,045), búsqueda de sensaciones (RP = 1,036) y toma de riesgos (RP = 1,008) en T1 se asociaron con una mayor prevalencia de BD dos años después. Mayores niveles de falta de perseverancia (RP = 1,033) y búsqueda de sensaciones (RP = 1,029) se asociaron con una mayor prevalencia posterior de consumo de tabaco. Falta de premeditación (RP = 1,057), falta de perseverancia (RP = 1,042), búsqueda de sensaciones (RP = 1,033) y toma de riesgos (RP = 1,019) se asociaron con una mayor prevalencia posterior de consumo de marihuana. Las personas adolescentes con mayores niveles de impulsividad y toma de riesgos constituyen una subpoblación relevante para el diseño de intervenciones preventivas orientadas a retrasar el inicio y progresión hacia comportamientos de uso problemático.

Palabras clave: alcohol, tabaco, marihuana, adolescentes, impulsividad, toma de riesgos

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Alcohol, tobacco, and marijuana use typically begins between the ages of 12 and 17 years. In Spain, by age 14,55% of adolescents had consumed alcohol, 13.8% tobacco, and 9.8% marijuana in the previous year (OEDA, 2024), with similar figures reported in South America and Argentina (SEDRONAR, 2019). During adolescence, compared with adulthood, alcohol use tends to be less frequent but involves larger quantities per drinking occasion (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2017). One underlying reason for this phenomenon is that adolescents are more likely to display a high-risk drinking pattern known as binge drinking (BD). From an epidemiological perspective (Ministerio de Salud de la Nación Argentina, 2025; OEDA, 2024), BD is defined as the consumption of ≥5 standard alcohol units (SAUs). However, international agencies recommend operationalising BD according to sex and age, establishing cut-off points of ≥3 SAUs (42 grams of alcohol) for girls and between ≥3 and 5 SAUs (42 to 70 grams of alcohol) for boys, depending on age (NIAAA, 2017).

Of particular relevance, studies with adolescents have reported that between 26% and 47% (Addolorato et al., 2018; OEDA, 2024; Pilatti et al., 2023; SEDRONAR, 2023; Teixidó-Compañó et al., 2019) engaged in BD during the previous month. BD, as well as tobacco and marijuana use, has been associated with numerous negative outcomes, including increased aggressiveness, fighting, and driving under the influence of substances (Donoghue et al., 2017; OPS, 2021), as well as cognitive deficits (Lees et al., 2020; Meruelo et al., 2017; Smith et al., 2015; Spear, 2018) and a greater likelihood of developing substance use disorders (Walker & Loprinzi, 2014; Waller et al., 2019).

Over the last decade, the gap in alcohol use between boys and girls has narrowed (White, 2020). Illustrating this, a study conducted with adolescents (M age = 15.26 years, SD = 1.26) found very similar prevalence rates of alcohol use among boys and girls during the previous year (75.5% and 76.8%, respectively), as well as BD in the previous month (43.5% and 49.1%, respectively) (Pilatti et al., 2023). Regarding tobacco use, girls even show higher monthly prevalence rates than boys (≈20% vs. ≈15%; Ministerio de Salud de la Nación Argentina, 2020; OEDA, 2024). However, boys tend to initiate smoking earlier, usually in peer contexts, whereas girls more often initiate use in family settings (Okoli et al., 2013). In relation to marijuana, use is more prevalent among boys (18.8% vs. 13.2%), who also display riskier consumption patterns than girls (SEDRONAR, 2017).

Impulsivity and risk-taking tend to increase during adolescence, partly because brain areas associated with the reward system mature earlier than those involved in cognitive control (Shulman et al., 2016). In addition, socialisation processes, peer interaction, and cultural norms, including gender roles, shape the expression of these behaviours (Allen, 2024; Wang et al., 2025). For example, boys are often socialised to take risks and display aggression, whereas girls are more frequently socialised to adopt coping or avoidance responses in risky situations (Hemsing & Greaves, 2020; Man, 2024). Impulsivity and risk-taking, understood as components of the broader disinhibition construct (Reynolds et al., 2013), are associated with a greater likelihood of psychoactive substance use (Caneto et al., 2020; Hanson et al., 2014; LaSpada et al., 2020; Martínez-Loredo et al., 2018).

Impulsivity is the tendency to act rapidly and without planning in response to internal or external stimuli, without adequately considering possible negative consequences (International Society for Research on Impulsivity, 2021). It is a multidimensional construct that includes facets related to sensation seeking, the tendency to act under intense emotions, and difficulties in behavioural planning. Evidence suggests that each facet predicts different indicators (e.g., frequency, quantity, problems) of substance use (Bos et al., 2019; Pilatti et al., 2017; VanderVeen et al., 2016). Likewise, Rømer Thomsen et al. (2018) showed that specific dimensions of impulsivity were differentially associated with problematic alcohol, marijuana, and other substance use.

Risk-taking, which is closely linked to impulsivity, may be understood as the propensity to choose courses of action in which the probability of outcomes is uncertain (Duell et al., 2018) and which may compromise one's own wellbeing or that of others (Hawley, 2011). Some international studies have shown that risk-taking is associated with the use of alcohol (Fernie et al., 2013; MacPherson et al., 2010) and marijuana (Felton et al., 2015; Hanson et al., 2014) in adolescents. In Argentina, a study with adolescents aged 15 to 18 years (Pilatti et al., 2017) found that trait impulsivity was associated with alcohol quantity and BD frequency reported three months later. However, in that study, risk-taking was not significantly associated with any alcohol use indicator. Another study found that peer presence may increase risk-taking, particularly among boys (De Boer et al., 2017).

Most of the studies described above employed cross-sectional designs. In addition, most longitudinal studies have been conducted in the United States (Felton et al., 2015; MacPherson et al., 2010) or Europe (Fernie et al., 2013; Martínez-Loredo et al., 2018), limiting the generalisability of findings to other cultural contexts. In Argentina, for example, moderate alcohol use has a certain degree of social legitimacy, and early drinking experiences often occur within family contexts (Pilatti et al., 2013). It is therefore necessary to examine potential risk factors for early substance use that may be useful for the development of culturally sensitive interventions (Henrich et al., 2010).

The aims of this study, conducted with adolescents, were to: (1) describe indicators of alcohol, tobacco, and

marijuana use across three measurement waves; (2) analyse changes in substance use as a function of time and sex; and (3) examine the prospective association between personality variables (impulsivity and risk-taking) and the prevalence of tobacco use, marijuana use, and BD two years later. To the best of our knowledge, there is limited regional literature on longitudinal monitoring of the use of these substances and the predictive capacity of personality traits. The present study contributes to the early identification of adolescents who may be more vulnerable to initiating or escalating the use of these substances.

Method

Design

A longitudinal panel design was employed (Hernández Sampieri et al., 2014). The design featured three administrations of all instruments to the same participants, separated by approximately 12 months.

Participants

Based on the official list of schools in the city of Córdoba (Argentina), all institutions located within a 10 km² radius of the downtown area were invited (n = 46). Final selection was based on convenience (e.g., having a computer lab) and opportunity (i.e., willingness to participate). Ten privately managed schools took part (13 did not have a computer room and 23 declined participation).

Students attending the final year of primary school (Year 6) and the first two years of secondary school were invited. An informed consent form was sent to parents/legal guardians, and 71% provided permission. In addition, students who agreed to participate provided voluntary assent, with only 1.2% declining participation.

At baseline, the sample comprised 1,080 students aged between 10 and 15 years (M = 12.27, SD = 0.952), with a higher proportion of girls (54%) than boys. In the second year, 973 students aged between 11 and 16 years participated (54.6% girls; M = 13.30, SD = 0.957), and in the third wave, 873 students aged between 12 and 17 years took part (54.4% girls; M = 14.34, SD = 0.974). Supplementary Material presents the age distribution of participants at each of the three waves. The Supplementary Material is available in OSF at https://doi.org/10.17605/OSF.IO/7YHSC

Procedure

This study was part of the MATE project (Marijuana, Alcohol and Tobacco in Schools Study), which examined substance use among adolescents in Córdoba (Argentina). Data collection was conducted in groups of approximately 15 students in each school's computer room. Each year, participants completed the BART and an online survey (LimeSurvey platform). Data were collected over a four-month period (August to November) across three consecutive years (2017–2019). To encourage participation, prizes were raffled each year among students who completed the survey (e.g., thermal mugs, boxes of alfajores [caramel cookies], mates [containers used for a traditional Argentinian beverage]). Study procedures were approved by the Ethics Committee of the Institute for Psychological Research (CEIIPsi), Faculty of Psychology, National University of Córdoba.

Measures

Alcohol Use

Alcohol use was assessed using a questionnaire (Pilatti et al., 2021) that examined the prevalence (0 = no; 1 = yes) of lifetime and last-year alcohol use (≥1 glass). Three additional questions assessed the beverage most frequently consumed: (1) type (e.g., beer, wine), (2) frequency of use during the previous year (ranging from 0 = I have never drunk alcohol/I did not drink during the last 12 months to 12 = four times per week or more), and (3) number of glasses consumed on a single occasion. Based on the alcoholic content of the reported beverage (previously determined using market information), the grams of pure alcohol consumed were calculated. Prevalence and frequency of binge drinking (BD) were measured. BD was defined as the consumption, on a single occasion, of 3 standard alcohol units (SAUs; i.e., 42 grams of alcohol) among girls aged 9 to 17 years. For boys, thresholds varied according to age: 3 SAUs (42 grams of alcohol) for boys aged 9 to 13 years, 4 SAUs (56 grams of alcohol) for those aged 14 and 15 years, and 5 SAUs (70 grams of alcohol) for those aged 16 and 17 years (NIAAA, 2017). Responses regarding alcohol use frequency and BD frequency were converted into quantitative variables (e.g., a response of 1–2 times in the previous year was recoded as 1.5 times). For regression analyses (see Data Analysis section), participants were classified as drinkers with or without BD according to their reported BD prevalence during the previous year at Time 3.

Tobacco Use

Participants were asked about the prevalence (0 = no; 1 = yes) of lifetime and last-year smoking (≥1 whole cigarette). Frequency of tobacco use during the previous year was assessed (from 0 = I have never smoked/I did not smoke during the previous 12 months to 12 = four times per week or more), as well as the number of cigarettes smoked per day. This ordinal variable was transformed into a quantitative variable through response recoding (e.g., 1–2 times in the previous year was recoded as 1.5). For regression analyses, participants were classified as users or non-users according to their reported tobacco use prevalence during the previous year at Time 3.

Marijuana Use

Participants were asked about the prevalence (0 = no; 1 = yes) of lifetime and last-year marijuana use (e.g., "During the previous 12 months, have you used marijuana at least once?"). Frequency of marijuana use during the previous year was also assessed (from 0 = I have never used marijuana/I did not use marijuana during the previous 12 months to 12 = four times per week or more). This ordinal variable was transformed into a quantitative variable through response recoding (e.g., 1–2 times in the previous year was recoded as 1.5). For regression analyses, participants were classified as users or non-users according to their reported marijuana use prevalence during the previous year at Time 3.

UPPS-P Impulsivity Scale for Children and Adolescents.

The Spanish version (UPPS-P NA; Caneto et al., 2020) of the UPPS-P-Child scale (Gunn & Smith, 2010) was used. This instrument consists of 40 items designed to assess five dimensions of impulsivity: Positive Urgency, Negative Urgency, Lack of Perseverance, Lack of Premeditation, and Sensation Seeking. Participants rated the extent, on a 4-point scale (from 1 = not at all like me to 4 = very much like me), to which each item described their behaviour. Responses were summed within each dimension, with higher scores indicating higher levels of impulsivity. The original version (α = .65 to α = .89; Gunn & Smith, 2010), the Spanish adaptation (α = .73 to α = .89; Caneto et al., 2020), and the present study (α = .69 to α = .90) all showed acceptable reliability values for the population under study.

Balloon Analogue Risk Task (BART).

The Balloon Analogue Risk Task (BART; Lejuez et al., 2003) was used to assess risk-taking propensity. The task is computer-based and consists of 30 trials in which participants inflate a balloon by clicking the mouse. Five points are earned for each pump; however, each balloon has a variable and unknown explosion point. Each trial ends when the participant decides to bank the accumulated points or when the balloon explodes, resulting in the loss of points earned during that trial. The principal dependent measure was the adjusted average number of pumps (i.e., the mean number of pumps on balloons that did not explode), with higher scores indicating greater risk-taking propensity. The task was administered using The Psychology Experiment Building Language Test Battery software (Mueller & Piper, 2014).

Data Analysis

Descriptive analyses of alcohol, tobacco, and marijuana use were conducted for each of the three waves, separately for the total sample and by sex. Specifically, lifetime and last-year prevalence (nominal variables) of use of the three substances were calculated, as well as means and standard deviations describing frequency and quantity (quantitative variables) of use for each substance (quantity of marijuana use was not assessed). To determine changes in lifetime and annual prevalence of alcohol, tobacco, and marijuana use across the three waves, differences in proportions for these nominal variables were examined. To analyse sex differences and changes over time in quantity (alcohol and tobacco) and frequency (alcohol, tobacco, and marijuana) of use, repeated-measures ANOVAs were conducted. Sex (boys, girls) was included as a between-subjects factor, and time (Time 1 [T1], Time 2 [T2], and Time 3 [T3]) as a within-subjects repeated-measures factor. ANOVAs showing significant main effects or significant interactions were followed by Tukey post hoc tests to identify the locus of these effects. Effect size was reported using partial eta squared (η^2p).

To examine the association between trait impulsivity dimensions and risk-taking measured at T1 (independent quantitative variables) and the prevalence of BD/tobacco/marijuana use during the previous year at T3 (dichotomous nominal dependent variable [yes/no]), Poisson regression models with a log link function and robust variance estimation were used. This approach allows estimation of prevalence ratios (PRs) rather than odds ratios, which is more appropriate in studies where event prevalence is not low, as odds ratios tend to diverge from the real effect in terms of prevalence and usually overestimate the magnitude of association (Espelt et al., 2017; Espelt et al., 2019). Specifically, trait impulsivity dimensions and risk-taking measured at T1 were entered as independent variables, and consumption status (use vs. no use) at T3 was entered as the dependent variable. The analysis identified which variables were significantly associated with prevalence of use, and PRs together with their 95% confidence intervals (CIs) were estimated. Overall model fit was evaluated using the likelihood ratio chi-square test, where a significant value indicates that the model with predictors provides better fit than the null model. The deviance ratio and Pearson chi-square statistic relative to their degrees of freedom were also examined as indicators of overdispersion. Values close to 1 were considered indicative of adequate fit, whereas values above 1 suggested overdispersion (Hardin & Hilbe, 2018).

Regressions with BD (yes/no) as the dependent variable were conducted using the full sample. For tobacco and marijuana regressions, given the low prevalence of use at T3 (16% and 8% of the total sample, respectively), random subsamples of non-users were generated to balance the number of cases between comparison groups (users vs. non-users). The tobacco regression subsample comprised 296 participants (47.2% had used tobacco during the previous year), whereas the marijuana regression subsample comprised 111 participants (49.3% had used

marijuana during the previous year). It should be noted that participants who had already reported substance use behaviours at T1 were not excluded, as the aim was to analyse the discriminative capacity of personality variables regardless of initial level of use. Likewise, T1 and T3 were compared in order to evaluate the predictive value of personality traits for substance use over a broader longitudinal period. Repeated-measures ANOVAs were conducted using STATISTICA version 10, and all remaining analyses were performed using SPSS version 23.

Results

Descriptive Results and Group Differences

Lifetime and Last-Year Prevalence of Alcohol, Tobacco, and Marijuana Use Across Assessment Waves

Table 1 presents indicators of lifetime and last-year prevalence of alcohol, BD, tobacco, and marijuana use, as well as annual frequency of use, across the three assessment waves. The table also reports the quantity of alcohol consumed per occasion (expressed in grams) and the number of tobacco cigarettes smoked per day. Alcohol was the most commonly used substance at the beginning of the study (T1), alcohol was the most commonly used substance (66%), followed by markedly lower rates of tobacco (8.3%) and marijuana use (1.5%).

At T1, more than two thirds of adolescents reported having consumed alcohol at least in their lifetime. This percentage increased significantly to 73% at T2 ($p \leq .01$) and to 85% at T3 ($p \leq .001$). Last-year alcohol use prevalence was 42% at T1 and also showed a significant increase over time: 56% at T2 ($p \leq .001$) and 69% at T3 ($p \leq .001$). Among those reporting alcohol use during the previous year, lifetime prevalence of BD was 19% at T1, increasing to 31% at T2 ($p \leq .01$) and to 40% at T3 ($p \leq .05$). Similarly, the percentage of participants reporting BD during the previous year increased significantly, rising from 16% at T1 to 29% at T2 ($p \leq .01$) and to 38% at T3 ($p \leq .05$).

Eight percent of the sample reported lifetime tobacco use at T1, increasing to 14% at T2 and 18% at T3. Although a higher percentage of participants reported tobacco use over time in descriptive terms, these changes

Table 1
Descriptive statistics for alcohol, tobacco, and marijuana use across the three waves for the total sample and by sex

	Time 1 (*n*= 1080; *M age*= 12.27; SD= 0.95)			Time 2 (*n*= 973; *M age*= 13,29; SD= 0,95)			Time 3 (*n*= 873; *M age*= 14,33; SD= 0,96)		
	% total (*n*) *M* (*SD*)*	Boys	Girls	% total (*n*) *M* (*SD*)*	Boys	Girls	% total (*n*) *M* (*SD*)*	Boys	Girls
Alcohol									
Lifetime	66.4 (717)	67.9	65.1	73.1 (711)	71.9	74.2	84.9 (741)	83.2	86.3
Last year	41.5 (448)	41.9	41.1	55.8 (542)	54.3	57.1	69.0 (602)	65.3	72
Gr occasion[a]	31.8 (41.4)	30.0 (42.3)	33.3 (40.6)	42.0 (49.3)	41.9 (51.6)	41.9 (47.5)	53.6 (51.9)	54.5 (56.8)	53.0 (47.7)
Freq 12M[a]	16.1 (30.8)	17.9 (35.1)	14.6 (26.5)	18.6 (30.3)	18.8 (32.3)	18.5 (28.6)	19.2 (30.8)	22.1 (35.3)	17.0 (26.7)
BD									
Lifetime	18.6 (201)	18.3	18.8	30.9 (300)	27.8	33.3	40.0 (349)	34.9	44.2
Last year	15.9 (172)	15.1	16.6	28.6 (278)	25.6	31.1	37.9 (331)	31.9	42.9
Freq 12M[a]	8.1 (23.9)	9.5 (28.5)	6.8 (19.2)	11.6 (26.0)	11.5 (27.7)	11.8 (25.0)	13.1 (29.1)	13.7 (31.2)	12.6 (26.9)
Tobacco									
Lifetime	8.3 (89)	7.9	8.6	13.8 (134)	12	15.3	18.3 (160)	13.1	22.7
Last year	5.9 (64)	5.8	6	12.7 (123)	10.4	14.5	16.3 (142)	11.8	20
Cig. Per day[a]	3.6 (6.1)	4.8 (8.7)	2.7 (2.4)	4.9 (6.7)	4.4 (6.7)	5.3 (6.7)	3.9 (5.4)	3.9 (6.3)	3.9 (4.9)
Freq 12M[a]	40.7 (59.7)	50.2	32.7 (48.6)	39.6 (59.6)	31.2 (54.8)	44.6 (62.1)	43.8 (59.2)	39.1 (53.7)	46.1 (61.8)
Marijuana									
Lifetime	1.5 (16)	2.2	0.9	3.2 (31)	4.1	2.4	8.1 (71)	8.5	7.8
Last year	1.0 (11)	1.4	0.7	2.9 (28)	3.4	2.4	7.6 (66)	7.6	7.6
Freq 12M[a]	16.9 (29.5)	22.6 (36.5)	7 (5.8)	38.8 (66.9)	60.9 (83.2)	13.3 (26.6)	20.2 (40.4)	30.2 (54.5)	11.8 (20.3)

Note. *Depending on the level of measurement, values are expressed as absolute frequency (n), relative frequency (%) or mean (standard deviation). Lifetime = lifetime prevalence of use; Last year = prevalence of use during the previous year; Grams per occasion = grams of alcohol consumed per drinking occasion; Freq 12M = frequency during the previous 12 months; BD = binge drinking; Cig. per day = number of cigarettes smoked per day. [a]Calculated among participants who reported use of the substance.

were not statistically significant. The same pattern was observed for past-year tobacco use prevalence. Marijuana use prevalence was markedly lower than that observed for alcohol and tobacco. Specifically, lifetime prevalence was 1.5% at the first assessment, 3.2% at the second, and 8.1% at T3. Past-year marijuana use prevalence did not show a significant increase across assessment waves. Descriptive analyses for each variable by age group, at each of the three time points, are presented in section Supplementary Material of this manuscript.

Quantity and Frequency of Alcohol, Tobacco, and Marijuana Use by Sex and Across Time

The ANOVA for quantity of alcohol consumed per occasion revealed a significant main effect of Time, ($F_{2, 1708}$ = 151.7, $p \leq .001$, $\eta^2p = .15$). Post hoc analyses indicated that all three time points differed significantly from one another, showing increased consumption over time.

A significant main effect of Time was found for frequency of alcohol use during the previous year, ($F_{(2, 1712)}$ = 6.03, $p \leq .01$, $\eta^2p = .01$). However, post hoc analyses indicated no statistically significant difference between measurement waves.

For BD frequency during the previous year, a significant main effect of Time was observed, ($F_{(2, 1712)} = 9.81, p \leq .001$, $\eta^2p = .01$). According to post hoc analyses, BD frequency increased significantly across each of the three waves.

Regarding tobacco use, the ANOVA for number of cigarettes smoked per day showed a significant main effect of Time, ($F_{(2, 1698)}$ = 12.74, $p \leq .001$, $\eta^2p = .01$), with the value recorded at T1 being significantly lower than at T2 and T3.

The ANOVA for tobacco use frequency during the previous year showed significant main effects of Sex, ($F_{(1, 854)}$ = 5.01, $p \leq .05$, $\eta^2p = .01$), and Time, ($F_{(2, 1708)}$ = 20.47, $p \leq .001$, $\eta^2p = .02$). Tobacco use frequency was significantly higher among girls than boys and increased across measurement waves.

The ANOVA for marijuana use frequency revealed significant main effects of Sex ($F_{(1, 855)}$ = 7.16, $p \leq .01$, η^2p = .01), and Time, ($F_{(2, 1710)}$ = 12.69, $p \leq .001$, $\eta^2p = .01$). Marijuana use frequency was significantly higher among boys than girls. In addition, there was a significant increase from T1 to T3, whereas marijuana use frequency at T2 was statistically similar to both T1 and T3.

Poisson Regression with Log Link Function and Robust Variance

Adolescents With and Without Past-Year Binge Drinking

The Poisson regression model showed adequate fit to the data (χ^2 = 47.98, $p < .001$). The deviance/degrees of freedom ratio (0.684) and the Pearson chi-square/degrees of freedom statistic (0.608) indicated adequate model fit, with no evidence of overdispersion. Among the variables included, higher scores at T1 on Negative Urgency (PR = 1.023), Lack of Premeditation (PR = 1.025), Lack of Perseverance (PR = 1.045), Sensation Seeking (PR = 1.036), and risk-taking (PR = 1.008) were significantly associated with higher prevalence of BD at T3 (see Table 2).

Adolescents With and Without Past-Year Tobacco Use

The Poisson regression model showed adequate fit to the data (χ^2 = 15.10, $p < .05$). The deviance/degrees of freedom ratio (0.675) and the Pearson chi-square/degrees of freedom statistic (0.538) indicated satisfactory model fit, with no evidence of overdispersion. Among the included variables, higher T1 scores on Lack of Perseverance (PR = 1.033) and Sensation Seeking (PR = 1.029) were

Table 2

Prevalence ratios comparing adolescents with and without substance use for the variables binge drinking, tobacco use, and marijuana use

	RP	CI 95%	
		Lower	Upper
Binge Drinking			
Trait impulsivity			
NEG URG	**1.023**	**1.003**	**1.043**
LACK PREM	**1.025**	**1.001**	**1.048**
LACK PERS	**1.045**	**1.023**	**1.069**
SENS SEEK	**1.036**	**1.017**	**1.055**
POS URG	1.003	0.984	1.022
Risk-taking	**1.008**	**1.001**	**1.014**
Tobacco			
Trait impulsivity			
NEG URG	1.019	0.993	1.047
LACK PREM	1.019	0.988	1.052
LACK PERS	**1.033**	**1.003**	**1.064**
SENS SEEK	**1.029**	**1.003**	**1.057**
POS URG	1.012	0.986	1.039
Risk-taking	1.002	0.993	1.011
Marijuana			
Trait impulsivity			
NEG URG	1.010	0.972	1.049
LACK PREM	**1.057**	**1.011**	**1.105**
LACK PERS	**1.042**	**1.007**	**1.079**
SENS SEEK	**1.033**	**1.001**	**1.066**
POS URG	1.000	0.967	1.035
Risk-taking	**1.019**	**1.009**	**1.030**

Note. PR = prevalence ratio; CI = confidence interval; NEG URG = Negative Urgency; LACK PREM = Lack of Premeditation; LACK PERS = Lack of Perseverance; SENS SEEK = Sensation Seeking; POS URG = Positive Urgency. Statistically significant results at $p \leq .05$ are shown in **bold**.

significantly associated with higher prevalence of tobacco use at T3 (see Table 2).

Adolescents With and Without Past-Year Marijuana Use

The Poisson regression model showed adequate fit to the data ($\chi^2 = 17.45$, $p < .01$). The deviance/degrees of freedom ratio (0.599) and the Pearson chi-square/degrees of freedom statistic (0.513) indicated satisfactory model fit, with no evidence of overdispersion. Of all variables included, higher T1 scores on Lack of Premeditation (PR = 1.057), Lack of Perseverance (PR = 1.042), Sensation Seeking (PR = 1.033), and risk-taking (PR = 1.019) were significantly associated with higher prevalence of marijuana use at T3 (see Table 2). In other words, higher baseline levels of these impulsivity dimensions and risk-taking were associated with a greater likelihood of marijuana use at the end of follow-up.

Discussion

One of the aims of this longitudinal study was to describe and examine changes in alcohol, tobacco, and marijuana use among adolescents (aged 10 to 15 years at baseline) across three annual assessment waves. Of particular relevance, we found that two thirds (66%) of the sample (M age = 12 years) had already had contact with alcohol at the beginning of the study, increasing to 85% at the third assessment. These percentages are even higher than those reported in national (SEDRONAR, 2017) and international surveys (OEDA, 2024), in which between 46% and 58% of adolescents aged 12 to 14 years and between 79% and 81% of those aged 15 to 16 years had consumed alcohol at least once in their lifetime. Notably, average alcohol consumption (among those who drank) increased from 31.8 grams per occasion (equivalent to two glasses of beer) at baseline to 53.6 grams (equivalent to four glasses of beer, corresponding to BD) at T3. Likewise, average drinking frequency increased by three days per year, rising from 16 to 19 drinking days annually.

The percentage of adolescents reporting lifetime tobacco and marijuana use increased from 8.3% and 1.5%, respectively, at baseline to 18.3% and 8.1% at T3. These values are markedly lower than those reported by the Argentine Observatory on Drugs (SEDRONAR, 2019), where 20.6% and 5.7% of adolescents aged up to 14 years reported tobacco and marijuana use, respectively, whereas those aged 15 to 16 years showed prevalence rates of 41.2% and 18.7%. A noteworthy finding of our study concerns the frequency of use of these substances. Tobacco use increased from three times per month at the first assessment to almost once per week at T3, whereas marijuana use increased from once per month to twice per month at the final assessment.

The increase in substance use observed across waves likely reflects developmental changes associated with age. In this regard, the transition from preadolescence to middle adolescence constitutes a critical period for the initiation and escalation of substance use (Spear, 2018). Several studies have shown that both prevalence and frequency of use increase with age (Aiken et al., 2018; Johnston et al., 2021; Pilatti et al., 2023). It is worth highlighting that one of the main contributions of this study is the longitudinal documentation of these changes in a cohort of Argentine adolescents. Specifically, the study contributes to understanding factors that may promote escalation of use during this developmental stage.

When analysing substance use according to sex, the findings are consistent with national (Ministerio de Salud de la Nación Argentina, 2020; Pilatti et al., 2023; SEDRONAR, 2017) and international studies (Johnston et al., 2021; OEDA, 2024; OPS, 2021; White, 2020). Specifically, alcohol use behaviours were similar among boys and girls over time, whereas tobacco use was higher among girls and marijuana use was higher among boys across waves. Some studies have reported that, compared with boys who smoke, girls who smoke experience stronger psychological effects during abstinence (Faulkner et al., 2018), are more likely to relapse under stress (Xu et al., 2008), and show greater difficulty maintaining long-term abstinence (Smith et al., 2016).

Another aim was to examine the prospective association between personality variables (impulsivity and risk-taking) and prevalence of substance use two years later. Regarding alcohol, all dimensions of trait impulsivity except Positive Urgency, as well as risk-taking, were associated with greater prevalence of BD. These findings partially coincide with longitudinal studies from other countries. For example, studies in samples of US adolescents have shown that impulsivity in general (Farley & Kim-Spoon, 2015), urgency traits (Riley et al., 2016), Lack of Premeditation, and Sensation Seeking (Ellingson et al., 2019) were associated with greater subsequent alcohol use frequency. In Spain, Fernández-Artamendi et al. (2018) found that higher levels of impulsivity and Sensation Seeking predicted greater frequency of intoxication episodes and alcohol-related problems in adolescents (M age = 13.02 years, SD = 5.07). In Argentina, Pilatti et al. (2017) found that only Positive and Negative Urgency were associated with later alcohol use (typical use and BD), although that study included only two waves separated by three months. In general, studies examining alcohol use and risk-taking (using the BART) have not reported significant associations or effects of alcohol use on subsequent risk-taking (see review by Canning et al., 2022). In this sense, a novel finding of the present study concerns the role of risk-taking in involvement in problematic drinking patterns such as BD.

Regarding tobacco use, adolescents who showed a greater tendency to seek novel sensations (Sensation Seeking) and greater difficulty persisting with long and boring tasks (Lack of Perseverance) displayed higher prevalence of tobacco use two years later. Consistent with our findings, several international studies have shown that higher levels of impulsivity in adolescents distinguish between those with and without tobacco use (Fields et al., 2009; Reynolds et al., 2007; Weckler et al., 2017), as well as predicting later tobacco use (Farley & Kim-Spoon, 2015; Malmberg et al., 2013). Moreover, a meta-analysis (Bos et al., 2019) found that all UPPS-P dimensions were positively associated with tobacco use in adolescents, although Sensation Seeking was the most strongly associated dimension (r = .20), consistent with the present findings. Another study (Zhao et al., 2019) found that Sensation Seeking positively predicted tobacco as well as alcohol use in adolescents aged 11 to 16 years.

In turn, a greater tendency to act without considering consequences (Lack of Premeditation), greater tendency to seek novel sensations (Sensation Seeking), greater difficulty persisting with long and boring tasks (Lack of Perseverance), and higher risk-taking were associated with greater prevalence of marijuana use two years later. These findings are consistent with a meta-analysis in adolescent populations showing associations between trait impulsivity dimensions and marijuana use, as well as related problems (VanderVeen et al., 2016). Likewise, previous studies have found that risk-taking distinguishes between individuals with and without marijuana use, being higher among users (Hanson et al., 2014), and predicts increases in use over time (Felton et al., 2015). It has also been reported that greater risk-taking is associated with lower likelihood of discontinuing use during youth (LaSpada et al., 2020). According to LaSpada et al., difficulties in processing risks associated with behaviour may contribute to greater subsequent use, as the ability to consider long-term consequences may be diminished. This is in line with our findings, as greater difficulty considering consequences (Lack of Premeditation) was also associated with higher prevalence of marijuana use.

This study has several limitations. Although all schools located within the predefined geographical radius were invited to participate, schools were not selected through a random procedure but through self-selection, and public schools were not included. These factors limit sample representativeness. Although the study included a large sample and adequate sex representation, findings should be interpreted with caution, as the observed prevalence rates and associations may reflect a specific socioeconomic profile, limiting generalisability, particularly to adolescents attending schools with fewer resources. In addition, trait impulsivity and substance use were assessed through self-report measures, which depend on participants' ability to accurately evaluate their own personality traits and may lead to imprecise estimates of use because of recall bias. Another limitation is that the number of participants reporting substance use (especially tobacco and marijuana) prevented multivariate analyses stratified by sex. Future studies should aim to obtain even larger samples allowing differential analyses by sex. Furthermore, other variables that may have influenced substance use behaviours were not considered. For example, social norms (Pilatti et al., 2021) or expectancies regarding substance use (Smit et al., 2018) may have acted as mediating variables in the relationship between personality factors and substance use (Paternó Manavella et al., 2022; Pearson & Hustad, 2014). Future studies should integrate these variables. Finally, the definition of a standard alcohol unit shows some geographical variability. For example, in Spain it is equivalent to 10 grams of alcohol (Valencia Martín et al., 2014), whereas in Argentina it usually corresponds to approximately 14 grams (Ministerio de Salud de la Nación Argentina, 2025). These differences represent a limitation when comparing prevalence rates across countries.

Despite these limitations, the present study provides evidence regarding the prevalence of alcohol, tobacco, and marijuana use, and their variation across three years, in a large sample of adolescents with a low attrition rate (≤20%). The findings suggest a specific personality profile associated with prevalence of each substance assessed. This is particularly important because impulsivity, as well as the propensity to engage in risky behaviours, shows its greatest increase during this developmental stage (Bava & Tapert, 2010; Collado et al., 2014). Adolescents with self-control difficulties may be more vulnerable to becoming involved in substance use behaviours and may therefore represent a relevant subpopulation for the design of early interventions aimed at delaying progression towards problematic patterns of use.

In this regard, our findings suggest as potential intervention pathways those strategies aimed at strengthening self-control and promoting engagement in exciting yet healthy activities (Hampson et al., 2013). Interventions specifically designed to prevent marijuana and/or alcohol use could focus on the development of self-control skills, emotional regulation (Modecki et al., 2017), and mindfulness (Lokita et al., 2021). However, it is important to consider that current prevention models advocate multicomponent approaches integrating individual variables, interpersonal relationships, and educational environments (Liu et al., 2023; Tinner et al., 2022). In this sense, incorporating assessment of specific impulsivity dimensions and risk-taking in school and primary care contexts may be highly relevant in order to identify vulnerable profiles early and implement preventive interventions. Likewise, the findings of the present study should be interpreted both as a contribution and as a starting point for future research integrating additional

contextual variables, thereby facilitating the development of comprehensive prevention programmes.

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Conflict of Interest

The authors declare that they have no conflicts of interest.

Supplementary Material

Supplementary Material of this manuscript is openly available in OSF at https://doi.org/10.17605/OSF.IO/7YHSC

Author Contributions

Gabriela Rivarola Montejano, Angelina Pilatti, and Ricardo Pautassi conceived the study and contributed to its design. Rivarola Montejano collected the data, and Pilatti and Pautassi supervised data collection. Rivarola Montejano, Pilatti, and Pautassi conducted the statistical analyses. Rivarola Montejano drafted the first version of the manuscript. Pilatti and Pautassi critically reviewed, edited, and approved the final version of the manuscript.

References

Addolorato, G., Vassallo, G. A., Antonelli, G., Antonelli, M., Tarli, C., Mirijello, A., Agyei-Nkansah, A., Mentella, M. C., Ferrarese, D., Mora, V., Barbàra, M., Maida, M., Cammà, C., Gasbarrini, A., & Alcohol Related Disease Consortium* (2018). Binge Drinking among adolescents is related to the development of Alcohol Use Disorders: results from a Cross-Sectional Study. *Scientific Reports*, *8*(1), 12624. https://doi.org/10.1038/s41598-018-29311-y

Aiken, A., Clare, P. J., Wadolowski, M., Hutchinson, D., Najman, J. M., Slade, T., Bruno, R., McBride, N., Kypri, K., & Mattick, R. P. (2018). Age of alcohol initiation and progression to binge drinking in adolescence: a prospective cohort study. *Alcoholism: Clinical and Experimental Research*, *42*(1), 100-110. https://doi.org/ 10.1111/acer.13525

Allen, J. P. (2024). Rethinking peer influence and risk taking: A strengths-based approach to adolescence in a new era. *Development and Psychopathology*, *36*(5), 2244–2255. https://doi.org/10.1017/S0954579424000877

Bava, S., & Tapert, S. F. (2010). Adolescent brain development and the risk for alcohol and other drug problems. *Neuropsychology Review*, *20*(4), 398-413. https://doi.org/10.1007/s11065-010-9146-6

Bos, J., Hayden, M. J., Lum, J. A., & Staiger, P. K. (2019). UPPS-P impulsive personality traits and adolescent cigarette smoking: A meta-analysis. *Drug and Alcohol Dependence*, *197*, 335-343. https://doi.org/10.1016/j.drugalcdep.2019.01.018

Caneto, F., Pilatti, A., Cupani, M., & Pautassi, R. (2020). Validación de la versión breve en español de la escala UPPS-P de impulsividad para niños y adolescentes (BUPPS-P NA). *Revista de Psicopatología y Psicología Clínica*, *25*(3), 175-185. https://doi.org/10.5944/rppc.26249

Canning, J. R., Schallert, M. R., & Larimer, M. E. (2022). A Systematic Review of the Balloon Analogue Risk Task (BART) in Alcohol Research. *Alcohol and Alcoholism*, *57*(1), 85-103. https://doi.org/10.1093/alcalc/agab004

Collado, A., Felton, J. W., MacPherson, L., & Lejuez, C. W. (2014). Longitudinal trajectories of sensation seeking, risk taking propensity, and impulsivity across early to middle adolescence. *Addictive Behaviors*, *39*(11), 1580-1588. https://doi.org/10.1016/j.addbeh.2014.01.024

Crane, N. A., Schuster, R. M., Fusar-Poli, P., & Gonzalez, R. (2013). Effects of cannabis on neurocognitive functioning: recent advances, neurodevelopmental influences, and sex differences. *Neuropsychology Review*, *23*(2), 117-137. https://doi.org/10.1007/s11065-012-9222-1

De Boer, A., Peeters, M., & Koning, I. (2017). An experimental study of risk taking behavior among adolescents: A closer look at peer and sex influences. *The Journal of Early Adolescence*, *37*(8), 1125-1141. https://doi.org/10.1177/0272431616648453

Donoghue, K., Rose, H., Boniface, S., Deluca, P., Coulton, S., Alam, M. F., Gilvarry, E., Kaner, E., Lynch, E., Maconochie, I., McArdle, P., McGovern, R., Newbury-Birch, D., Patton, R., Phillips, C., Phillips, T., Russell, I., Strang, J., & Drummond, C. (2017). Alcohol consumption, early-onset drinking, and health-related consequences in adolescents presenting at emergency departments in England. *Journal of Adolescent Health*, *60*(4), 438-446. https://doi.org/10.1016/j.jadohealth.2016.11.017

Duell, N., Steinberg, L., Icenogle, G., Chein, J., Chaudhary, N., Di Giunta, L., Dodge, K., Fanti, K., Lansford, J., Oburu, P., Pastorelli, C., Skinner, A., Sorbring, E., Tapanya, S., Uribe Tirado, L., Peña Alampay, L., Al-Hassan, S., Takash, H., Bacchini, D., & Chang, L. (2018). Age patterns in risk taking across the world. *Journal of Youth and Adolescence*, *47*(5), 1052-1072. https://doi.org/10.1007/s10964-017-0752-y

Ellingson, J. M., Corley, R., Hewitt, J. K., & Friedman, N. P. (2019). A prospective study of alcohol involvement and the dual-systems model of adolescent risk-taking during late adolescence and emerging adulthood. *Addiction*, *114*(4), 653-661. https://doi.org/10.1111/add.14489

Espelt, A., Bosque-Prous, M., & Marí Dell'Olmo, M. (2019). Reflexiones sobre el uso de la Odds Ratio o la Razón de Prevalencias o Proporciones. *Adicciones*, *31*(4), 257-259, https://doi.org/10.20882/adicciones.1416

Espelt, A., Marí-Dell'Olmo, M., Penelo, E., & Bosque-Prous, M. (2017). Estimación de la Razón de Prevalencia con distintos modelos de Regresión: Ejemplo de un estudio internacional en investigación de las adicciones. *Adicciones*, *29*(2), 105-112. http://dx.doi.org/10.20882/adicciones.823

Fields, S., Collins, C., Leraas, K., & Reynolds, B. (2009). Dimensions of impulsive behavior in adolescent smokers and nonsmokers. *Experimental and Clinical Psychopharmacology*, *17*(5), 302–311. https://doi.org/10.1037/a0017185

Farley, J., & Kim-Spoon, J. (2015). Longitudinal Associations among Impulsivity, Friend Substance Use, and Adolescent Substance Use. *Journal of Addiction Research & Therapy, 6*(2), 1-14. https://doi.org/10.4172/2155-6105.1000220

Faulkner, P., Petersen, N., Ghahremani, D. G., Cox, C. M., Tyndale, R. F., Hellemann, G. S., & London, E. D. (2018). Sex differences in tobacco withdrawal and responses to smoking reduced-nicotine cigarettes in young smokers. *Psychopharmacology, 235*(1), 193-202. https://doi.org/10.1007/s00213-017-4755-x

Felton, J. W., Collado, A., Shadur, J. M., Lejuez, C. W., & MacPherson, L. (2015). Sex differences in self-report and behavioral measures of disinhibition predicting marijuana use across adolescence. *Experimental and Clinical Psychopharmacology*, *23*(4), 265–274. https://doi.org/10.1037/pha0000031

Fernández-Artamendi, S., Martínez-Loredo, V., Grande-Gosende, A., Simpson, I. C., & Fernández-Hermida, J. R. (2018). What predicts what? Self-reported and behavioral impulsivity and high-risk patterns of alcohol use in Spanish early adolescents: A 2-year longitudinal study. *Alcoholism: Clinical and Experimental Research*, *42*(10), 2022-2032. https://doi.org/10.1111/acer.13852

Fernie, G., Peeters, M., Gullo, M. J., Christiansen, P., Cole, J. C., Sumnall, H., & Field, M. (2013). Multiple behavioural impulsivity tasks predict prospective alcohol involvement in adolescents. *Addiction*, *108*(11), 1916-1923. https://doi.org/10.1111/add.12283

Gunn, R., & Smith, G. (2010). Risk factors for elementary school drinking: Pubertal status, personality, and alcohol expectancies concurrently predict fifth grade alcohol consumption. *Psychology of Addictive Behaviors, 24*(4), 617-627. https://doi.org/10.1037/a0020334

Hampson, S. E., Tildesley, E., Andrews, J. A., Barckley, M., & Peterson, M. (2013). Smoking trajectories across high school: sensation seeking and Hookah use. *Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco*, *15*(8), 1400–1408. https://doi.org/10.1093/ntr/nts338

Hanson, K. L., Thayer, R. E., & Tapert, S. F. (2014). Adolescent marijuana users have elevated risk-taking on the balloon analog risk task. *Journal of Psychopharmacology*, *28*(11), 1080-1087. https://doi.org/10.1177/0269881114550352

Hardin, J. W. & Hilbe, J. M. (2018). *Generalized linear models and extensions* (4ta ed.). STATA Press.

Harrison, J. D., Young, J. M., Butow, P., Salkeld, G., & Solomon, M. J. (2005). Is it worth the risk? A systematic review of instruments that measure risk propensity for use in the health setting. *Social Science & Medicine, 60*(6), 1385–1396. https://doi.org/10.1016/j.socscimed.2004.07.006

Hawley, P. H. (2011). The evolution of adolescence and the adolescence of evolution: The coming of age of humans and the theory about the forces that made them. *Journal of Research on Adolescence*, *21*(1), 307-316. https://doi.org/10.1111/j.1532-7795.2010.00732.x

Hemsing, N., & Greaves, L. (2020). Gender norms, roles and relations and cannabis-use patterns: A scoping review. *International Journal of Environmental Research and Public Health, 17*(3), 947. https://doi.org/10.3390/ijerph17030947

Henrich, J., Heine, S. J., & Norenzayan, A. (2010). Most people are not WEIRD. *Nature*, *466*(7302), 29-29. https://doi.org/10.1038/466029a

Hernández Sampieri, R., Fernández Collado, C., & Baptista Lucio, P. (2014). *Metodología de la investigación* (6.ª ed.). McGraw-Hill.

Honorable Congreso de la Nación Argentina (2000). *Ley 25326: Protección de datos personales*. https://www.argentina.gob.ar/normativa/nacional/ley-25326-64790

International Society for Research on Impulsivity (2021). *What is impulsivity?* https://www.impulsivity.org/

Johnston, L. D., Miech, R. A., O'Malley, P. M., Bachman, J. G., Schulenberg, J. E., & Patrick, M. E. (2021). *Monitoring the Future National Survey Results on Drug Use, 1975-2020: Overview, Key Findings on Adolescent Drug Use*. Institute for Social Research, University of Michigan.

LaSpada, N., Delker, E., East, P., Blanco, E., Delva, J., Burrows, R., Lozoff, B., & Gahagan, S. (2020). Risk taking, sensation seeking and personality as related to changes in substance use from adolescence to young adulthood. *Journal of Adolescence*, *82*(1), 23-31. https://doi.org/10.1016/j.adolescence.2020.04.011

Lees, B., Meredith, L. R., Kirkland, A. E., Bryant, B. E., & Squeglia, L. M. (2020). Effect of alcohol use on the adolescent brain and behavior. *Pharmacology Biochemistry and Behavior*, *192*, 172906. https://doi.org/10.1016/j.pbb.2020.172906

Lejuez, C. W., Aklin, W. M., Jones, H. A., Richards, J. B., Strong, D. R., Kahler, C. W., & Read, J. P. (2003). The Balloon Analogue Risk Task (BART) differentiates smokers and nonsmokers. *Experimental and Clinical Psychopharmacology*, *11*(1), 26-33. https://doi.org/10.1037/1064-1297.11.1.26

Liu, X. Q., Guo, Y. X., & Wang, X. (2023). Delivering substance use prevention interventions for adolescents in educational settings: A scoping review. *World Journal of Psychiatry*, *13*(7), 409–422. https://doi.org/10.5498/wjp.v13.i7.409

Lokita, K., Siahaan, F., & Widyasari, P. (2021). The mediating effect of emotion regulation on the mindfulness and impulsivity of high school students. *Psikohumaniora: Jurnal Penelitian Psikologi*, *6*(2), 199-214. https://doi.org/10.21580/pjpp.v6i2.8953

Lynam, D. R., Smith, G. T., Whiteside, S. P., & Cyders, M. A. (2006). *The UPPS–P: Assessing five personality pathways to impulsive behavior (Tech. Rep.)*. Purdue University.

MacPherson, L., Magidson, J. F., Reynolds, E. K., Kahler, C. W., & Lejuez, C. W. (2010). Changes in sensation seeking and risk-taking propensity predict increases in alcohol use among early adolescents. *Alcoholism, Clinical and Experimental Research*, *34*(8), 1400–1408. https://doi.org/10.1111/j.1530-0277.2010.01223.x

Malmberg, M., Kleinjan, M., Overbeek, G., Vermulst, A. A., Lammers, J., & Engels, R. C. (2013). Are there reciprocal relationships between substance use risk personality profiles and alcohol or tobacco use in early adolescence? *Addictive Behaviors*, *38*(12), 2851-2859. https://doi.org/10.1016/j.addbeh.2013.08.003

Man P. K. (2024). Gambling disorder gender analysis: social strain, gender norms, and self-control as risk factors. *Frontiers in Sociology, 9*, 1436066. https://doi.org/10.3389/fsoc.2024.1436066

Martínez-Loredo, V., Fernández-Hermida, J. R., de La Torre-Luque, A., & Fernández-Artamendi, S. (2018). Polydrug use trajectories and differences in impulsivity among adolescents. *International Journal of Clinical and Health Psychology*, *18*(3), 235-244. https://doi.org/10.1016/j.ijchp.2018.07.003

Meruelo, A. D., Castro, N., Cota, C. I., & Tapert, S. F. (2017). Cannabis and alcohol use, and the developing brain. *Behavioural Brain Research*, *325*, 44-50. https://doi.org/10.1016/j.bbr.2017.02.025

Ministerio de Salud de la Nación Argentina. (2025). *Manual para el cuidado de*

personas con enfermedades no transmisibles. Disponible en: https://www.argentina.gob.ar/sites/default/files/manualcuidadoent4_-1-.pdf

Ministerio de Salud de la Nación Argentina (2020). *Encuesta Mundial sobre Tabaco en Jóvenes: Informe final de Argentina, 2018*. Disponible en: https://bancos.salud.gob.ar/sites/default/files/2020-09/encuesta-mundial-sobre-tabaco-en-jovenes-en-argentina-junio-2020.pdf

Modecki, K. L., Zimmer-Gembeck, M. J., & Guerra, N. (2017). Emotion regulation, coping, and decision making: Three linked skills for preventing externalizing problems in adolescence. *Child Development*, *88*(2), 417-426. https://doi.org/10.1111/cdev.12734

Mueller, S., & Piper, B. (2014). The Psychology Experiment Building Language (PEBL) and PEBL test battery. *Journal of Neuroscience Methods*, *222*, 250-259. https://doi.org/10.1016/j.jneumeth.2013.10.024

National Institute on Alcohol Abuse and Alcoholism, NIAAA (2017). Underage drinking. https://pubs.niaaa.nih.gov/publications/underagedrinking/Underage_Fact.pdf

Observatorio Español de las Drogas y las Adicciones, OEDA. (2024). Alcohol, tabaco y drogas ilegales en España. https://pnsd.sanidad.gob.es/profesionales/sistemasInformacion/home.htm

Okoli, C., Greaves, L., & Fagyas, V. (2013). Sex differences in smoking initiation among children and adolescents. *Public Health*, *127*(1), 3-10. https://doi.org/10.1016/j.puhe.2012.09.015

Organización Panamericana de la Salud, OPS. (2021). *Informe sobre la situación del alcohol y la salud en la región de las Américas 2020*. Organización Panamericana de la Salud.

Paternó Manavella, M. A., Rivarola Montejano, G., Michelini, Y., Rodríguez Espínola, S., & Pilatti, A. (2022).

Evaluación del Modelo de Predisposición Adquirida para consumo de alcohol en adolescentes. *Ciencias de la salud*, *20*(3), 1-22.
https://doi.org/10.12804/revistas.urosario.edu.co/revsalud/a.9460

Pearson, M. R., & Hustad, J. T. (2014). Personality and alcohol-related outcomes among mandated college students: Descriptive norms, injunctive norms, and college-related alcohol beliefs as mediators. *Addictive Behaviors*, *39*(5), 879-884. https://doi.org/10.1016/j.addbeh.2014.01.008

Pilatti, A., Fernández, C., Viola, A., García, J. S., & Pautassi, R. M. (2017). Efecto reciproco de impulsividad y consumo de alcohol en adolescentes argentinos. *Salud y Drogas*, *17*(1), 107-121. https://doi.org/10.21134/haaj.v17i1.290

Pilatti, A., Godoy, J. C., Brussino, S., & Pautassi, R. M. (2013). Underage drinking: prevalence and risk factors associated with drinking experiences among Argentinean children. *Alcohol, 47*(4), 323-331. https://doi.org/10.1016/j.alcohol.2013.02.001

Pilatti, A., Kuntsche, E., Acosta, B., Diaz, J., Caneto, F., & Pautassi, R. M. (2023). Perceived Risk and Social Norms Associated with Alcohol, Tobacco, and Marijuana Use in Argentinean Teenagers. *International Journal of Mental Health and Addiction*, *21*, 1782–1798. https://doi.org/10.1007/s11469-021-00689-7

Reynolds, E. K., Collado-Rodriguez, A., MacPherson, L., & Lejuez, C. (2013). Impulsivity, disinhibition, and risk taking in addiction. En P. M. Miller (Ed.), *Comprehensive Addictive Behaviors and Disorders*, (pp.203-212). Academic Press.

Reynolds, B., Patak, M., Shroff, P., Penfold, R. B., Melanko, S., & Duhig, A. M. (2007). Laboratory and self-report assessments of impulsive behavior in adolescent daily smokers and nonsmokers. *Experimental and Clinical Psychopharmacology, 15*(3), 264–271. https://doi.org/10.1037/1064-1297.15.3.264

Riley, E. N., Rukavina, M., & Smith, G. T. (2016). The reciprocal predictive relationship between high-risk personality and drinking: An 8-wave longitudinal study in early adolescents. *Journal of Abnormal Psychology*, *125*(6), 798–804. https://doi.org/10.1037/abn0000189

Rømer Thomsen, K., Callesen, M. B., Hesse, M., Kvamme, T. L., Pedersen, M. M., Pedersen, M. U., & Voon, V. (2018). Impulsivity traits and addiction-related behaviors in youth. *Journal of Behavioral Addictions*, *7*(2), 317-330. https://doi.org/10.1556/2006.7.2018.22

Secretaría de Políticas Integrales sobre Drogas de la Nación Argentina, SEDRONAR. (2017). Análisis de los contextos individuales y sociofamiliares en jóvenes escolarizados y su relación con el consumo de alcohol y marihuana. https://www.argentina.gob.ar/sites/default/files/2018/05/oad_2017._contextos_individuales_y_socio-familiares_en_jovenes_escolarizados_y_la_relacion_con_consumo_de_alcohol_y_marihuana_0.pdf

Secretaría de Políticas Integrales sobre Drogas de la Nación Argentina, SEDRONAR. (2019). Estudio epidemiológico en población de educación secundaria. https://www.argentina.gob.ar/sedronar/investigacion-y-estadisticas/observatorio-argentino-de-drogas/estudios/investigaciones-por-a%C3%B1o/2019

Secretaría de Políticas Integrales sobre Drogas de la Nación Argentina, SEDRONAR. (2023). Principales resultados en relación con el consumo de bebidas alcohólicas. https://www.argentina.gob.ar/sedronar/observatorio-argentino-de-drogas/encuesta-nacional-sobre-consumos-y-practicas-de-cuidado-0

Shulman, E. P., Smith, A. R., Silva, K., Icenogle, G., Duell, N., Chein, J., & Steinberg, L. (2016). The dual systems model: Review, reappraisal, and reaffirmation. *Developmental Cognitive Neuroscience*, *17*, 103-117. https://doi.org/10.1016/j.dcn.2015.12.010

Smit, K., Voogt, C., Hiemstra, M., Kleinjan, M., Otten, R., & Kuntsche, E. (2018). Development of alcohol expectancies and early alcohol use in children and adolescents: A systematic review. *Clinical Psychology Review*, *60*, 136-146. https://doi.org/10.1016/j.cpr.2018.02.002

Smith, P. H., Bessette, A. J., Weinberger, A. H., Sheffer, C. E., & McKee, S. A. (2016). Sex/gender differences in smoking cessation: a review. *Preventive Medicine*, *92*, 135-140. https://doi.org/10.1016/j.ypmed.2016.07.013

Smith, R. F., McDonald, C. G., Bergstrom, H. C., Ehlinger, D. G., & Brielmaier, J. M. (2015). Adolescent nicotine induces persisting changes in development of neural connectivity. *Neuroscience and Biobehavioral Reviews*, *55*, 432–443. https://doi.org/10.1016/j.neubiorev.2015.05.019

Spear, L. P. (2018). Effects of adolescent alcohol consumption on the brain and behaviour. *Nature Reviews Neuroscience*, *19*(4), 197-214. https://doi.org/10.1038/nrn.2018.10

Teixidó-Compañó, E., Sordo, L., Bosque-Prous, M., Puigcorbé, S., Barrio, G., Brugal, M. T., Belza, M. J., & Espelt, A. (2019). Factores individuales y contextuales relacionados con el binge drinking en adolescentes españoles: Un enfoque multinivel. *Adicciones*, *31*(1), 41-51. https://doi.org/10.20882/adicciones.975

Tinner, L., Palmer, J. C., Lloyd, E. C., Caldwell, D. M., MacArthur, G. J., Dias, K., Langford, R., Redmore, J., Wittkop, L., Holmes Watkins, S., Hickman, M., & & Campbell, R. (2022). Individual-, family-and school-based interventions to prevent multiple risk behaviours relating to alcohol, tobacco and drug use in young people aged 8-25 years: a systematic review and meta-analysis. *BMC Public Health*, *22*(1), 1111. https://doi.org/10.1186/s12889-022-13072-5

Valencia Martín, J. L., González, M., & Galán, I. (2014). Aspectos metodológicos en la medición del consumo de

alcohol: la importancia de los patrones de consumo. *Revista Española de Salud Pública*, *88*, 433-446. https://doi.org/10.4321/S1135-57272014000400002

VanderVeen, J. D., Hershberger, A. R., & Cyders, M. A. (2016). UPPS-P model impulsivity and marijuana use behaviors in adolescents: A meta-analysis. *Drug and Alcohol Dependence*, *168*, 181–190. https://doi.org/10.1016/j.drugalcdep.2016.09.016

Walker, J. F., & Loprinzi, P. D. (2014). Longitudinal Examination of Predictors of Smoking Cessation in a National Sample of U.S. Adolescent and Young Adult Smokers. *Nicotine & Tobacco Research*, *16*(6), 820-827. https://doi.org/10.1093/ntr/ntu005

Waller, R., Murray, L., Shaw, D. S., Forbes, E. E., & Hyde, L. W. (2019). Accelerated alcohol use across adolescence predicts early adult symptoms of alcohol use disorder via reward-related neural function. *Psychological Medicine*, *49*(4), 675-684. https://doi.org/10.1017/S003329171800137X

Wang, W., Evans, K., & Schweizer, S. (2025). Social and non-social risk-taking in adolescence. *Scientific Reports*, *15*(1), 6880. https://doi.org/10.1038/s41598-025-90050-y

Weckler, H., Kong, G., Larsen, H., Cousijn, J., Wiers, R. W., & Krishnan-Sarin, S. (2017). Impulsivity and approach tendencies towards cigarette stimuli: Implications for cigarette smoking and cessation behaviors among youth. *Experimental and Clinical Psychopharmacology*, *25*(5), 363–372. https://doi.org/10.1037/pha0000139

White, A. M. (2020). Gender Differences in the Epidemiology of Alcohol Use and Related Harms in the United States. *Alcohol Research: Current Reviews*, *40*(2), Artículo 01. https://doi.org/10.35946/arcr.v40.2.01

Xu, J., Azizian, A., Monterosso, J., Domier, C. P., Brody, A. L., London, E. D., & Fong, T. W. (2008). Gender effects on mood and cigarette craving during early abstinence and resumption of smoking. *Nicotine & Tobacco Research*, *10*(11), 1653-1661. https://doi.org/10.1080/14622200802412929

Zhao, W., Xu, F., Ding, W., Song, Y., & Zhao, Q. (2019). The relationship between sensation seeking and tobacco and alcohol use among junior high school students: The regulatory effect of parental psychological control. *Frontiers in Psychology*, *10*, 2022. https://doi.org/10.3389/fpsyg.2019.02022

GUIDELINES FOR AUTHORS

Adicciones is edited by Socidrogalcohol, Spanish Scientific Society for Studies on Alcohol, Alcoholism and Other Drug Dependencies.

Adicciones publishes original articles in the field of addictions, including publications on treatment, prevention, basic and descriptive studies from different disciplines (medicine, psychology, basic research, social research, etc.). All articles are selected after undergoing an anonymous review process carried out by experts in each topic.

Adicciones publishes 4 issues per year in March, June, September and December. The journal includes five types of publications: editorials, original articles, review articles and letters to the editor.

In order to facilitate reading and avoid possible grammatical errors, references in these guidelines to author and authors, reviewer, reviewers, editor, editors, must be understood as referring respectively to author (male or female), authors (male or female), reviewer (male or female), reviewers (male or female), editor (male or female), editors (male or female).

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As a general rule, editorials are brief manuscripts commissioned by the Editorial Committee from authors or research groups of recognized prestige. Their usual and indicative length is approximately 3,000 words and they are published at the beginning of each issue of the journal.

The main objective of these contributions is to guide, comment on, or reflect upon topics of interest and current relevance for the scientific and professional community. They usually include, concisely, analyses and positions on emerging trends or relevant debates in the field of addictions.

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They will present the update of a topic in a rigorous and exhaustive manner. In general terms, only systematic reviews and meta-analyses will be accepted. These reviews must follow systematized methods (e.g., PRISMA criteria) and be registered in review protocol databases (e.g., PROSPERO).

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